The School District of Philadelphia
Office of Research and Evaluation

EAT.RIGHT.NOW.

FY 2013 Evaluation Report

2013

The School District of Philadelphia

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FY 2013 Evaluation Report

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I. Executive Summary

EAT.RIGHT.NOW. (**ERN**) is The School District of Philadelphia-based nutrition education program of the Pennsylvania Nutrition Education Tracks (PA TRACKS) initiative, which seeks to improve food choices and encourage physical activity among school-age children in the state. The PA TRACKS initiative is funded by the U.S. Department of Agriculture (USDA) Food and Nutrition Service (FNS), with matching state and local support, and is managed by The Pennsylvania State University, College of Health and Human Development, known hereafter as the *Management Entity* (ME). ERN programming is conducted by the School District and its community partners: Drexel University, Health Promotion Council, The Food Trust, Urban Nutrition Initiative, and Albert Einstein. All ERN education is provided to only SNAP-Ed eligible schools.

The purpose of this report is to present the multi-initiative evaluation findings of ERN programming that was conducted in FY 2013, as well as to provide recommendations to inform and strengthen future program delivery. The evaluation, led by The School District of Philadelphia's Office of Research and Evaluation (ORE), sought to assess the effects of the ERN program's evidence-based core curriculum and other practice-based nutrition education curricula on achieving PA TRACKS' goals and objectives.

i. Methodology and Findings

Data collection and analysis for the evaluation projects described within this report were conducted by The School District of Philadelphia (SDP) Office of Research and Evaluation (ORE). A mixed-methods approach was employed, using a range of student and teacher surveys and observations (across the K through 8 continuum). Also, where appropriate, different research designs, including the use of control groups, were employed throughout the different evaluation projects. Evaluation projects included students who received ERN programming in grades 3, 5, 7, and 8, as well as K through 8 teachers. Across all evaluation projects, ORE staff surveyed **over 2,700** students who had received SNAP-Ed programming in The School District of Philadelphia in 2012-2013.

Program Reach and Scope

A total of 228,414 direct nutrition education events were completed by ERN community partners in FY 2013. The amount of direct education varied across community partners, and represents a total decrease of 3.8% from FY 2012. Nutrition education topics ranged from *MyPlate/MyPyramid* as the most taught content objective (21.1% of lessons), to *Skills/Goals* as the least taught content objective overall (0.1% of lessons).

Longitudinal Impact Study: Year 1

A three-year Longitudinal Impact Study was piloted in FY 2013 and will continue through the end of FY 2015. The study's objectives were to determine differences in nutrition and physical activity knowledge and behaviors among students exposed to nutrition-only lessons, physical activity-only lessons, or a combination of both nutrition and physical activity lessons. The study was also designed to evaluate differences in knowledge across

school implementation levels: high, medium, and low. A total of 733 3rd grade students participated in 2012-2013.

Findings demonstrated significant associations between nutrition and physical activity knowledge. Nutrition knowledge scores significantly increased from pre- to post-survey for all students. Nutrition and combination intervention cohorts experienced increases in snack knowledge, while the physical activity-only cohort experienced a decrease. There was a strong, significant association between breakfast knowledge and breakfast eating behaviors. The physical activity-only intervention cohort obtained the highest physical activity knowledge scores, but this knowledge did not translate to a significant association with activity frequency. Among all intervention cohorts, higher total knowledge and physical activity knowledge were significantly associated with decreased screen-time ($p<0.05$). The combination intervention cohort demonstrated the strongest, significant positive correlation between physical activity knowledge and weekly physical activity level ($p<0.001$). School implementation levels did not have a significant effect on changing student knowledge.

Vegetable Core Follow-up and 5th Grade Behaviors

Fifth grade students who participated in the Vegetable Core for FY 2012 were identified and given knowledge and behavior surveys, which included Pennsylvania State University's Vegetable Core Survey; 366 students (62%) of the original sample of 588 students completed a 5th grade follow-up survey. Knowledge scores were fairly well maintained over time, as indicated by a significant difference between mean 4th grade pre-survey knowledge and 5th grade follow-up scores ($p<0.001$). Attitudes and preferences toward vegetables declined from post-intervention to follow-up and although no significant changes in self-efficacy were noted, female students had consistently higher self-efficacy for eating and preparing vegetable snacks than their male counterparts. At 5th grade follow-up, no significant association was found between students' nutrition knowledge and consumption of fruits, vegetables, or dairy, meaning that although a student's nutrition knowledge may have been high, this did not translate to meeting the recommendations for healthy eating. However, eating dinner with the family was strongly associated with higher vegetable preference ($p<0.001$).

Choice, Control, & Change (C3) Curriculum

For the 7th grade component, a total of 354 students (204 intervention and 150 comparison) completed a pre- and post-survey, testing their knowledge on Unit 1 of the *Choice, Control, & Change* curriculum. It is important to note that no significant differences were found between intervention and comparison (those students who did not receive the C3) groups around knowledge of key choice, control, and change concepts, nor knowledge of fruit and vegetable servings, food/activity environment, sugar, and fast food. A significant, positive relationship was found between 7th grade C3 health knowledge score and physical activity frequency, which indicated that the students who have a greater understanding of health concepts were more proactive in health behaviors. This finding is particularly important when educating pre-adolescents as they develop and practice healthy decision making skills and behaviors that will carry into adulthood.

For the 8th grade component, a total of 290 students (146 intervention and 144 comparison) completed a pre- and post-survey, testing their knowledge of Unit 2 of the C3 curriculum. Among 8th grade students who received

the C3 lessons, there was an increase in energy balance knowledge at post-intervention; students who received C3 lessons had slightly greater knowledge, but the difference was not statistically significant.

Assembly Programming

A total of 434 students completed pre- and post-surveys for three nutrition assemblies (124 for *FoodPlay*[1], 127 for *Jump with Jill*[2], and 183 for *Rapping about Prevention*[3]). Surveys were tailored to the content of the three assemblies evaluated. Overall, students' knowledge significantly increased after viewing *Rapping About Prevention* ($p<0.001$). Knowledge did not increase significantly among students who watched the other two assemblies. Of the three assemblies, *Rapping About Prevention* generated the most positive emotional response from students, with more than three quarters of students reporting that they felt "very excited" and "very happy" while watching the performance. More than 50% of teachers reported using the assembly supplemental lessons in their classrooms; this percentage varied by assembly.

ii. Conclusions

The FY 2013 evaluation revealed that ERN programming had positive impacts in some areas, with the greatest effects on nutrition and physical activity knowledge from assembly programs and the Vegetable Core. The evaluation of assembly programming suggested that students and teachers enjoyed watching the assemblies and students learned from the assembly materials. Examining the relationship between students' reaction (or emotional affect) to the assembly programs and their subsequent gain in knowledge after watching provided further insight into why some assembly performances were more impactful on nutrition and physical activity knowledge than others.

The follow-up evaluation of the Vegetable Core concluded that students retained some knowledge of key concepts one year post-intervention, but demonstrated less positive scores on other determinants of behavior, such as attitude and self-efficacy. This finding demonstrated partial ineffectiveness of short-term interventions to encourage long-term behavior change, which is valuable information for the planning and implementation of future nutrition education curricula.

After participating in an assigned intervention, results from the first year of the three-year Longitudinal Impact Study revealed differences in students' nutrition and physical activity knowledge and behaviors across intervention cohorts. While some positive effects were demonstrated in the first year of the study, it is

[1] FoodPlay Production's *Trish's Awesome Nutrition Ambition* is a high-energy, fun-filled performance incorporating MyPlate to demonstrate the people of all ages have the ability to take their health in their own hands by making healthy choices. From: http://foodplay.com/live-shows/

[2] *Jump with Jill* is a professional live show that travels the country transforming nutrition education into a rock & roll nutrition concert. The school assembly uses a child-friendly approach to reinforcing classroom nutrition education learning. From: http://www.jumpwithjill.com/school-assemblies/

[3] Sterlen Barr, CEO of Rapping About Prevention Inc., is a health educator and motivational rap artist. He educates, inspires, motivates and encourages youth to stay healthy, make positive choices about physical activity and healthy food choices. From: http://www.nopuffdaddy.com/fff.shtml

hypothesized that as the study continues, there will be a cumulative effect, resulting in more pronounced differences in knowledge and behaviors among the three intervention cohorts.

Inconclusive results in the evaluation of the C3 curriculum occurred in part due to the inconsistent administration of lessons across the schools. Some students were exposed to the C3 lessons more or less frequently than others, which limited their gain in knowledge of key concepts. Factors outside of the control of the ORE, such as inconsistency in lesson implementation across the six different community partners, also impacted results. These issues also occurred in the implementation of the Longitudinal Impact Study, Year 1. In order to increase the internal validity of these evaluations, while ameliorating these above-mentioned concerns, corrections to the schedule of lesson administration for both C3 and for the Longitudinal Impact Study will be made for FY 2014.

SUMMARY OF RECOMMENDATIONS

Based on the results of each evaluation project conducted in FY 2013, the following table provides an overview of recommendations for change and improvement across selected nutrition education programs led by ERN community partners:

Key Recommendations for Program & Evaluation Improvement in FY 2014

1. ***STARtracks Clarification*:** Community partners are advised to clarify STARtracks reporting of lesson content objectives and lesson types (e.g., single or series lessons).
2. ***Need for More Prolonged, Concentrated Nutrition Education**:* Results of the Vegetable Core Follow-Up Study indicated that from 4th to 5th grade, students did not always sustain self-efficacy, vegetable preference, or family meal time behaviors. This could be due, in part, to the short length of the Vegetable Core curriculum. Given these findings, ERN should administer more prolonged, concentrated nutrition education to sustain knowledge, attitudes, self-efficacy, and preference among students over time.
3. ***Address Physical Activity among Teen Girls*:** The C3 Study showed that 7th and 8th grade females were significantly less physically active than their male peers; more efforts should be made to increase physical activity levels among girls.
4. ***Improvements to Assembly Programming*:** Teachers suggested that assemblies could be improved by adding new content, increasing student interaction, and having better sound quality.
5. ***Improve Lesson Consistency*:** Through discussions with community partners and the FY 2013 evaluation findings, it was determined that there was a need for improving the consistency in lesson implementation across the six community partners. For FY 2014, ORE developed lesson timelines for community partners to follow so that students are receiving the same set of lessons in the same format. ORE will also evaluate the students from all community partners within the same time frame to provide consistency in the evaluation methods.
6. ***Elimination of School Implementation Level*:** Due to the current District budgetary issues and lack of resources in schools, for FY 2014 the ORE has decided to disregard the school implementation level component of the Longitudinal Impact Study.
7. ***Encourage Breakfast and Family Meal Time Behaviors:*** Results from the Longitudinal Impact Study: Year 1, Vegetable Core Follow-up and C3 evaluations indicated a need for reinforcing breakfast behaviors among students. Vegetable Core Follow-up results found that students who reported eating dinner with their families also were more likely to have greater vegetable preference than those who did not participate in family meal time. Addressing the guardians' role in students' nutrition behaviors may provide students with more inclusive healthy environments.

Program Evaluation Activities Continuing in FY 2014

I. Longitudinal Impact Study: Year 2
   a. 4th grade students will be evaluated; cohorts will remain the same, with the majority of lessons still being SDP-ERN.

II. *Choice, Control & Change* (C3) Outcome Evaluation
   a. Only 8th grade will be included in the evaluation.

III. Research Study based on findings from FY13 *Choice, Control & Change* (C3) evaluation

IV. Assembly Programming Evaluation

New Program Evaluation Activities for FY2014

I. 5th Grade Monitoring Tool
   a. Community partners and Penn State will be responsible for conducting this evaluation.

II. Adult Program Evaluation
   a. Feasibility Study I: Parent/Caregiver Workshops at SNAP-Ed Eligible Schools
   b. Feasibility Study II: Engaging Parents/Caregivers Outside of School Setting

II. Introduction

i. Program Description

EAT.RIGHT.NOW. **(ERN)** is a multi-faceted health and nutrition education outreach program for SNAP (Supplemental Nutrition Assistance Program) eligible[4] students enrolled in The School District of Philadelphia. The program is one component of the larger Pennsylvania Nutrition Education Tracks (PA TRACKS) initiative, which seeks to improve food choices and encourage physical activity among school-age children in the state. In Philadelphia, the ERN program is implemented by the following community partners: The School District of Philadelphia (SDP), Drexel University (DU), Health Promotion Council (HPC), Albert Einstein Medical Center (AE), The Food Trust (TFT), and the Urban Nutrition Initiative (UNI). The PA TRACKS initiative is funded by the U.S. Department of Agriculture (USDA) Food and Nutrition Service (FNS), with matching state and local support, and is locally managed by The Pennsylvania State University, College of Health and Human Development (referred hereafter as the *Management Entity* or ME).[5] ERN programming is delivered in approximately 250 Philadelphia public and charter schools in grades K through 12. To be eligible for ERN programming, schools must have 50% or more of the student population qualify for free or reduced school lunch. This is the fourteenth year of operation for ERN in The School District of Philadelphia.

The ERN program operates through the above-mentioned partners, employing over 94 professional nutrition educators. These educators reach their audience through a variety of formats including direct education (e.g., classroom lessons, after-school programs, caregiver workshops, assembly programming, etc) and indirect education (e.g., newsletters, pamphlets, handouts, and school bulletin boards, announcements and health fairs).

a. School-Age Track

PA TRACKS has two components: the school-age track and the adult-age track. For the 2013 fiscal year (FY), some community partners provided services in both tracks; however, SDP programming was only delivered in the school-age track. Thus, all of the evaluation activities presented herein were concentrated within this component. SDP program and evaluation activities within PA TRACKS were delivered across a range of age groups from kindergarten through 12th grade. Education provided in the school-age track consists of the evidence- or practice-based curricula, including, but not limited to: SDP-ERN lessons; SDP-Drexel high school lessons; *Eat the Alphabet*; *4th Grade Vegetable Core*; and *Choice, Control and Change* ("C3").

The logic model provided in Appendix A of this report presents an overview of The School District of Philadelphia ERN program activities and includes resources, participants, and key outcome and impact objectives for FY 2013.

[4] Children from households earning a gross income of <130% of poverty qualify for SNAP benefits.
[5] Pennsylvania State University College of Health and Human Development is the Management Entity (ME) for the statewide implementation of the Pennsylvania Nutrition Education Tracks (TRACKS) initiative.

ii. Evaluation Purpose & Focus

According to the United States Government Accountability Office (GAO), "a program evaluation is a systematic study using research methods to collect and analyze data to assess how well a program is working and why."[6] The purpose of this report is to present the methodology and findings of ERN program evaluation conducted in FY 2013. The evaluation, led by SDP's Office of Research and Evaluation (ORE), sought to assess the effects of the ERN program's evidence-based core curriculum and other practice-based nutrition education curricula on achieving PA TRACKS goals and objectives. In addition, the evaluation aimed to determine barriers to optimal implementation that may have impacted programming fidelity.

Due to the large scope of the ERN program, the evaluation focused on four key program components: Longitudinal Impact Study: Year 1, the Vegetable Core Follow-up Study, *Choice, Control, and Change* (C3) curriculum, and the nutrition assembly programs. The methods used to examine each component of the program are described in Table 1.1.

Table 1.1. Evaluation Components, Data Sources, and Analyses

Component	Sources of Data	Analyses
Process Evaluation: Reach and Scope of E.R.N.	o STARtracks	o Descriptive statistics
Longitudinal Impact Study	o Pre- and post- survey[a]	o Descriptive statistics o Inferential statistics (*t*-tests, correlations, chi-Square tests, independent and paired samples *t*-tests, one way and repeated measures ANOVA)
Vegetable Core Follow-up & 5th Grade Behaviors[b]	o Vegetable Core survey o 5th grade nutrition and physical activity behaviors survey[c]	o Descriptive statistics o Inferential statistics (*t*-tests)
Choice, Control, and Change (C3)	o Pre- and post- survey with modified YRBS[d]	o Descriptive statistics o Inferential statistics (correlations, chi-Square tests, independent and paired samples *t*-tests, one-way and repeated measures ANOVAs)
Assembly Programming	o Student Survey (5th grade only)[e] o Electronic Teacher Survey (K-8)[f] o Assembly observations	o Descriptive statistics o Test-retest analysis o Inferential statistics (correlations, independent and paired samples *t*-tests, one-way and repeated measures ANOVAs)

[a] See Appendix B for survey
[b,c] Questions were adapted from the School Physical Activity & Nutrition (SPAN) Survey, See Appendix C
[d] See Appendix D for survey
[e] See Appendix E for pre-surveys, Appendix F for post-surveys
[f] See Appendix G for survey

[6] United States Government Accountability Office. (2012). Designing Evaluations, 2012 Revision. United States Government Accountability Office, Applied Research and Methods, GAO-12-208G.

iii. Literature Review: Nutrition Education among School-Age Children

Shifts in the American diet over the past thirty years have contributed to rising concerns about nutrition quality, trends in energy intake, and obesity incidence. National data indicate that daily energy intake among youth ages 2 to 18 years old has increased by at least 160 kCal since 1977.[7] Trends reveal that children and adolescents are not meeting recommended national guidelines for consumption of fruits and vegetables, but are consuming more foods containing added sugars and fat, often away from home.[8,9] Youth are also decreasing their overall physical activity levels in favor of spending more time in sedentary activities, such as watching television, recreational computer use, and playing video games.[10] Evidence shows that adolescents tend to reduce their level of moderate to vigorous activity by about one to two hours per week between early and late adolescence.[11] The combination of increased dietary energy intake and reduced energy expenditure has significantly contributed to increased adiposity and obesity incidence in youth over time.[12,13,14,15]

Understanding the concept of energy balance forms the basis of understanding how to maintain a healthy weight.[16,17] While many nutrition interventions have concentrated on improving students' understanding of specific nutrition topics (i.e., fruits and vegetables, beverages, saturated fat, physical activity),[18,19,20] knowledge pertaining to the broader topic of energy balance (e.g. balancing calories in and out) may also improve behavior outcomes.[21,22] SDP ERN utilizes a modified version of the evidence-based *Choice, Control & Change* curriculum,

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[7] Poti,J., Popkin, B. (2011). Trends in energy intake among US children by eating location and food source, 1977-2006. *Journal of the American Dietetic Association,* 111(8):1156-1164.

[8] Van der Horst, K., Oenema, A., et al (2006). A systematic review of environmental correlates of obesity-related dietary behaviors in youth. *Health Education Research,* 22(2): 203-226.

[9] Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance--2011. MMWR 2012; 61(No. SS-4).

[10] Rideout, V., Foeher, U., et al (2010). Generation M2: Media in the lives of 8 to 18 year olds. January 2010 Report. The Henry J. Kaiser Family Foundation, Menlo Park, CA.

[11] Nelson, M., Neumark-Stzainer, D., et al (2006). Longitudinal and secular trends in physical activity and sedentary behavior during adolescence. *Pediatrics*, 118(6): e1627-e1634.

[12] Singh, A.S., Mulder, C., et al (2008). Tracking of childhood overweight into adulthood: A systematic review of the literature. *Obesity Reviews,* 9: 474-488.

[13] Hall, K., Heymsfield, S., et al (2012). Energy balance and its components: Implications for body weight regulation. *American Journal of Clinical Nutrition,* 95: 989-995.

[14] Goran, M. (2001). Energy metabolism and obesity. *Obesity, 84*(2): 347-362.

[15] Glickman, D., et al (2012). Accelerating progressing in obesity prevention: Solving the weight of the nation. Institute of Medicine Committee on Accelerating Progress in Obesity Prevention. National Academies Press.

[16] Hall, K et al. (2012). *American Journal of Clinical Nutrition*

[17] Nelson, M., Lytle, L., et al (2009). Improving literacy about energy-related issues: The need for better understanding concepts behind energy intake and expenditure among adolescents and their parents. *Journal of the American Dietetic Association*, 109: 281-287.

[18] Kropski, J., Keckley, P., et al (2008). School-based obesity prevention programs: an evidence-based review. *Obesity*, 16(5): 1009-1017.

[19] Robinson-O'Brien, R., Story, M., et al (2009). Impact of garden-based youth nutrition intervention programs: a review. *Journal of the American Dietetic Association*, 109: 273-280.

[20] Roseman, M., Riddell, M., et al (2011). A content analysis of kindergarten-12th grade school-based nutrition interventions: Taking advantage of past learning. *Journal of Nutrition Education and Behavior*, 43(1): 2-18.

[21] Contento, I., Koch, P., et al (2010). Adolescents demonstrate improvement in obesity risk behaviors after completion of Choice, Control and Change, a curriculum addressing personal agency and autonomous motivation. *Journal of the American Dietetic Association*, 110: 1830-1839.

[22] Slater, M., Sirard, J., et al (2011). Relationships between energy balance knowledge and the home environment. *Journal of the American Dietetic Association,* 111: 556-560.

which aims to improve knowledge of energy balance concepts among middle school students. [23] Results of the evaluation of the modified C3 curriculum are presented in this report.

Low-income children and adolescents from food-insecure households are at greater risk for obesity than higher income youth.[24,25] This is due to disparities in the availability of and access to healthy foods, and space for physical activity.[10] In the city of Philadelphia, where one quarter of the population lives below the Federal Poverty Line, food insecurity rates are high. In 2012 Pennsylvania's 1st Congressional District, which includes neighborhoods in Southwest, South, and North Philadelphia, was ranked as one of the top 30 Congressional Districts for food hardship.[26] At least half of the schools included in this year's program evaluation are located in the 1st Congressional District. Get Healthy Philly, an initiative led by the Philadelphia Department of Public Health and local partners, has championed efforts that coincide with national policies to support healthier living. Through Get Healthy Philly, progress toward improving the health and wellness of students in The School District of Philadelphia include: revisions to school food service menus to improve food quality while increasing cost-effectiveness; increased free school breakfast participation; and the creation of Wellness Councils in 171 schools to implement health improvement strategies.[27] Additional modifications to school meal programs are supported by the Child Nutrition and Women, Infants, and Children (WIC) Reauthorization (CNR) Act (i.e., The Healthy, Hunger-Free Kids Act). Relevant highlights of the 2010 CNR Act include expanded access for students to receive free school meals, improved quality of school meals through updated nutrition standards, and availability of competitive grants for School Breakfast Programs.[28] In conjunction with these federal and local policy changes, school-based nutrition education has the potential to further impact low-income children and adolescents' dietary quality and overall health.

For children and adolescents, most interactions with food and physical activity environments occur within two contexts: home and school. Schools have the capacity for high reach and dosage of health-related interventions, like nutrition education, due to continuous and intensive contact during the formative years of education.[29] Relative to goals of the PA TRACKS initiative, schools can "help create new opportunities [for students] to get to know and make healthy food" through nutrition education, food taste testing, and awareness-building.[30]

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[23] Koch, P., Contento, S., Barton, A. (2010). Choice, Control & Change: Using science to make food & activity decisions. South Burlington, VT: Teachers College Columbia University and the National Gardening Association.

[24] Ogden, C. Lamb, M., et al (December 2010). Obesity and socioeconomic status in children and adolescents: United States, 2005-2008. National Center for Health Statistics Data Brief, No. 51, December 2010. U.S. Department of Health and Human Services.

[25] Casey, P., Simpson, P., et al (2006). The association of child and household food insecurity with childhood overweight status. *Pediatrics,* 118(5): e1406-e1413.

[26] Food Research and Action Center (2013). Food hardship in America 2012: Data for the nation, states, 100 MSAs, and every Congressional District (February 2013). Washington, DC: Burke, M., Hartline-Grafton, H., Weill, J.

[27] Mallya, G.(2012). Healthy eating and active living: Making the healthy choice the easy choice. Get Healthy Philly Annual Report, 2011-2012. Philadelphia Department of Public Health, City of Philadelphia. Retrieved from http://www.phila.gov/health/pdfs/commissioner/2012AnnualReport_Nutrition.pdf

[28] Food Research and Action Center (2010). *Highlights: Health, Hunger Free Kids Act of 2010*. Food Research and Action Center. Retrieved July 16, 2013 from http://frac.org/highlights-healthy-hunger-free-kids-act-of-2010/

[29] Roseman, M. et al (2011). *Journal of Nutrition Education and Behavior.*

[30] Ben-Sefer, E., Ben-Natan, M., et al (2009). Childhood obesity: Current literature, policy and implications for practice. *International Nursing Review*, 56(2), 166-173.

Evidence shows that improvements in nutrition and dietary quality result in greater academic achievement and reduced absenteeism in schools.[31,32,33,34,35] Outside of structured programming, teachers and staff can positively impact students' health behaviors by serving as role models for healthy eating and physical activity. An apparent growing trend in education and health promotion is to reform schools into community centers that integrate academics, health and social services, youth and community development, and community engagement. This concept has been outlined in the Community School Model.[36]

The majority of school-based nutrition education programs, including ERN, are based on two theories of behavior change: the Social Ecological Model, which examines behavior in the context of an individual's social and environmental influence; and the Social Cognitive Theory,[37] which contends that learning takes place through observing the actions of others.[38,39,40] Based on these theories, an array of studies have presented findings related to child and adolescent dietary behaviors. These findings provide rationale and direction for nutrition education programming and evaluation. For instance, younger children tend to have a limited understanding of health awareness and have limited control over their food environment.[41] Children establish preferences for nutritious foods from modeling food context from parents/caregivers, teachers, and peers, as well the physical environment in which food is available.[42] Alternatively, pre-adolescents and adolescents have greater independence, are highly influenced by their social environment, and are cognitively capable of understanding the connection between diet quality and chronic disease.[43,44,45] The previous information has important implications for timing and dosage of nutrition education, since eating patterns in childhood and adolescence may be linked to those later in life.[46]

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[31] Florence, M., Asbridge, M., et al (2008). Diet quality and academic performance. *Journal of School Health,* 78(4): 209-215.

[32] Halterman, J., Kaczorowski, C., et al (2001). Iron deficiency and cognitive achievement among school-aged children and adolescents in the United States. *Pediatrics,* 107(6): 1381-1386.

[33] Li, Y., Dai, Ql, et al (2008). Overweight is associated with decreased cognitive functioning among school-age children and adolescents. *Obesity,* 16(8): 1809-1815.

[34] Shilts, M., Lamp, C., et al (2010). Pilot study: EatFit impacts sixth graders' academic performance on achievement of mathematics and English education standards. *Journal of Nutrition and Education Behavior,* 41(2): 127-131.

[35] Taras, H. (2005). Nutrition and student performance at school. *Journal of School Health,* 75(6):199-213.

[36] Coalition for Community Schools (2009). Community Schools Research Brief. Retrieved from http://www.communityschools.org/assets/1/AssetManager/CCS Research Report2009.pdf

[37] Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall, Englewood Cliffs, NJ.

[38] Hendrie, G., Brindal, E., et al (2012). Combined home and school obesity prevention interventions for children: What behavior change strategies and interventions characteristics are associated with effectiveness? *Health Education and Behavior*, 39(2):159-171.

[39] Hoelscher, D., Evans, A., et al (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*, 102(3 Suppl): S52-63.

[40] Sharma, M. (2006). School-based interventions for childhood and adolescent obesity. *Obesity Reviews,* 7(3): 261-269.

[41] Wagner, N., Meusel, D., et al (2005). Nutrition education for children—results and perspectives. *Journal of Public Health,* 13(2): 102-110.

[42] Birch, L., Ventura, A. (2009). Preventing childhood obesity: What works? *International Journal of Obesity,* 33:S74-S81.

[43] Roseman, M. et al (2011). *Journal of Nutrition Education and Behavior.*

[44] Craven, K., Moore, J., et al (2011). School-based nutrition education intervention: Effect on achieving a healthy weight among overweight ninth-grade students. *Journal of Public Health Management Practice,* 17(2), 141-146.

[45] Pearson, N., Ball, K.,et al (2010). Predictors of changes in adolescents' consumption of fruits, vegetables and energy-dense snacks. *British Journal of Nutrition*, 105(5): 795-803.

[46] Maynard, M., Gunnell, D., et al (2005). What influences diet in early old age? Prospective and cross-sectional analyses of the Boyd Orr cohort. *European Journal of Public Health*, 16(3):315-323.

According to a 2012 Institute of Medicine (IOM) committee report on childhood obesity prevention practices, the most significant outcomes in school-based nutrition education interventions have been demonstrated in elementary and middle school students.[47] However, this may be due to the lower percentage of interventions conducted with older adolescents; 24% of high schools provided nutrition education in 2004-2005 compared to 74% of elementary and 73% of middle schools. A review of 45 reports on school-based nutrition programs by the Community Preventive Services Task Force (2011) found that most participating students are in grades 3-5.[48] Of interventions with children, significant changes in BMI/weight status are more prevalent compared to those conducted with older children (ages 10-14) entering adolescence.[49]

Lack of curricula continuity and wide variation in activities has contributed to a gap within nutrition education programming, as these issues limit topic reinforcement and long-term impact on knowledge and behavior. In a 2010 Report to Congress, USDA FNS outlined key components of effective nutrition education interventions that contribute to improved nutrition and physical activity behaviors in low-income populations, including obesity prevention practices.[50] Recommendations from USDA FNS comprise: (1) targeted behaviors or practices; (2) tailored objectives to the target audience; (3) longer duration and intensity of programming; (4) coherent and focused curricula; (5) multi-component using a social ecological approach, and (6) trained staff, particularly for interventions conducted in school environments. These recommendations, as well as acknowledging the aforementioned gaps in nutrition education scope and sequence, provide insight into how to improve fundamental ERN program and evaluation activities in future years.[50]

iv. Structure of the E.R.N. FY 2013 Evaluation Report

Due to the multi-faceted nature of this evaluation, the report is structured in terms of major projects. Within each project there is a brief overview, design, methods, results, discussion and limitations. A comprehensive conclusion concludes the report. The following projects will be discussed:

1. Program Reach and Scope
2. Longitudinal Impact Study: Year 1
3. Vegetable Core Follow-up and 5th Grade Behaviors
4. *Choice, Control, and Change* (C3) Curriculum
5. Assembly Programming

[47] Glickman,D., et al (2012). National Academies Press.
[48] Guide to Community Preventive Services. Promoting good nutrition: School-based programs promoting nutrition and physical activity. Retrieved from www.thecommunityguide.org/nutrition/schoolprograms.html. Last updated: 12/17/2011.
[49] Kropski J., et al (2008) *Obesity.*
[50] Food and Nutrition Service Office of Research and Analysis (2010). Nutrition education and promotion: The role of FNS in helping low-income families make healthier eating and lifestyle choices. A report to Congress. United States Department of Agriculture, Food and Nutrition Service Office of Research and Analysis. Retrieved from http://www.fns.usda.gov/sites/default/files/reports/NutritionEdRTC.pdf

III. Program Reach and Scope

i. Overview

A process evaluation for EAT.RIGHT.NOW. (ERN) was conducted using the STARtracks reporting system. STARtracks is the Pennsylvania reporting system for all PA TRACKS-funded programs and activities, and is maintained by the Management Entity at The Pennsylvania State University. STARtracks measures the overall extent of programmatic offerings using records of the number of program events that occur in each grade level and for each content objective. For example, every time an individual classroom received some form of nutrition education, it was counted as one event. If a single nutrition educator administered one lesson to one classroom, it counted as one event, and if an assembly was presented to twenty different classes simultaneously, it counted as twenty events. In addition, events are categorized as *direct* or *indirect education*. For direct education, a nutrition educator or classroom teacher delivers approved nutrition lessons and activities to the students. Assembly programming also counts as direct education. Indirect education includes activities such as nutrition-themed bulletin boards, pamphlets, handouts, etc.

Information collected from STARtracks in the fiscal year (FY) 2013 was used to identify the match[51] type and extent of programming carried out by each community partner, and the span of content objectives covered throughout the ERN program. Data presented refer to all direct education activities that occurred in the first three quarters of the 2012-2013 school year (SY) (i.e., October 2012 through June 2013); quarter four data are not reported, as students are not in school during this time period.

The following definitions provide clarification about types of nutrition education lessons taught by ERN community partners throughout the school year:

- **One-on-One:** Brief, focused education with an individual that may stand alone or may be used to reinforce messages delivered in other settings.
- **Single classes:** "Stand alone" nutrition education sessions, held during the school day or in an afterschool setting. Single classes may include crafts, activities, games, food tastings, or food/cooking demonstrations.
- **Series classes:** Two or more consecutive lessons, taught during the school day or in an afterschool setting, planned as an orderly progression of information. Each class builds upon material covered in the previous lesson and introduces new subject matter.
- **Assembly:** Multi-classroom nutrition education that includes interaction between the students and presenter.
- **Assembly follow-up:** Extension lessons and activities that reinforce assembly messages with related follow-up nutrition education.

[51] The cost of providing nutrition education in Pennsylvania is shared by the Federal government with state and local government and businesses. The non-federal funds are referred to as partner match. Partner match is the portion of expenses that are not reimbursed by the Federal Government, but are locally funded from public or private sources. Local Partners are responsible for obtaining partner match to participate in PENNSYLVANIA NUTRITION EDUCATION TRACKS.

- **Multimedia:** Web modules, online activities, computer games, video presentations, podcasts, or other "non-traditional" programming. To be considered direct education, multimedia strategies must be interactive, generate participant responses, and be able to capture required demographic information.

ii. Results

a. Nutrition Education Events

Reported between October 2012 and June 2013 (i.e., Quarters 1-3), ERN educators conducted 228,414 nutrition education events. This represents a 3.8% decrease from last year's activities reported in Quarters 1-3. The number of events by type is presented in Table 2.1. In SY 2012-2013, the total number of nutrition-related assemblies provided to SNAP-Ed eligible schools was 6,975.

Table 2.1. Number of Nutrition Education Events by Type, 2012-13, Q1-3

Type	Drexel	Einstein	TFT	HPC	SDP	UNI	Total by Activity
Single class	1,132	4,205	10,869	1,480	24	58	17,768
Series classes	28,032	60,666	35,917	17,839	17,626	12,266	172,346
2-4	15,282	134	16,769	16,640	0	11,355	60,180
5-9	1,348	6,602	14,769	1,198	13	445	24,375
10 or more	11,402	53,930	4,379	1	17,613	466	87,791
One-on-one	1,570	380	0	1,344	0	0	3,294
After-school single class	4	0	2	3	0	22	31
After-school series classes	390	2	2	13	35	274	716
Assembly	0	0	0	0	6,975	0	6,975
Assembly follow-up	0	0	0	0	27,281	0	27,281
Multimedia	0	0	0	2	1	0	3
Total by Partner	31,128	65,253	46,790	20,681	51,942	12,620	**228,414**

The total number of events conducted by each community partner is reported in Table 2.2. The number of nutrition education events for each community partner was also compared between the 2011-2012 and 2012-2013 school years. For the 2013 school year, Albert Einstein had the highest number of nutrition education events followed by The School District of Philadelphia, whose total number of events also included nutrition assembly programs and follow-up lessons for all SNAP-Ed eligible schools in the district who hosted a nutrition assembly in their school. Between last school year (2012) and the most recent school year (2013), the number of

events conducted by Einstein, TFT, and UNI increased, with the latter having the greatest increase (3.8%). Drexel, HPC, and SDP had decreases in the number and percentage of events from FY 2012 to FY 2013. Drexel had the greatest decrease (10.2%) of all partners from FY 2012 to FY 2013.

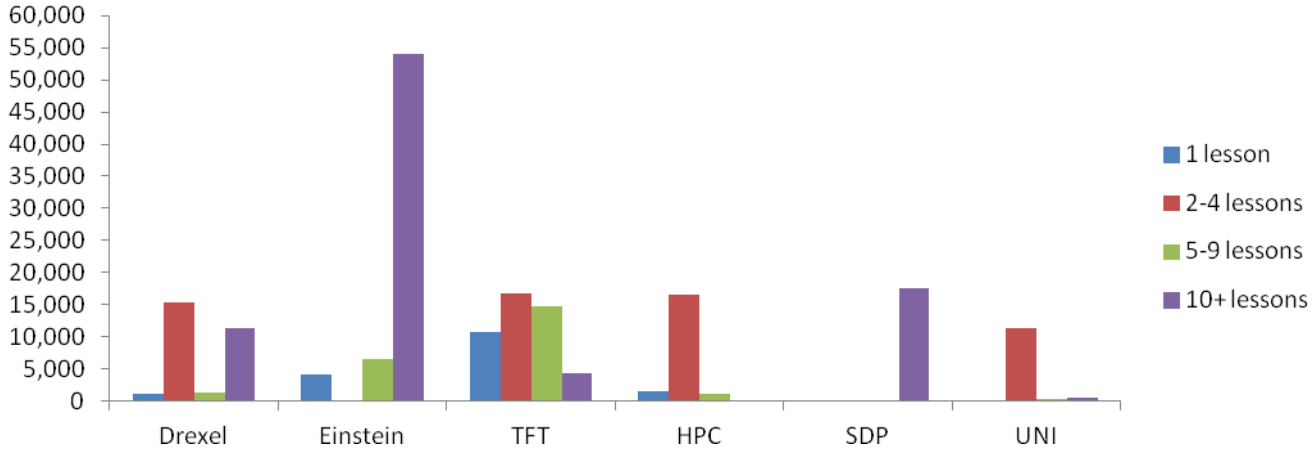
Table 2.2. Number of Events by Community Partner, FY 2013 Q1-3 Compared to FY 2012, Q1-3

Community Partner	Total Number of Events 2012-13	Percentage of All Events (%)	Total Number of Events 2011-12	Percentage of All Events (%)	Percentage Change (%): 2012 and 2013
Drexel University	31,128	13.6	34,663	15.0	-10.2
Albert Einstein	65,253	28.6	64,647	28.5	+0.9
The Food Trust (TFT)	46,790	20.5	46,392	19.5	+0.9
Health Promotion Council (HPC)	20,681	9.1	21,455	9.0	-3.6
The School District of Philadelphia (SDP)	51,942*	22.7	54,226*	22.8	-4.2
Urban Nutrition Initiative (UNI)	12,620	5.5	12,160	5.1	+3.8
Total	**228,414**	**100.0**	**237,543**	**100.0**	**-3.8**

*Includes assembly programs

As evidenced in Figure 2.3, each community partner varied in the number of lessons and series of lessons completed. For instance, nutrition educators from Einstein provided the greatest number of nutrition education lessons (n=64,871), with the majority as part of a 10 or more series (n=53,930). The School District of Philadelphia almost exclusively provided nutrition education lessons as part of a 10 or more lesson series (n=17,613).

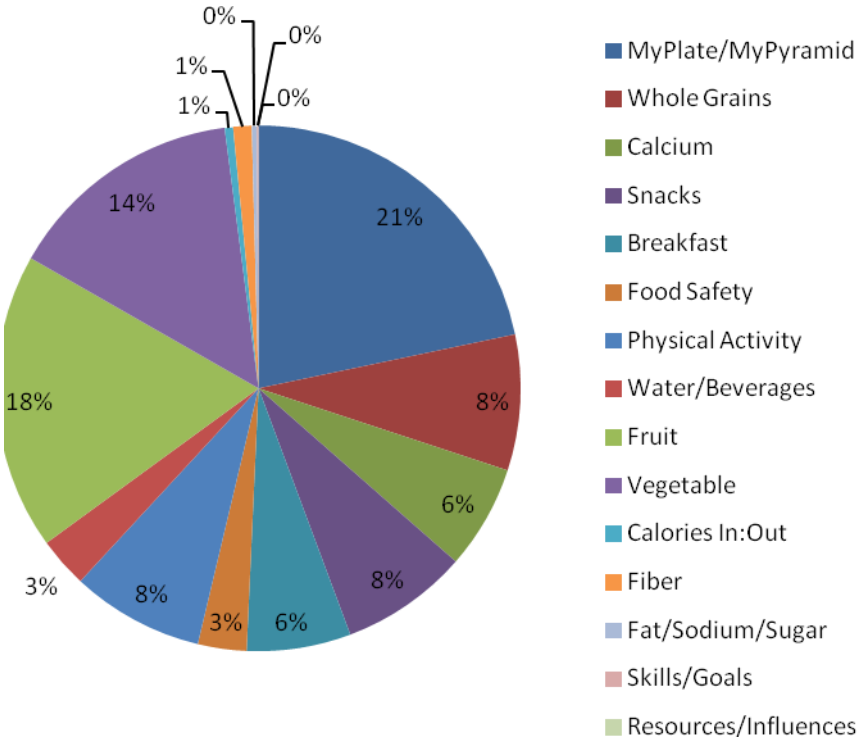
Figure 2.3. Number of Nutrition Lesson Classes Conducted by Partner (n=190,114 lessons), FY 2013, Q1-3



b. STARtracks Content Objectives for ERN Lessons

STARtracks provided data on nutrition education lessons by grade levels K, 1st, 2nd, 3rd, 4th, 5th, 6-8th, and 9-12th, in the following content objectives: MyPlate/MyPyramid,[52] fruit, vegetables, breakfast, snacks, calcium, whole grains, physical activity, beverages, and calories In:Out.[53] Last year, ORE was told by community partners that many educators selected MyPlate/MyPyramid as the default content objective for lessons with multiple messages. As depicted in Figure 2.4, 21.1% of all nutrition lessons covered MyPlate/MyPyramid, followed by fruits (17.7%), and vegetables (14.2%). The two content objectives that composed the smallest percentages were Skills/Goals (0.1%) and Calories In:Out (0.5%). This percentage pattern parallels that of the 2011-2012 content objectives.[54]

Figure 2.4. Nutrition Education Objectives for Students K-12, FY 2013, Q1-3

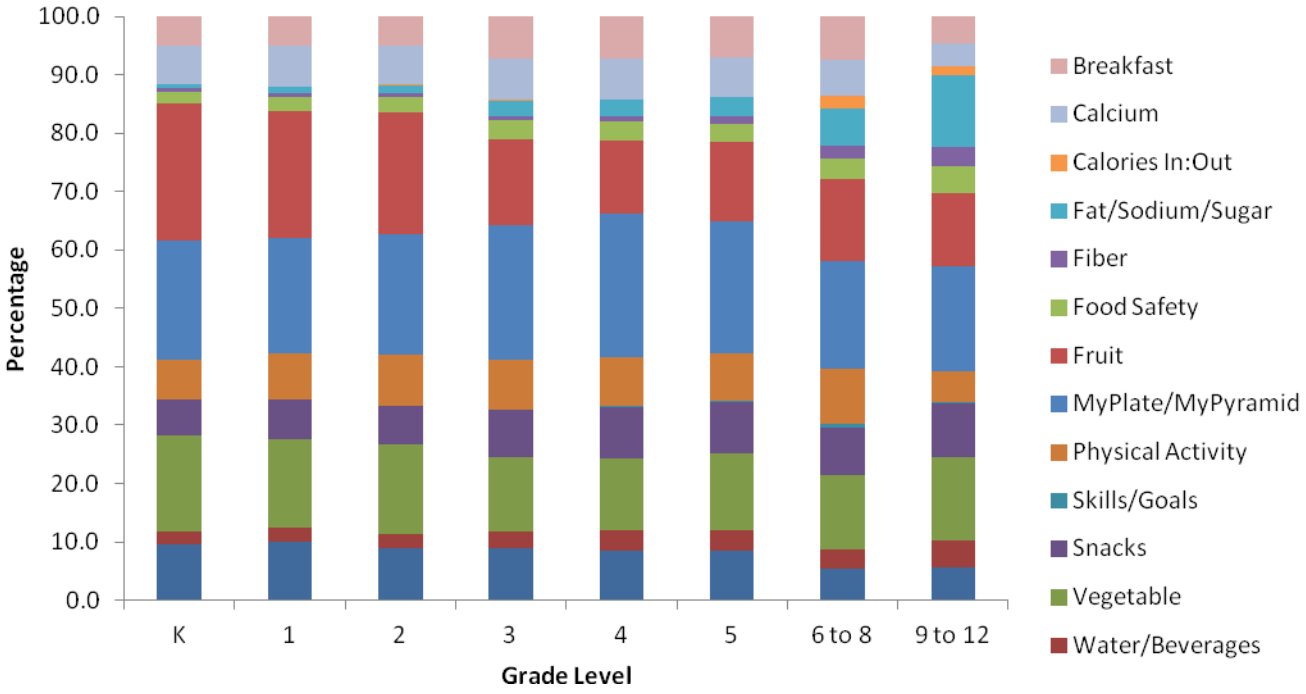


In addition to exploring the overall distribution of main nutrition education objectives for all students, nutrition education objectives by grade level were also examined. As shown in Figure 2.5, the majority of lessons covered fruits in grades K-1 and MyPlate/MyPyramid for grades 2-12. A total of 25,181 events were coupled with a food

[52] MyPlate/MyPyramid lessons are related to the USDA 2010 Dietary Guidelines key messages.
[53] Calories In:Out lessons regard balancing caloric intake with physical activity.
[54] The School District of Philadelphia, Office of Research and Evaluation. (2012). EAT.RIGHT.NOW.FY2012 evaluation report. Philadelphia, PA: The School District of Philadelphia.

tasting, with Einstein providing the majority (n=10,416) followed by Drexel (n=4,763) and The Food Trust (n=3,361).

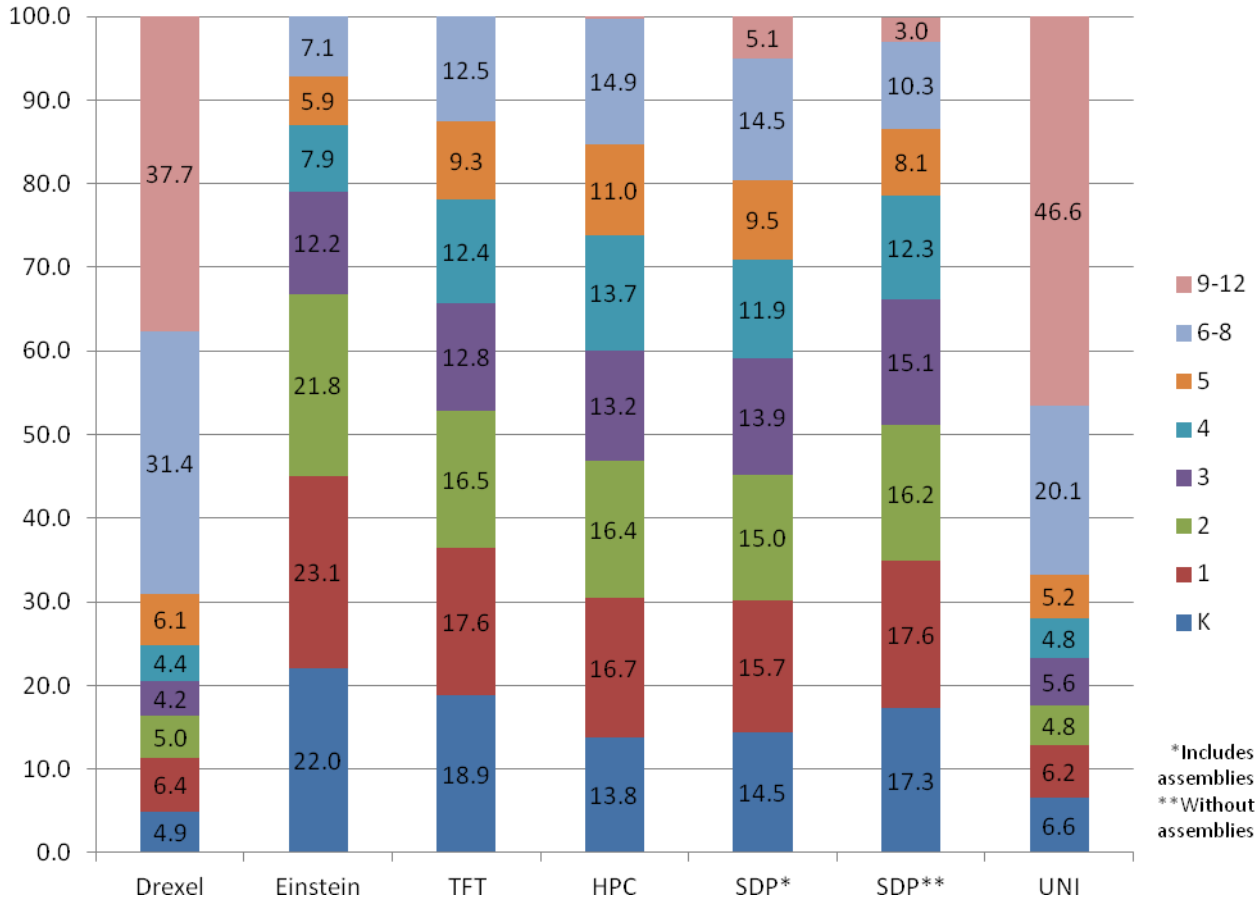
Figure 2.5. Nutrition Education Objectives by Grade Level, FY 2013, Q1-3



c. Partner and Grade Level Focus

The percentages of each partner's nutrition activities provided to each grade level were calculated. The results were then compared among partners to discern whether any notable differences occurred (see Figure 2.6). Similar to last school year, Drexel and UNI focused the majority of their education in grades 6-8 and 9-12, while other community partners focused on younger students in grades K-5. After removing the assembly and assembly follow-up lessons from SDP's reach and scope, there was a slight change in the reach of activities to students in grades 6-12.

Figure 2.6. Percentage of Lesson by Grade and Community Partner, FY 2013, Q1-3



iii. Discussion

Findings from the FY 2013 process evaluation indicate some areas for improvement in program reach and scope, as well as issues with the reporting of nutrition education events. The number of direct nutrition education events decreased slightly from last year.

Consistent with results from the 2011-2012 process evaluation, there was a limited range in the content objectives of lessons taught by nutrition educators. ORE staff recognized that the restricted array of lesson content objectives was due to skewed reporting by community partners in the STARtracks system. For instance, if a lesson discussed more than one food group, such as fruits and vegetables, it generally was reported as a default "MyPlate/MyPyramid" content objective. In April 2013, when ORE approached partners about STARtracks objectives reporting, it was evident that there was a need for more designated objectives for each lesson or an option to select more than one main objective in the STARtracks reporting system. For the remaining reporting quarters (2-4), ORE advised community partners to be as specific as possible when selecting

content objectives, so as to avoid skewed reporting of MyPlate/MyPyramid. However little change in content objective distribution could be made due to technical limitations and objective designation in the STARtracks system.

Other STARtracks reporting errors were also identified, which led to inconsistencies in the process evaluation validity. Most notably, the *Choice, Control & Change* lessons, which focus on understanding concepts related to energy balance and goal-setting, were reported as the "MyPlate/MyPyramid" content objective, rather than the more appropriate objectives of "Calories In:Out" or "Skills/Goal-setting." In preparation for FY 2014, ORE collaborated with community partners to establish standardized content objectives for all lessons for the *Choice, Control & Change* curriculum and the Longitudinal Impact Study: Year 1, which is mainly composed of SDP ERN lessons. The goals of these changes are to improve the internal validity of these evaluation projects and to more precisely reflect the distribution of content objectives taught by nutrition educators.

ORE suggests that similar clarifications to STARtracks reporting should be agreed upon by ERN community partners. A detailed assessment of STARtracks data, as well as communication with community partners, revealed discrepancies between what is defined as a "series" lesson type among the partners. As seen in Table BA, the alarming number of single lessons taught by SDP (24) compared to the 17,626 lessons as part of a 10+ series indicates a need for clearly defined parameters as to what constitutes each lesson classification. If a lesson is indicated as part of a series, a clearer definition is needed concerning what type of series it is (i.e., 2-4, 5-9, 10+), and whether an education event should still be reported as that type of series if not all of the lessons in the series are completed. For instance, if one lesson from a 10+ series is taught but is not administered with the remaining series lessons, would this be considered a single lesson or a 10+ lesson? It is recommended that the ME and community partners work together in defining the aforementioned reporting issues moving forward into FY 2014 and FY 2015.

Furthermore, the overall delivery of events by community partners in FY 2013 (n=228,414) was less than reported in FY 2012 (n=237,543), representing a 3.84 percentage decrease. Looking back at FY 2011, the reported number of events was 213,752. The percentage change from events reported in FY 2011 and FY 2013 is 6.86%. This increase may be largely explained by the expansion in the number of events by Einstein (specifically their *Eating the Alphabet* and *Eating the World* curricula): FY 2011 (43,126) to FY 2013 (65,253). The same trend held true for The Food Trust: FY 2011 (42,793) to FY 2013 (46,790). An explanation for the decrease in activities from FY 2012 to FY 2013 is still to be determined. ORE will engage community partners in a discussion around the possible decline in FY 2013 activities.

IV. Longitudinal Impact Study: Year 1

i. Overview

Beginning in the 2012-2013 school year (SY), the District's Office of Research and Evaluation (ORE) piloted a three-year Longitudinal Impact Study that will continue through 2015. In order to build upon on-going program evaluation activities, the study focused on the following key evaluation impact objectives:

- What impact did the following interventions have on student content knowledge on the topics of fruits, vegetables, healthy snacks, and the importance of physical activity?
    - Receiving only nutrition-related lessons
    - Receiving only physical activity-related lessons
    - Receiving a combination of lessons on both nutrition and physical activity
- Do the interventions listed above impact the self-reported consumption of fruits and vegetables, whole grains, low-fat milk products, and the level of physical activity?
- Are there differences in knowledge and behaviors among the three intervention cohorts?
- Are there differences in student-level outcomes (e.g., knowledge and behavior around nutrition and physical activity) among low, medium, and high-level implementation schools?[55]

Across the three year study trends in students' knowledge and behaviors around nutrition and physical activity will be monitored. Moreover, a majority of the lessons used in this study were SDP-ERN, with a few coming from other evidence-based curricula (including *Show Me Nutrition* and *Balance My Day*). Because the ORE is evaluating several SDP-ERN nutrition and physical activity-related lessons, to increase curriculum effectiveness, we will add to the practice base.

ii. Design

The Longitudinal Impact Study utilizes a pre- and post-survey design to measure the evaluation objectives across three intervention cohorts: nutrition-only, physical activity-only, and a combination of both.[56] The FY 2013 sample consists of only 3rd grade students. The study will continue with the inclusion of only 4th grade students in FY 2014 and only 5th grade students in FY 2015 (see Table 3.1).

[55] ORE stratified schools by level of health/nutrition/wellness implementation. Schools were separated into three categories: (1) "high": schools that had a great track record of implementing health and wellness-based initiatives, had wellness champion, etc; (2) "medium": schools that have done some work with nutrition/wellness, but not as active as high-level implementers; and (3) "low": schools that have historically had little to no relationships with wellness/nutrition programs and staff; or do not have any identified wellness champions, programs, etc. Intelligence was gathered from the District's "Get Fit Philly" initiative and from our community partners, who work closely with staff at the schools.

[56] "Intervention cohorts" refers to the three groups of students who participated in this study: (1) those who received nutrition-only lessons; (2) those who received physical activity-only lessons; and (3) those who received a combination of lessons from groups 1 and 2.

Table 3.1. Longitudinal Impact Schools by Lesson and Partner, Year 1, FY 2013

Impact Lesson	Partner	Assigned Schools	Level of Implementation
Nutrition-only (N=215)	SDP	Feltonville Intermediate	Low
	Drexel	W.C. Longstreth	Medium
	HPC	B.B. Comegys	Low
	TFT	D.N. Fell	Medium
	UNI	E. Gideon	High
	AE	F.S. Key	High
Physical activity-only (N=252)	SDP	G. Sharswood	High
	Drexel	J.G. Blaine	High
	HPC	J.W. Catharine	Medium
	TFT	L.H. Carnell	Medium
	UNI	H.C. Lea	Low
	AE	F.D. Pastorius	Low
Combination: Nutrition & Physical Activity (N=266)	SDP	J.H. Taggart	Medium
	Drexel	J.H. Brown	Low
	HPC	A.M. Stearne	High
	TFT	Olney Elementary	High
	UNI	A. Locke	Low
	AE	E. Steel	Medium

During the study, schools will receive limited ERN indirect and direct education other than the provided intervention specific curriculum, in order to limit potential confounders to study outcomes. In the 2012-2013 SY, relative intervention lessons were delivered to 3rd grade students in the selected schools (see Table 3.1). The intervention will proceed to 4th grade students in 2013-2014, and 5th grade in SY 2014-2015. The intervention lesson content will remain the same across the years, but will increase in difficulty to remain age-appropriate for each grade. Notably, it is not the objective of this study to follow students from year to year, but to measure differences in nutrition and physical activity knowledge and behavior among the intervention cohorts. Evaluation instruments include a pre-and post-intervention *Nutrition and Physical Activity Knowledge Survey*, which assesses global content knowledge regarding fruits, vegetables, and healthy snacks, and specific content knowledge related to the objectives covered in each intervention cohort. A modified-SPAN *Nutrition and Physical Activity Behaviors Assessment* is also used at the post-intervention measurement to assess key dietary and physical activity behaviors.

iii. Methods

The cohort samples consisted of a selection of 18 eligible schools, which were then stratified by implementation level (Table 3.1). Schools must meet the following criteria for inclusion: (1) be SNAP-Ed eligible; (2) have grades levels 3 to 5; (3) be served by the same community partner for the next two consecutive years; and (4) cannot have less than two 3rd grade classrooms. Each community partner was assigned one low, one medium, and one

high implementation school within the three intervention cohorts. Selected schools were assigned to the following intervention cohorts for the study time frame of 2012 to 2015:

Nutrition-only Cohort: Students assigned to "nutrition-only" receive only those lessons from nutrition-focused curricula. All lessons derived from SDP-ERN curricula.

Physical activity-only Cohort: Students assigned to "physical activity-only" receive only those lessons that provide education on the health benefits of physical activity. However, to remain aligned with SNAP-Ed goals and objectives, the lessons also include a message related to the USDA Dietary Guidelines. For example, embedded in each lesson is the following statement that educators share with children: "In addition to eating the right foods, our bodies need physical activity to keep us healthy." Several lessons were derived from SDP-ERN curricula, while others were from Drexel-ERN and the evidence based curriculum: *Balance My Day*.

Combination Nutrition and Physical Activity Cohort: Students assigned to "combination" receive lessons consisting of content related to both nutrition and physical activity. These lessons are comprised of three nutrition-only lessons and three physical activity-only lessons from the above-mentioned curricula.

Pre-surveys to collect baseline content knowledge data were administered prior to lesson implementation in January 2013. Post-surveys were administered in May 2013, approximately 1 to 2 weeks following the final lesson for each school. Pre- and post-survey data were matched for analyses by students' District ID numbers. A total of 733 students completed both the pre- and post-surveys, answering at least 20 out of 28 total knowledge questions on the survey. Students' demographic data including age, race/ethnicity, and gender were collected through the District's Data Warehouse.

The main knowledge concepts assessed in the pre- and post-surveys were: physical activity (Q8-10, 12-16), nutrition (Q1-7, 11), healthy snacks (Q18A-F), food group identification (Q17A-F), and total knowledge (Q1-18A-F). Composite scores were created by summing the number of correct responses with their respective concept measures (e.g. total physical activity knowledge score; total snack knowledge score). Analyses were conducted to determine differences in concept knowledge from pre- to post-survey, across implementation levels and cohort levels, as well as by gender.

A variety of statistical tests were employed to identify changes in knowledge from pre- to post-survey. Among all students, gender differences in knowledge and behaviors were examined using independent samples *t*-tests for pre- and post-survey data. Any measures which indicated significant differences between genders at pre-survey were examined for overall differences from pre- to post-survey, using ANCOVA tests, with gender as a covariate. Analysis of Variance (ANOVA) tests were used to explore group differences in outcomes across the three intervention cohorts and three levels of implementation at pre-survey and at post-survey. Repeated measures (RM-ANOVA) examined the change in outcomes over time and the main effect of interactions between intervention cohorts, implementation groups, and time from pre- to post-survey. Lastly, chi-square and correlation tests were used to examine associations between knowledge and behaviors at post-survey.

iv. Results

In the 2012-13 SY, 733 students' pre- and post-survey data were matched for analyses. 215 students (29.3% of matched sample) participated in the nutrition-only cohort; 252 students (34.4%) participated in the physical activity-only cohort; 266 students (36.3%) participated in the combination cohort. There was a fairly even distribution of students in each level of school implementation: 261 students were in the "low implementation" schools (35.6%); 237 students in the "medium implementation" schools (32.3%); and 235 students in the "high implementation" schools (32.1%).

Table 3.2 shows the demographic characteristics of students who completed both pre- and post-surveys. Gender and race/ethnicity were reported for 727 students, 369 (50.8%) of whom were male. The majority of students were Black or African American (60.2%), followed by Hispanic/Latino (13.3%), Asian (12.1%), and White (9.1%). Students who identified as more than one race or ethnicity were categorized as multiracial and comprised 4.7% of the total sample. Some differences in race/ethnicity between the cohorts were noted: a higher percentage of African Americans (74.1%) participated in the physical activity-only cohort compared to the other intervention groups. 21.3% of students who participated in the nutrition-only cohort identified as Asian compared to 8.8% and 7.9% in the physical activity-only and combination cohorts, respectively. A greater percentage of Hispanic/Latino students (17.1% and 18.5%, respectively) participated in the nutrition-only and combination only cohorts compared to physical activity-only (4.8%). All of these differences were due to chance.

Table 3.2. Race/Ethnicity of Impact Cohort Participants, FY 2013

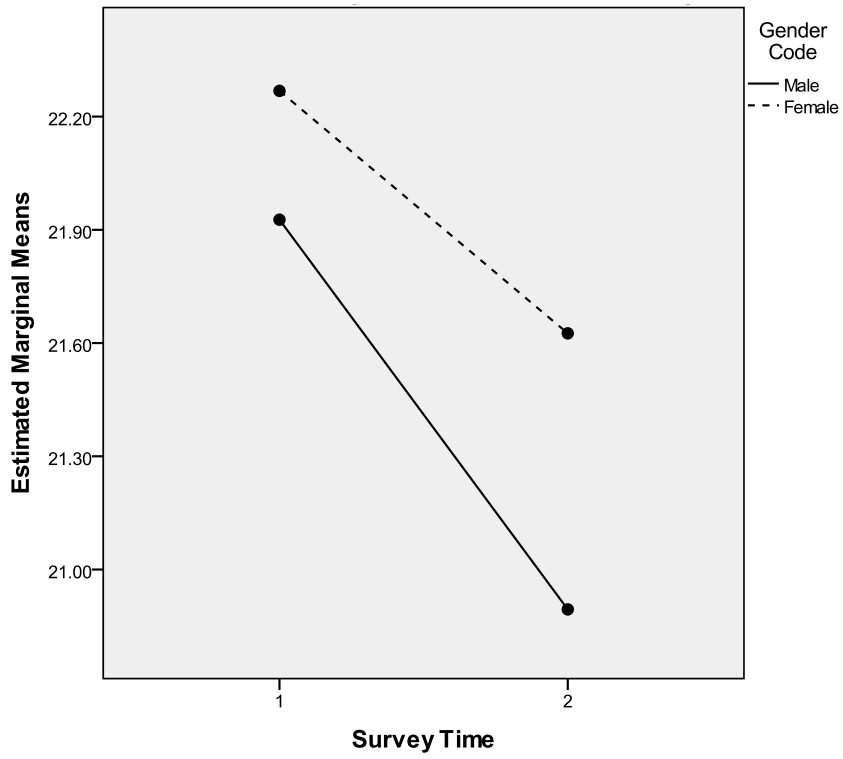
Race/Ethnicity	Overall (N=727) n, (%)	Nutrition-only (N=211) n, (%)	Physical Activity-only (N=251) n, (%)	Combination Lessons (N=265) n, (%)
Black or African American	438, (60.2)	108, (51.2)	186, (74.1)	144, (54.3)
White	66, (9.1)	16, (7.6)	21, (8.4)	29, (10.9)
Hispanic/Latino	97, (13.3)	36, (17.1)	12, (4.8)	49, (18.5)
Asian	88, (12.1)	45, (21.3)	22, (8.8)	21, (7.9)
More than 1 ethnicity	34, (4.7)	6, (2.8)	8, (3.2)	20, (7.5)

a. Total Knowledge

A total knowledge score was composed by summing correct answers to all of the knowledge questions on the pre- and post-surveys. The mean knowledge score at pre-survey was 22.09 out of 28 possible points (SD=2.73) and M=21.26, SD=2.77 on the post-survey. A total of 125 students answered 23 questions correctly on the pre-survey. The total knowledge score decreased significantly from pre- to post-survey for all students (t=8.600, p<0.001). At the time of the pre-survey there were no significant differences in total knowledge scores between gender groups (t=-1.687, p=0.092) or intervention cohorts (F=0.808, p=0.466). As seen in Figure 3.3, RM-ANOVA results indicated a significant effect of the interaction between time and gender (F=3.996, p=0.046), where

males had a greater decrease in knowledge over time than females. Knowledge scores were not significantly affected by the interaction of time and intervention cohort, meaning one intervention cohort did not score significantly different than the other groups (Main effect of interaction: *F*=1.675*, p*=0.188).

Figure 3.3. Estimated Marginal Means of All Students' Total Knowledge Scores by Gender, FY 2013



Results of an ANOVA test did indicate significant differences in pre-survey mean total knowledge scores for students in the three levels of school implementation: low (M=21.65, SD=2.80), medium (M=22.56, SD=2.52), and high (M=22.11, SD=2.78). Levels of implementation were used as a covariate in ANCOVA tests to further examine differences in total knowledge scores. Results of the ANCOVA tests do not support the effect of implementation level on post-survey total knowledge after controlling for pre-knowledge scores (*F*=0.636, *p*=0.530) meaning that the implementation level did not have an effect on the knowledge differences from pre- to post-survey.

The relationship between total knowledge scores and physical activity were examined using Pearson's correlation tests. There was a weak but significant correlation between student knowledge scores and reported weekly physical activity (*r*=0.110, *p*=0.003). Similarly, there was a weak but significant negative correlation, between knowledge scores and time spent watching TV (*r*=-0.160, *p*<0.001).

b. Nutrition Knowledge

Mean nutrition knowledge scores are displayed in Table 3.4. The mean nutrition knowledge score at pre-survey was 6.95 out of 8 points (SD=0.94) and 7.12 at post-survey (SD=1.03). Paired samples *t*-tests found significant differences in nutrition knowledge scores from pre- to post-survey (t=-4.182, p<0.001). Across the three school implementation levels (low, medium, and high), significant differences were determined in student nutrition knowledge scores at pre-survey (F=5.694, p=0.004). Therefore, implementation levels were used as a covariate in remaining analyses. RM-ANOVA tests found no statistically significant differences in nutrition knowledge at pre- (F=2.124, p=0.120) or post-survey (F=0.645, p=0.525) among the three intervention cohorts. Although non-significant, the nutrition-only intervention cohort had the highest mean nutrition knowledge score, 7.19 out of 8 possible points. Pre-survey independent samples *t*-tests indicated no statistically significant differences in nutrition knowledge scores between males and females. Females scored significantly higher than males on nutrition knowledge questions at post-survey (t=-2.785, p=0.005).

Table 3.4. Longitudinal Impact Study Knowledge Scores from Post-Survey, Year 1, FY 2013

Knowledge Measure *(Survey Question)*	Nutrition-only n, M (SD)	Physical Activity-only n, M (SD)	Combination Lessons n, M (SD)	Total Scores n, M (SD)
Overall Knowledge *(Q1-18)*	n=215, 21.3 (2.93)	n=252, 21.16 (2.99)	n=266, 21.28 (2.40)	n=733, 21.26 (2.77)
Nutrition-only Know. *(Q1-7, 11, 17, 18)*	n=215, 7.19 (1.06)	n=252, 7.10 (1.11)	n=266, 7.08 (0.94)	n=733, 7.12 (1.03)
Food Group Selection *(Q17)*	n=215, 3.97 (1.33)	n=252, 3.70 (1.32)	n=266, 3.74 (1.37)	n=733, 3.80 (1.34)
Healthy Snack Identification *(Q18)*	n=214, 5.72 (0.80)	n=249, 5.70 (0.93)	n=266, 5.79 (0.58)	n=729, 5.74 (0.78)
Physical Activity Knowledge *(Q8-10, 12-16)*	n=215, 4.50 (0.84)	n=252, 4.73 (0.81)	n=266, 4.66 (0.74)	n=733, 4.64 (0.80)
Sedentary Activity Know. *(Q8, 13, 15)*	n=215, 0.98 (0.34)	n=252, 1.05 (0.42)	n=266, 0.95 (0.30)	n=733, 0.99 (0.36)

Chi-square analyses were conducted to examine the association between sugar knowledge and sweetened beverage behaviors. A total of 707 students answered the question, "Can sugar in soda cause cavities," correctly. Of the students who answered the question correctly, 249 students (34.1%) did not report consuming soda, punch, Kool-Aid® or other sugar sweetened beverages while 458 (62.7%) had at least one serving in the previous 24 hours. Chi-square results indicated no significant association between knowledge and behaviors around sugar sweetened beverages (r=0.182, p=0.265).

c. Breakfast

There was no significant difference in the number of students who correctly answered the breakfast knowledge question on the pre- and post-surveys (p=0.208). Although non-significant, there was a descriptive mean difference from pre- to post-survey, where more students answered the question incorrectly on the post-

(M=0.95, SD=0.22) than on the pre-survey (M=0.96, SD=0.19). On a separate behavior question, a total of 630 students (85.9%) reported eating breakfast "yesterday" on the post-survey, while 103 (14.1%) did not eat breakfast "yesterday." Chi-square analyses indicated a strong, significant association between breakfast knowledge and breakfast behaviors (r=14.259, p=0.001). On the post survey, the majority of students (82.6%) answered the breakfast knowledge question correctly and also reported eating breakfast "yesterday," whereas 90 students (12.3%) answered the question correctly but did not eat breakfast. Students in the low implementation schools (M=0.91, SD=0.28) reported eating breakfast significantly more (F=4.815, p=0.008) than students in the medium (M=0.84, SD=0.37) and high implementation schools (M=0.82, SD=0.38).

d. Food Group Identification

Table 3.5 summarizes the mean results of all students' responses to the food group identification section of the pre- and post-surveys. There was a significant difference (t=-4.624, p<0.001) in total food group knowledge scores of students from pre- (M=3.55, SD=1.31) to post-survey (M=3.80, SD=1.34). On an individual level, there were no significant changes in knowledge from pre- to post-survey for the potato and nuts identification measures.

Table 3.5. Longitudinal Impact Study Food Group Identification Knowledge Scores, Year 1, FY 2013

Survey Measure ***(Question Number)***	Pre-Survey Mean, SD		Post-Survey Mean, SD		Mean Difference	*T*-test statistic	*p*-value	95% Confidence Interval
Cheese – Dairy *(Q17A)*	0.80	0.40	0.85	0.36	-0.04658	-2.734	**0.006**	-0.8002, -0.01313
Potato – Vegetable *(Q17B)*	0.54	0.50	0.57	0.49	-0.03434	-1.605	0.109	-0.7633, 0.00765
Grapes – Fruits *(Q17C)*	0.93	0.25	0.96	0.20	-0.02610	-2.672	**0.008**	-0.04528, -0.00692
Eggs – Protein *(Q17D)*	0.45	0.50	0.50	0.50	-0.05809	-2.528	**0.012**	-0.10320, -0.01298
Pasta – Grain *(Q17E)*	0.49	0.50	0.55	0.50	-0.06319	-2.782	**0.006**	-0.10778, -0.01859
Nuts – Protein *(Q17F)*	0.35	0.48	0.36	0.48	-0.01233	-0.515	0.607	-0.05932, 0.03466
Total FG Knowledge *(Q17A-F, 5 possible points)*	3.55	1.31	3.80	1.34	-0.24693	-4.624	**<0.001**	-0.35178, -0.14209

No significant differences in food group identification knowledge were found across gender groups during pre (p=0.224) and post-survey (p=0.075). Moreover, RM-ANOVA tests found no statistically significant differences in the mean food group knowledge scores of intervention cohorts from pre- to post-survey (F(1,730)=0.611, p=0.543). ANOVA tests were conducted to determine significant differences between implementation levels and food group identification scores. Pre-survey ANOVA results indicated a significant difference between food group knowledge scores and school implementation levels (F=3.80, p=0.022). Implementation levels were used as a covariate for remaining statistical analyses. After controlling for pre-survey knowledge scores using ANCOVA analysis, there was no statistically significant effect of school implementation levels on post-survey knowledge scores (F=1101, p=0.333), meaning the implementation levels did not affect students' change in knowledge.

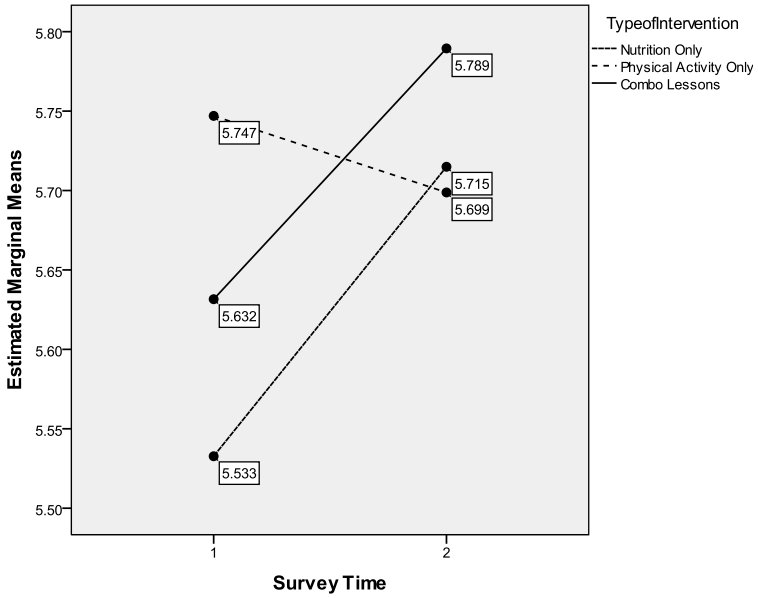
e. Snack Knowledge

The mean snack knowledge score at pre-survey was 5.64 out of 6 possible points (SD=0.80). There were no significant differences in knowledge scores between gender (p=0.363); however, ANOVA tests indicated significant differences in knowledge scores across the different intervention groups at pre-survey (*F*=4.377, *p*=0.013). Intervention groups were used as a covariate for the remaining statistical analyses.

From pre- to post-survey, paired samples *t*-test indicated a significant difference in the snack knowledge score for all students (mean change=-0.09465, *t*=-3.101, *p*=0.002). RM-ANOVA found the effect of the interaction between time and gender to be statistically significant, *F*=6.620, *p*=0.010, where females (M=5.84, SD=0.51) had a significantly higher knowledge score at post-survey than males (M=5.64, SD=0.97). Since significant differences existed between school implementation levels at the pre-survey (*p*=0.008), ANCOVA tests were employed to control for the effect of pre-survey snack knowledge of students in the different school implementation levels. After adjusting for pre-survey scores, there was no significant effect of implementation level on snack knowledge (*F*=1.055, *p*=0.349).

ANCOVA tests controlled for the effect of pre-survey snack knowledge scores of students in the three intervention cohorts and found there was a significant effect of lesson type on snack knowledge (*F*=2.951, *p*=0.053). As Figure 3.6 displays, the change in snack knowledge scores from pre to post between intervention cohorts was statistically significant over time. The physical activity-only group experienced a decrease in snack knowledge scores, whereas the nutrition-only and combination intervention cohorts showed an overall increase (main effect of interaction: *F*=5.808, *p*=0.003). This most likely is due to the fact that the nutrition-only and combination cohorts received nutrition-specific content related to healthy snacks, whereas the physical activity group did not.

Figure 3.6. Estimated Marginal Means of All Students' Snack Knowledge Scores by Intervention, FY 2013



f. Fruits and Vegetables

In terms of student fruit and vegetable knowledge, there were no statistically significant differences found among the three intervention cohorts at pre- (p=0.633) or post-survey (p=0.566). Students reported eating fruits or vegetables on the average of 2.64 times "yesterday" (SD=1.82). A total of 144 students (19.7%) met the recommended five servings of fruits and vegetables per day. Although non-significant (p=0.103), the nutrition-only cohort reported a descriptively higher report of fruit and vegetable consumption (M=2.86, SD=1.87) compared to the combination cohort (M=2.59, SD=1.79) and physical activity-only cohort (M=2.51, SD=1.80). Chi-square analysis indicated no significant association between fruit and vegetable knowledge and meeting recommendations for daily fruit and vegetable consumption for all students (r=1.490, p=0.475). The majority of students (76.1%) answered both fruit and vegetable knowledge questions correctly, but did not meet the recommended five servings of fruits and vegetables per day, while 18.3% answered both questions correctly and did meet the recommendations. When stratified by intervention cohort, there was no significant association between fruit and vegetable knowledge and behavior for any of the intervention cohorts: nutrition-only (r=0.046, p=0.592); physical activity-only (r=0.401, p=0.818); and combination (r=0.944, p=0.254).

g. Physical Activity

The mean physical activity knowledge score for students at pre-survey was 5.96 out of 8 possible points (SD=1.21) and M=4.64 at post-survey (SD=0.80). Paired samples t-test determined the mean knowledge scores were significantly different from pre- to post-survey, t=28.756, p<0.001. Physical activity knowledge scores did not differ significantly across the three levels of school implementation at pre-survey (F=0.897, p=0.408). At pre-survey, there were no statistically significant differences in physical activity knowledge scores between the intervention cohorts (F=1.084, p=0.339); however, post-survey ANOVA tests indicated statistically significant differences in physical activity knowledge scores across the intervention cohorts. Students in the physical activity-only intervention cohort scored highest (M=4.73, SD=0.81) compared to combination (M=4.66, SD=0.74) and the nutrition-only (M=4.50, SD=0.84) intervention cohorts; F=5.036, p=0.007. RM-ANOVA tests were conducted to determine the effect of the interaction over time from pre- to post-survey and the effect of the intervention cohorts over time, but results indicated no significant interaction (F(1,730)=0.189, p=0.828). No significant gender differences were determined between physical activity knowledge scores of males and females at pre-survey (t=-0.875, p=0.382) or post-survey (t=-1.861, p=0.063).

Physical activity behavior summaries are provided in Table 3.7. The mean number of days in the previous week that students reported spending 60 minutes or more physically active was 3.47, SD=2.21. Almost half of the students (n=340, 46.8%) reported physical activity on both weekend days (Saturday and Sunday), while 29.8% (n=216) did not report 60 minutes of physical activity on either weekend day. Independent samples t-tests determined significant differences in the report of weekly physical activity between males (M=3.26, SD=2.23) and females (M=3.68, SD=2.18), t=-2.511, p=0.012. When evaluating gender differences in physical activity reports, females were more physically active than males during weekdays (t=-2.367, p=0.018); however, there were no significant differences in physical activity reported during weekend days (t=-1.621, p=0.105).

Table 3.7. Longitudinal Impact Study Physical Activity Behaviors, Year 1, FY 2013

Physical Activity (PA) Behaviors *(Survey Question)*	Nutrition-only n, M (SD)	Physical Activity-only n, M (SD)	Combination Lessons n, M (SD)	Total Students n, M (SD)
Total days – PA 60 minutes *(Q10)*	214, 3.63 (2.31)	248, 3.09 (2.08)	263, 3.71 (2.20)	725, 3.47 (2.21)
School days – PA 60 minutes	214, 2.27 (1.90)	248, 2.02 (1.69)	263, 2.59 (1.71)	725, 2.30 (1.77)
Weekend days – PA 6- minutes	214, 1.36 (0.82)	248, 1.06 (0.85)	264, 1.12 (0.88)	726, 1.17 (0.86)
Hours per school day – TV *(Q11)*	212, 2.66 (2.22)	249, 2.45 (2.03)	266, 2.36 (2.08)	727, 2.48 (2.11)
Hours per school day – Computer *(BQ12)*	214, 1.94 (2.03)	249, 1.98 (2.06)	264, 2.01 (2.00)	727, 1.98 (2.03)
Hours per school day – Video Games *(BQ13)*	213, 2.37 (2.33)	250, 2.45 (2.32)	266, 2.46 (2.22)	729, 2.43 (2.29)
Total hours per school day sedentary*	210, 6.99 (5.23)	249, 6.87 (4.83)	264, 6.81 (4.73)	723, 6.88 (4.90)

*The sum of the reported number of hours per typical school day spent watching TV, using a computer, and playing video games.

Total sedentary behavior was calculated by summing the reported number of hours per typical school day spent watching TV, using a computer, and playing video games. The mean number of reported sedentary hours was 6.88, SD=4.90 per day. Watching TV was the most common way students spent their sedentary time (M=2.48, SD=2.11). Males reported significantly more time spent sedentary (M=7.74, SD=5.22) than females (M=6.07, SD=4.42), t=4.644, p<0.001.

Multiple correlations were conducted to examine the relationship between physical activity knowledge and behaviors. A weak but significant correlation was found between physical activity knowledge scores and reported physical activity behaviors (r=0.123, p=0.001) meaning that the greater physical activity knowledge, the more participation in physical activity. When selectively evaluating the correlation between physical activity knowledge and physical activity behaviors of students in the physical activity-only cohort, a non-significant correlation was determined (r=0.153, p=0.091); however, the combination cohort had a significant correlation between physical activity knowledge and behavior(r=0.238, p<0.001). A negative relationship was determined between physical activity knowledge score and reported time spent watching TV or movies (r=-0.127, p=0.001).

v. Discussion

Results from the first year of the three-year Longitudinal Impact Study revealed some change in students' nutrition and physical activity knowledge and behaviors after participating in an assigned intervention. Regarding the original evaluation objectives, differences in knowledge and behaviors were found to be somewhat dependent on intervention cohort, but with little to no association with school implementation level of health and wellness initiatives. Findings demonstrated that nutrition and combination intervention cohorts experienced increases in snack knowledge during the intervention, while the physical activity-only cohort experienced a decrease. It can be inferred from these results that the nutrition lessons included in the curriculum of these two intervention cohorts were effective in increasing students' knowledge about healthy and unhealthy snack choices. Results were inconclusive regarding differences in food group identification knowledge among the intervention cohorts; students who received nutrition lessons did not gain any more food

group knowledge than those who did not. More specifically, there was no change in knowledge from pre- to post-intervention across all three intervention cohorts for potato and nuts identification measures. This implies that students receiving nutrition lessons specific to food groups, such as the "MyPlate" lesson used in this study, may require more knowledge reinforcement regarding food group identification.

While knowledge increased in many specific areas, overall knowledge decreased for all students from pre- to post-survey. A decrease may have occurred due to overlap between survey administration and state-wide standardized testing, such that students may have felt overwhelmed or "burned out" when confronted with the multiple-choice post-survey. Similarly, fewer students correctly answered the breakfast knowledge question on the post- than on the pre-survey. It was observed by ORE staff that students found the responses to this question very easy to answer, and even amusing. Therefore, possible explanations for the decrease in knowledge about breakfast could be that the students intentionally selected the "amusing" answer rather than the correct one.

Findings demonstrated significant associations between nutrition and physical activity knowledge, and physical activity and sedentary behaviors. Among all intervention cohorts, higher physical activity knowledge scores were significantly associated with decreased time spent watching television. Similarly, as total knowledge scores increased, reported weekly physical activity also increased, while time watching television decreased. The combination intervention cohort demonstrated the strongest, significant positive correlation between physical activity knowledge and weekly physical activity level. Although the physical activity-only intervention cohort obtained the highest physical activity knowledge scores, this knowledge did not translate to a significant association with activity frequency. These results did not reflect the initial hypothesis that greater physical activity knowledge scores would lead to higher physical activity frequency.

Reported weekly physical activity showed that females were more physically active than males during weekdays, with no significant differences in physical activity by gender reported for weekend days. This finding is unique, as females are commonly regarded in the literature as less active than males, across multiple age groups from childhood to adolescence. [57,58] Within a sample of Philadelphia elementary school students in grades 4-6, Trost et. al (2013) found that boys participated in significantly higher levels of moderate-to-vigorous physical activity than girls.[59] Possible explanations for the differences between our sample and what has been cited previously include: changes in the physical activity environment at the individual schools (e.g., specialized physical education classes, sports programs, extracurricular activities) that resulted in higher physical activity levels for girls, gender differences in the appeal of sedentary behaviors (e.g., screen time), or seasonal variation in the availability of after-school physical activity programs (e.g., girls might enroll in dance classes throughout the year, while boys might play seasonal sports like football or basketball).

[57] Belcher, B., Berrigan, D., et al (2010). Physical activity in US youth: Impact of race/ethnicity, age, gender, & weight status. *Medicine and Science in Sports and Exercise*, 42(12): 2211-2221.
[58] Nader, P., Bradley, R., et al (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association*, 300(3): 295-305.
[59] Trost, S., McCoy, T., et al (2013). Physical activity patterns of inner-city elementary schoolchildren. *Medicine and Science in Sports and Exercise*, 45(3):470-474.

No significant associations were found between fruit and vegetable knowledge and meeting the recommended five servings of fruits and vegetables per day. Furthermore, knowledge concerning sugary soda as the cause of cavities was not correlated to sugar-sweetened beverage consumption. However, knowing that breakfast makes the body healthy was significantly associated with breakfast consumption. In general, insignificant findings connecting nutrition knowledge and dietary habits may be due to children's limited control over food choices outside of school. [60,61,62] Because caregivers are the main influencers of young children's diets, there are restrictions on the effect that nutrition education and nutrition knowledge can have on children's behavior outcomes.[63,64]Additionally, children are not as capable as adolescents or adults at understanding abstract concepts like the connection between diet and disease or illness (e.g., cavities can occur from drinking too much sugary soda).[65] Therefore, consistent messages about diet, physical activity, and health benefits/consequences are important to continue and reinforce as children age and develop, so as to encourage the adoption of healthy behaviors.

Due to the current political climate of The School District of Philadelphia, several changes have been made to schools and staffing, which may have influenced the original levels of school implementation determined for this study design in FY 2013. Some of the original schools selected for this study have since been closed down or taken over by private charter organizations outside of the District. In response, ORE assigned different District schools to fill the vacancy in the study design for FY 2014. These added schools do not necessarily implement nutrition and physical activity education in similar ways. Furthermore, several District schools have been merged together, influencing the capacity for program implementation and thus altering the original school implementation levels determined for FY 2013. Therefore, the ORE has decided to disregard the implementation level component of this study, starting in FY 2014.

The findings from this study are limited in several ways. Foremost, there was an unequal distribution of minority students among the intervention cohort samples; therefore, findings cannot be generalized because they may not accurately reflect the Philadelphia SNAP-Ed student population. Race/ethnicity was also not included as a covariate factor in outcome measurements; therefore, it is unclear if demographic characteristics, other than gender, may have impacted study results.

Furthermore, during survey administration ORE staff observed that many students had difficulty answering the multiple choice questions related to weekly participation in physical activity, and hours per day of screen time on the *Nutrition and Physical Activity Behaviors Assessment.* Misunderstanding of these questions may have led

[60] Birch, L., Ventura, A. (2009). Preventing childhood obesity: What works? *International Journal of Obesity*, 33:S74-S81.
[61] Hanson, K., Olson, C. (2013). School meals participation and weekday dietary quality were associated after controlling for weekend eating among U.S. school children aged 6 to 17 years. *The Journal of Nutrition*, 143:714-721.
[62] Robinson-O'Brien, R., Burgess-Champoux, T., et al (2010). Associations between school meals offered through the National Lunch Program and the School Breakfast Program and fruit and vegetable intake among ethnically diverse, low-income children. *Journal of School Health*, 80(10): 487-492.
[63] Birch, L., Fisher, J. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, 101(Suppl): 539-549.
[64] Patrick, H., & Nicklas, T. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition*, 24(2); 83-92.
[65] Hoelscher, D., Evan, A., et al (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*, Supplement 102(3):S52-S63.

to over and/or under-reporting of weekly physical activity and screen time. However, it was found that on average students had approximately 7 hours of screen time per day outside of school, which is consistent with findings for youth ages 8-18 years old, as reported by researchers at the Kaiser Family Foundation (2010).[66] These questions were adapted from the School Physical Activity and Nutrition (SPAN) survey, a nationally recognized, validated measure.

Finally, inconsistency in the schedule of lesson delivery across ERN community partners may have led to errors in the validity of results. For FY 2014, ERN community partners were instructed by ORE to adhere to a standardized schedule for delivery of the Longitudinal Impact Study lessons to 4th grade students. It is predicted that more consistent lesson delivery will lead to more pronounced findings in the continuation of this longitudinal study. We are also providing training on all of the lessons, which will also help to standardize messages across all of the different, varied nutrition educators.

[66] Rideout, V., Foeher, U., Roberts, D. (2010). Generation M2: Media in the lives of 8 to 18 year olds. January 2010 Report. The Henry J. Kaiser Family Foundation, Menlo Park, CA.

V. Vegetable Core Follow-Up and 5th Grade Behaviors

i. Overview

The Vegetable Core was a four-lesson intervention implemented during the 2011-12 school year (SY) designed to increase 4th grade students' knowledge of the nutritional benefits of vegetables.[67] The lessons exposed students to various vegetables by providing them with the opportunity to sample food after they had received the associated lessons. In the 2011-2012 SY, the Office of Research and Evaluation (ORE) conducted an interrupted time-series evaluation of the Vegetable Core with the 4th grade intervention students. In SY 2012-13, ORE conducted a follow-up study to assess sustainability of knowledge, attitudes, and behaviors among 5th grade students who received the 4th grade Vegetable Core curriculum in SY 2011-12. No additional intervention was prescribed to this grade group in SY 2012-13, but rather an analysis of follow-up data to determine what factors (dose, contact type, etc.) positively affected post-survey scores. The intention of this evaluation was to measure for sustainability, while also determining what opportunities exist for program providers to boost student knowledge around Vegetable Core-related concepts in the future.

ii. Design

Two fifth grade surveys were developed and vetted among *EAT.RIGHT.NOW*. (ERN) community partners and the Management Entity (ME). The first survey, entitled *5th Grade Nutrition and Physical Activity Assessment*, contained nutrition and physical activity knowledge, attitude, and behavior questions. The purpose of this survey was to determine the following:

- Among those students who participated in the 4th grade Vegetable Core last year, was there sustainability of knowledge, attitudes, and behaviors from last school year to the current year?
- What knowledge of nutrition and physical activity did 5th grade students have outside of the Vegetable Core content?

The second 5th grade survey, entitled *5th Grade Nutrition Behaviors Assessment*, utilized modified School Physical Activity and Nutrition (SPAN) survey items to specifically ask students about their dietary and physical activity behaviors from the previous day, including whether or not the student ate breakfast and lunch. Together, both assessments were used to determine any associations between knowledge and behaviors. Both of the above-mentioned surveys were administered by ORE between March and May 2013.

iii. Methods

During the 2011-12 SY, 588 4th graders participated in the Vegetable Core curriculum evaluation. The survey included questions regarding Vegetable Core knowledge, self-efficacy, attitude, and preference measures. Each of these measures were defined by the Management Entity in a previous publication by Wall et al (2008).[1] In

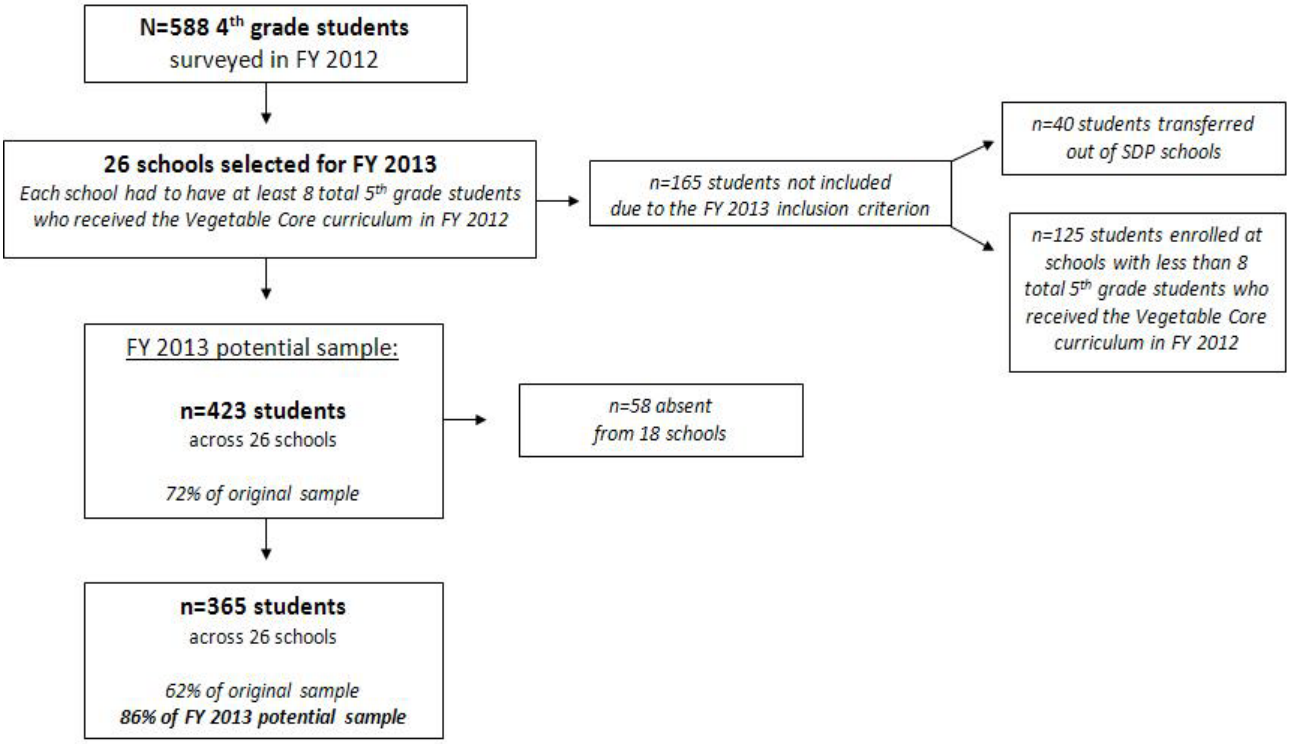
[67] Wall, D., Least, C., et al (2012). Nutrition education intervention improves vegetable-related attitude, self-efficacy, preference, and knowledge of fourth-grade students. *Journal of School Health*, 82(1): 37-43.

2012-13, a follow-up evaluation was conducted to monitor any changes in attitudes, behaviors, and preferences. Since the 4th graders transitioned into 5th grade, a sampling plan was constructed to reach the largest groups of students without expending resources. Students were grouped by current school enrollment. Forty students from the original 2012 sample transferred out of the SDP system, and therefore were lost to follow-up.

Participation in the 2013 evaluation was determined by the Vegetable Core student sample size at each school. After removing the 40 students who transferred out of the SDP system, the remaining 548 students were enrolled in 87 schools. Out of the 87 schools, 26 were selected for participation in the follow-up evaluation. The school selection criterion was based on enrollment of at least 8 total 5th grade students who received the Vegetable Core curriculum in 2012. Due to this criterion, an additional 125 students from excluded schools were not eligible for inclusion in the follow-up.

The 2013 potential sample consisted of 423 5th grade students across 26 schools (72% of original 2011-2012 4th grade sample). Once absences on the day the follow-up was conducted were accounted for (n=58 from 18 schools), the final sample was reduced to 365 students (62% of original sample), as shown in Figure 4.1. Finally, only students who completed the 4th grade pre- and post-survey within approximately 3-5 weeks were included in the analysis, which was determined by making comparisons to the 2011-12 SY assessments (Figure 4.1). This is due to the exclusion of students who did not complete surveys in that time frame during Penn State's evaluation of the Vegetable Core in FY 2011-2012.

Figure 4.1. Vegetable Core Follow-Up Reach, FY 2013



*The 26 schools where students attended 5th grade in FY 2013 were: Anderson, Bethune, Catherine, Decatur, Dunbar, Emlen, Farrell, Fell, GAMP, Gompers, Huey, Loesche, Masterman, Meredith[1], Mifflin[1], Mitchell, Moore, Peirce, Pennypacker, Penrose, Prince Hall, Richmond, Sharswood, Stearne, & Waring.

[1]Masterman and Meredith are not ERN eligible schools. Students attending Masterman and Meredith in FY 2013 previously attended ERN eligible schools in FY 2012, where they received Vegetable Core.

iv. Results

Acquisition of content knowledge and behavior change was measured using pre-to-post-survey responses. All analyses were conducted using IBM SPSS® Statistical Package 19, and an *a priori* alpha level of 0.05 was used to determine statistical significance. The specifics of each outcome measure are detailed below.

For the final sample, demographic information was collected for 362 students. Of those students, 192 (53.0%) were female; 56.6% were Black or African American, followed by White (23.8%), Hispanic/Latino (9.9%), and Asian (5.8%). Students who identified as more than one race or ethnicity were categorized as "multiracial," and comprised 3.9% of the total sample. The mean age of students during the Vegetable Core follow-up was 11.5, ranging from 10.6-13.4.

In order to evaluate sustainability of baseline Vegetable Core knowledge, attitudes, self-efficacy, and vegetable preference over time, paired samples *t*-tests were conducted comparing the scores from students' 4th grade pre-

survey in 2012 to scores on the 5th grade follow-up in 2013 (Table 4.2). Similarly, analyses were conducted examining 4th grade post-survey to 5th grade follow-up scores (Table 4.3).

Table 4.2. Vegetable Core 4th Grade Pre and 5th Grade Follow-Up

Vegetable Core Measure	Maximum Score	4th Pre M, SD	5th Follow-Up M, SD	*t*-value	Significance (p-value)	95% Confidence Interval
Knowledge (n=321)	4	2.73, 1.170	3.12, 1.11	-5.025	**<0.001**	-0.55489, 0.24262
Attitude (n=343)	10	7.87, 2.029	7.60, 1.95	2.381	**0.018**	0.04711, 0.49517
Self-efficacy (n=341)	10	7.73, 2.18	7.65, 2.10	0.608	0.544	-0.17701, 0.33537
Preference (n=320)	50	35.91, 7.82	35.43, 7.54	1.254	0.211	-0.27007, 1.22007

Table 4.3. Vegetable Core 4th Grade Post and 5th Grade Follow-Up

Vegetable Core Measure	Maximum Score	4th Post M, SD	5th Follow-Up M, SD	*t*-value	Significance (p-value)	95% Confidence Interval
Knowledge (n=297)	4	3.92, 0.983	3.16, 1.12	10.192	**<0.001**	0.61401, 0.90787
Attitude (n=306)	10	7.90, 2.177	7.63, 2.06	2.194	**0.029**	0.02831, 0.52071
Self-efficacy (n=309)	10	7.85, 2.281	7.61, 2.10	1.909	0.57	-0.00752, 0.49943
Preference (n=285)	50	37.48, 8.44	35.59, 7.67	4.869	**<0.001**	1.12661, 2.65584

Independent samples *t*-tests analyzed the gender differences of the four main Vegetable Core measures at follow-up. Attitude was the only component with significant gender differences in scores at follow-up, where females (M=7.82, SD=1.72) scored significantly higher than males (M=7.30, SD=2.21), $t(315.5)=-2.477$, $p=0.014$.

RM-ANOVA analyses indicated gender differences in knowledge, attitude, self-efficacy, and preference over each of the three survey time points (Table 4.4). Females scored significantly higher than males on the attitude ($F(1,280)=8.410$, $p=0.004$) and self-efficacy ($F(1,283)=5.790$, $p=0.017$) components at all three survey points.

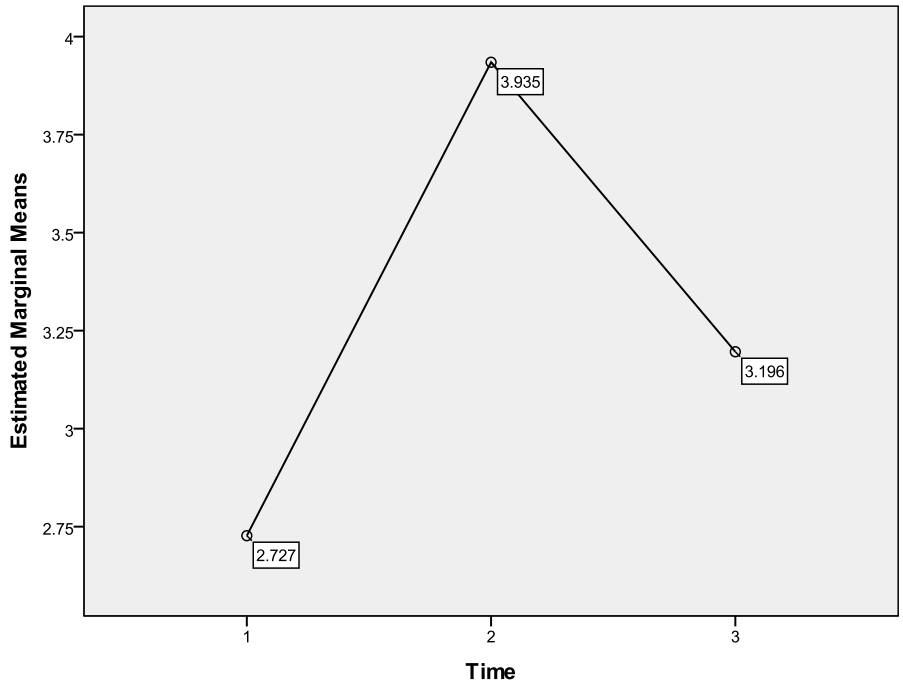
Table 4.4. Vegetable Core 4th Grade RM-ANOVA Results for Time and Gender, Pre-to-Post-Survey, 2012-2013

Dependent Variable	Males n, M, *SD*	Females n, M, *SD*	Main Effect of Time	Main Effect of Gender	Main Effect of Interaction	Result
Knowledge	n=122 3.18, *1.16*	n=136 3.22, *1.11*	F(2,512)=98.651 **p<0.001**	F (1,256)=0.188 p=0.665	F(2,512)=0.027, p=0.973	Main effect of time was statistically significant.
Attitude	n=130 7.52, *1.955*	n=152 7.80, *1.63*	F(1.9,526.2)=6.071 **p=0.002**	F (1,280)= 8.410 **p=0.004**	F(1.9,526.2)=0.022, p=0.978	Main effect of time and main effect of gender were statistically significant.
Self-efficacy	n=129 7.33, *2.28*	n=156 7.83, *1.94*	F(1.9,540.4)=2.508 p=0.082	F (1,283)=5.790 **p=0.017**	F(1.9,540.4)=0.051, p=0.944	Main effect of gender was statistically significant.
Preference	n=113 35.76, *6.77*	n=143 35.76, *6.77*	F(1.9,472.7)=12.817 **p<0.001**	F (1,254)=0.281 p=0.597	F(1.9,472.7)=0.022, p=0.973	Main effect of time was statistically significant.

a. Knowledge

RM-ANOVA analyses were conducted to determine if knowledge learned during the 4th grade Vegetable Core was sustained over time. Although there was a significant decrease in Vegetable Core knowledge scores from 4th grade post-survey to 5th grade follow-up ($t(297)=10.192$, $p<0.001$), the mean score at 5th grade follow-up was significantly higher than 4th grade pre-survey scores ($t(320)=-5.025$, $p<0.001$), indicating that VC knowledge was retained to some extent (Figure 4.5).

Figure 4.5. Estimated Marginal Means of VC Knowledge Scores From Pre(1), to Post(2), to Follow-Up(3)



b. Attitude

A significant difference was found between attitude scores from 4th grade post to 5th grade follow-up (Mean difference=0.419, p=0.004). However when comparing the attitude scores of students from 4th grade pre-survey (baseline) to 5th grade follow-up, there was not a significant difference in scores (Mean difference=0.232, p=0.186). At all three points of time, females had a significantly higher overall mean attitude score than males (p=0.004).

c. Self-efficacy

There was a descriptive but non-significant difference in self-efficacy scores across each of the survey points (Main effect of time: F(1.9,540.4)=2.508, p=0.085). Females scored significantly higher than males at all three points of time (Main effect of gender: F(1,283)=5.790, p=0.017).

d. Preference

Preference scores significantly differed from 4th grade pre- to 4th grade post-survey (Mean difference=-1.434, p<0.001), and again from 4th post to 5th follow-up (Mean difference=1.880, p<0.001). When looking at the 4th grade baseline score to the 5th grade mean follow-up preference score, there is not a significant difference (Mean difference=0.466, p=0.639).

e. Additional Components

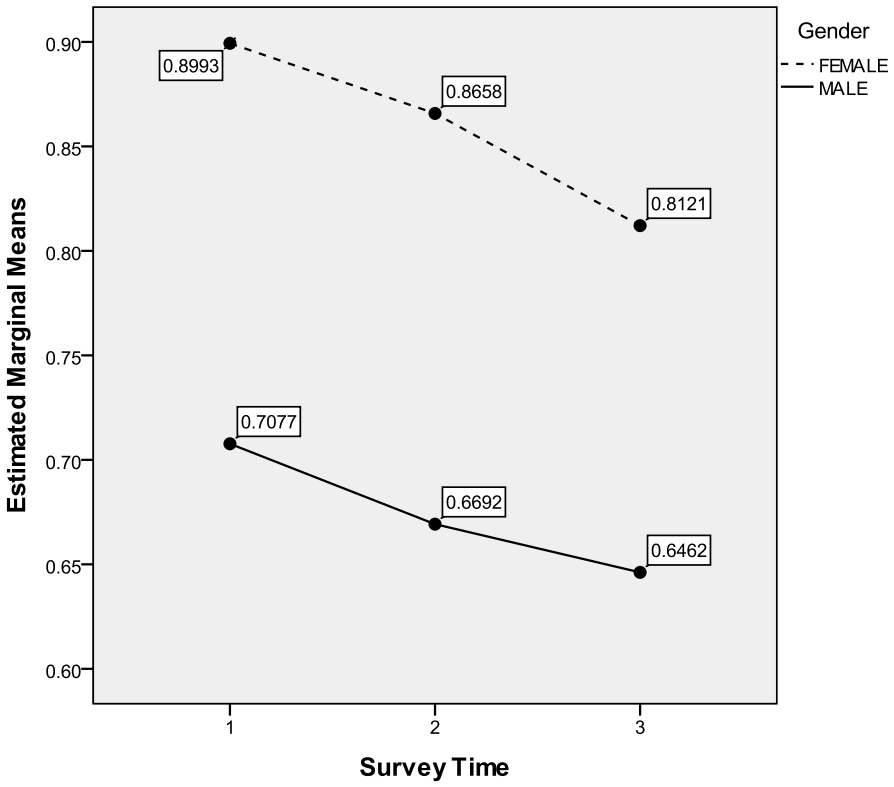
During the 5th grade follow-up, students were asked questions about nutrition and physical activity in addition to the four standard Vegetable Core questions. 95.3% of students knew that kids and teenagers should be physically active for 60 minutes a day. Students had difficulty around nutrition label comprehension, where 52.1% of students incorrectly answered a question regarding total calories in the package. The seven additional nutrition knowledge questions that were not a measurement of the Vegetable Core evaluation yielded a mean score of 4.44 out of 7, SD=1.19.

During the 5th grade follow-up in FY 2013, students were surveyed about self-reported behaviors. On average, the self-reported number of days spent doing moderate to vigorous physical activity was 4.60, SD=2.028 out of 7 days. There were no significant differences between the physical activity self-reported by males (M=4.58, SD=2.154) and females (M=4.63, SD=1.918), p=0.833. 20.1% of students met the recommended 5 or more servings of fruits and vegetables per day, where servings were counted by the number of times a student consumed the foods. There were no significant gender differences in the report of fruit and vegetable consumption (p=0.351). Vegetable Core knowledge scores were not significantly correlated with fruit and vegetable consumption behaviors (r=0.084, p=0.109).

Students reported an average dairy product (milk, cheese, yogurt) consumption of 3.13 times per day (SD=1.82). 63.3% of students reported consuming at least 3 servings of dairy per day, as recommended by the USDA Dietary Guidelines, while 36.7% did not meet guideline recommendations. Similar to fruit and vegetable consumption, Vegetable Core knowledge scores were not significantly correlated with dairy consumption behaviors (r=0.095, p=0.069).

Whether or not students make food with their family was also measured at all three survey points of time. RM-ANOVA results indicated statistically significant differences in students' report of making food with the family over time (main effect of time: $F(1.76,491.9)=3.478$, $p=0.037$). From 4th grade pre-survey to 5th grade follow-up, there was a strong drop in the number of students who reported making food with their families (Mean difference=0.075, $p=0.053$). As Figure 4.6 shows, females reported significantly more involvement with making food with their families than males did across all three points of time ($F(1,277)=24.675$, $p<0.001$). On the 5th grade follow-up survey, 244 students reported making food with their family and also eating dinner with their family (67.8%), $r=10.989$, $p=0.001$. Moreover, eating dinner with the family was strongly associated with higher vegetable preference, $r=22.696$, $p<0.001$.

Figure 4.6. Estimated Marginal Means of Making Food with Family by Gender, From Pre, to Post, to Follow-Up, FY 2013



vi. Discussion

The Vegetable Core curriculum delivered in the 2011-2012 school year resulted in significant increases in 4th grade students' knowledge, attitudes, self-efficacy, and preference in relation to vegetable consumption. These results parallel those found in Wall et al.'s (2008)[68] impact evaluation of the Vegetable Core curriculum.

[68] Wall, D., Least, C., et al (2012). Nutrition education intervention improves vegetable-related attitude, self-efficacy, preference, and knowledge of fourth-grade students. *Journal of School Health*, 82(1): 37-43.

Although the curriculum demonstrated positive results, its short delivery time-span of four lessons over 3 to 5 weeks left some questions about the sustainability of results. Therefore, in the 2012-2013 school year, ORE aimed to investigate any changes in student content knowledge and other key Vegetable Core measures over time, as well as any associations between outcome measures and nutrition behaviors.

Results from the 5th grade follow-up evaluation indicated that students' maintained a fair amount of knowledge one year following the Vegetable Core delivery, while other outcome measures decreased from 4th grade to 5th. Maintenance of knowledge was demonstrated by the significant difference between mean 5th grade follow-up and 4th grade pre-survey knowledge scores, as follow-up scores (M=3.196) were higher than those at baseline measurement (M=2.73). The data showed a decline in attitudes about vegetables on the follow-up survey, which may have resulted from the lack of reinforcement to eat and/or try vegetables; this was a main outcome objective of the food tastings included the Vegetable Core 4th grade classroom lessons. Pre- to post-survey analyses in FY 2012 indicated that Vegetable Core significantly reinforced taste preferences among 4th grade students. However, one year later preferences returned to near baseline values. This trend implies that students' exposure to trying new varieties of vegetables during the Vegetable Core curriculum increases their preferences for vegetables, but once the classroom exposure is removed, their preference lessens. Another explanatory variable for this change may be accessibility. For example, if a student tries squash during a Vegetable Core taste test, they may report liking the vegetable at post-survey, but one year later after not eating squash (due to limited access at home, school, etc), they may report a decline in preference.

Consistent with findings from FY 2012, the self-efficacy scores showed a descriptive, but non-significant increase from 4th grade pre- to post-survey which demonstrates a moderate preservation of self-efficacy over time. Female students consistently reported higher self-efficacy than males, which could imply that external factors influence vegetable consumption and food preparation behaviors among girls.

Vegetable Core and general nutrition knowledge was not associated with diet and physical activity behaviors. This indicates that while the Vegetable Core has some lasting impact on knowledge, attitudes, and self-efficacy surrounding vegetable consumption, it has little long-term influence on eating behaviors. While 5th grade students reported being physically active for an average 4 to 5 days per week, three-quarters did not consume the daily recommended servings of fruits and vegetables (5 or more per day), and more than one-third did not meet recommended dairy servings (at least 3 servings per day). The number of children still not meeting Dietary Guideline recommendations allows room for improvement in the implementation and delivery of nutrition education regarding these foods.

In general, outcomes of the Vegetable Core Follow-Up Study showed that the Vegetable Core intervention, which administers a high concentration of lessons over a short time period, led to significant increases in some outcome measures between 4th grade pre-and post-survey in FY 2012. However, participating in the Vegetable Core did not lead to persistent results over the long-term. Significant declines in vegetable attitudes and preferences with absence of the Vegetable Core lessons in FY 2013 support this reasoning. These findings are

consistent with nutrition education interventions reviewed by Roseman et al. (2011)[69] and Shaya et al. (2008)[70], who concluded that significant, positive results from short-term interventions do not endure over time. ORE recommends that more concentrated nutrition education be made over longer periods of time in order to sustain greater knowledge, attitudes, and self-efficacy toward healthy eating behaviors. Declines in vegetable preference after the Vegetable Core lessons indicate that continued exposure to vegetables, and perhaps other healthy foods, is needed to encourage positive behavior change. This suggestion is consistent with the Institute of Medicine's recommendation to increase nutrition education instructional time to develop strong foundation knowledge on healthy foods and eating habits.[71]

Beyond the key Vegetable Core outcome measures mentioned above, students were asked questions pertaining to various behaviors related to food consumption and preparation, including if they make food, and eat dinner with their family. The significant decline in the number of students preparing food with their families from 4th to 5th grade provides insight into family meal time behaviors, and rationale for additional focus on this objective in future PA TRACKS/ERN Adult Track programming. Moreover, the strong correlation between students' eating dinner with their family and greater vegetable preference indicates significant influence of family eating behaviors on children. Evidence provided in the literature supports the strong influence of parents and caregivers in affecting the diet and activity behaviors of their children.[72] Family mealtime provides the structure and context for developing children's eating patterns, as children are likely to model the eating behaviors of their parents and other surrounding adults.[73,74] Reviews of childhood obesity interventions indicate that family and parental involvement can enhance the effects of school-based programs by impacting the meal preparation and consumption behaviors in the home environment.[4,75]

Several limitations of this evaluation should be noted. First, the follow-up component of this study required ORE to match and find students who had completed the Vegetable Core in 4th grade in 2011-2012, and entered 5th grade in 2012-2013. This task proved more difficult than originally planned. Unfortunately, the large size of The School District of Philadelphia, the creation of new charter schools, and the transformation of public schools to charter or alternative schools, made it difficult to find every student who had participated in Vegetable Core.

Furthermore, ORE was not able to control for nutrition education administered to the 5th grade classrooms involved in the follow-up study. Although all of the students included in this year's study had participated in the Vegetable Core during 4th grade, ORE cannot equate any retention of scores to solely the Vegetable Core

[69] Roseman et al (2011). A content analysis of kindergarten-12th grade school-based nutrition interventions: Taking advantage of past learning. *Journal of Nutrition Education and Behavior, 43*(1): 2-18.
[70] Shaya, F., Flores, D., et al (2008). School-based obesity interventions: A literature review. *Journal of School Health*, 78(4): 189-196.
[71] Glickman et al (2012). Accelerating progressing in obesity prevention: Solving the weight of the nation. Institute of Medicine Committee on Accelerating Progress in Obesity Prevention.
[72] Hendrie, G., Brindal, E., et al (2012). Combined home and school obesity prevention interventions for children: What behavior change strategies and intervention characteristics are associated with effectiveness? *Health Education and Behavior,* 39(2): 159-171.
[73] Birch, L., Fisher, J. (1998). Development of eating behaviors among children and adolescents. Pediatrics, 101(Suppl): 539-549.
[74] Patrick, H., & Nicklas, T. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition*, 24(2); 83-92.
[75] Katz, D., O'Connell, M., et al (2008). Strategies for the prevention and control of obesity in the school setting: systematic review and meta-analysis. *International Journal of Obesity*, 32: 1780-1789.

curriculum. In addition, the Vegetable Core follow-up evaluation tool was not composed of questions unique to the Vegetable Core curriculum; some questions focused on general nutrition knowledge, which could have been learned outside of the curriculum. Students may have been exposed to reinforcing nutrition messages through school programming that occurred during the year since the Vegetable Core's conclusion. Out of the 26 schools in which follow-up surveys were administered, ORE confirmed that 5th grade nutrition programming occurred in FY 2013 Quarters 1 and 2 at twenty-two of those schools (n=311, 85.2%). This programming could have ranged from a single-classroom lesson to a series of classroom lessons, with topics ranging anywhere from physical activity to vegetables to calcium. However, the effect of this additional education exposure is believed to not have had a large impact on students' knowledge, as follow-up survey scores for general nutrition knowledge (non-Vegetable Core) were not significantly different between the students who received programming in FY 2013 compared to those who did not. Similarly, there were no significant differences in scores of the Vegetable Core measures regardless of additional education in FY 2013.

VI. Choice, Control, & Change (C3) Curriculum

i. Overview

The *Choice, Control & Change* (C3) curriculum demonstrated some positive knowledge and behavior change among 8th grade students in the 2011-2012 school year (SY). For this reason, its implementation was expanded into the 7th grade for the 2012-2013 SY. The original *Choice, Control & Change* (C3) lessons[1] were designed for classes lasting at least one hour, which is longer than the forty-five minutes typically allotted to nutrition educators in the School District of Philadelphia (SDP). To address the reduction in available classroom time, the creators of the original curriculum worked with the District to split the original four lessons into two parts, thus increasing the total number of lessons to eight. This implementation design was used in fiscal year (FY) 2012 and again in FY 2013.

The 7th grade lessons covered Unit 1: *Investigating Our Choices,* while 8th grade lessons covered Unit 2: *Dynamic Equilibrium.* Unit 1 aimed to teach students about how the environment in which we live, work, and play influences food and activity choices. The goal of Unit 1 was for students to understand that many of the foods readily available for consumption are not always the healthiest choices for our bodies. Unit 2 expanded on this idea by teaching students about how the right food and physical activity choices can keep the body in a state of energy balance. The goal of Unit 2 was to have students understand the concepts and importance of energy balance (i.e., energy intake through food is equal to energy expenditure through activity).

ii. Design

The Office of Research and Evaluation (ORE) employed a quasi-experimental design to assess the following outcomes:

- Whether the C3 curriculum accomplished its goal of increasing student knowledge of nutrition and physical activity; and
- Whether the C3 lessons caused a change in nutrition and physical activity behaviors.

All SNAP-Ed eligible schools, including charter and SDP public schools, with at least two 7th grade and two 8th grade classroom were stratified by community partner. Then, community partners chose schools in which they would like to implement the C3 curriculum (known as "intervention schools"). For each intervention school there was a school in which the community partner did not implement the C3 curriculum (known as "comparison schools"). Ultimately, twelve intervention schools and twelve comparison schools completed the study, as shown in Table 5.1. Community partners scheduled the lesson dates at their discretion, with some lessons occurring weekly and others occurring at a less frequent interval. Partners were instructed that they could not teach lessons more than one time per week. Outcomes were assessed using a pre/post-survey

[1] Koch, P.A., Contento, I.R., & Barton, A.C. (2010). *Choice, control, and change: Using science to make food and activity decisions.* New York, New York: Teachers College of Columbia University.

developed by ORE, with input from community partners and the Management Entity (ME). The knowledge assessment portion of the survey was written directly from the C3 unit the students received.

Table 5.1. C3 Schools by Community Partner and Condition Group, FY 2012–2013

Community Partner	Group	Assigned Schools
Albert Einstein	Comparison	Birney Prep Academy, F.D. Pastorius
	Intervention	E. Steel, H.A. Brown
Drexel University	Comparison	J. Cooke, W.H. Hunter
	Intervention	G. Washington, A.M.Y. 5 at James Martin
Health Promotion Council	Comparison	Potter-Thomas, G. Spruance
	Intervention	G.W. Childs, J. DeBurgos
The School District of Philadelphia	Comparison	A.J. Morrison, J.H. Taggart
	Intervention	F. Hopkinson, J. Alcorn
The Food Trust	Comparison	T. Duckrey, G. Clymer
	Intervention	A. Adaire, A. Hamilton
Urban Nutrition Initiative	Comparison	W.C. Bryant, A. Locke
	Intervention	G. Pepper, S.B. Huey

ORE was responsible for administering both the pre- and post-surveys in all classrooms. The pre-survey administration began on October 23, 2012 and the last class received the post-survey on June 6, 2013. Pre-surveys were administered prior to the commencement of lessons and post-surveys were scheduled to take place within two weeks of the final C3 lesson.

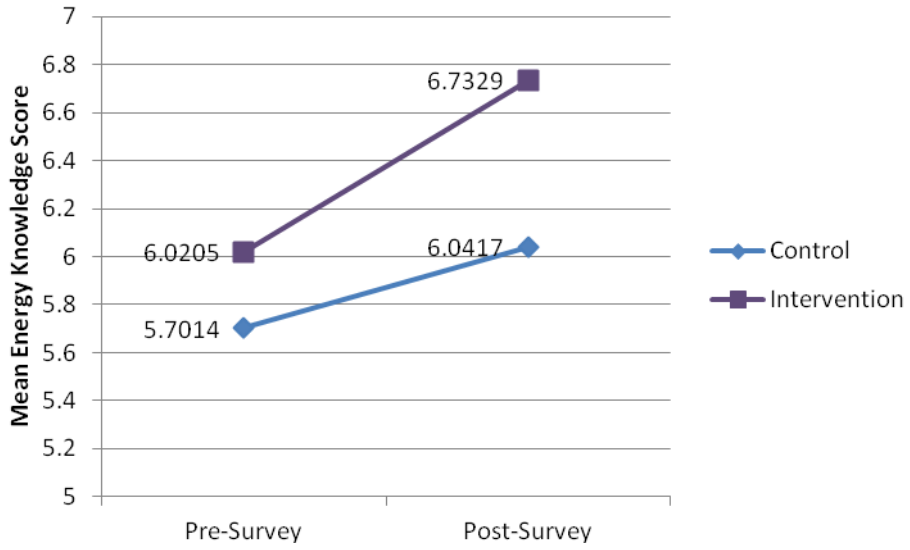
a. 7th and 8th Grade Survey Measures

The 7th grade survey (Appendix D) consisted of 30 items. Three items collected demographic data, including age, gender, and race/ethnicity. Eleven nutrition and physical activity behavior items were adapted from the *Diet and Physical Activity* portion of the Youth Risk Behavior Survey (YRBS).[2] The remaining 16 items asked about specific content covered in Unit 1, two of which were physical activity knowledge questions. Of those 16 items specific to content covered in Unit 1, 15 questions were used to calculate a "C3 health knowledge score." These questions yielded a score ranging from 0 to 15, with a higher score indicating greater mastery of content. Overall health knowledge was stratified into three categories: low (scores 0-4), medium (scores 5-10), and high (scores 11-15). Also, there were two physical activity environment-related questions, both of which were taken directly from the C3 curriculum. One question asked students to apply the definition of the environment to physical activity while the second question asked about what kind of environmental factors can influence physical activity.

[2] The full Youth Risk Behavior Survey asks questions about both risk and protective behaviors, including drug use, sexual activity, diet, and physical activity. It is administered biennially by the Center for Disease Control and Prevention (CDC) to a national sample of high school students.

The 8th grade survey (Appendix E) consisted of 33 items. Three items collected demographic data, including age, gender, and race/ethnicity. Eleven nutrition and physical activity behavior items were taken from the *Diet and Physical Activity* portion of the Youth Risk Behavior Survey (YRBS). The remaining 19 items asked about the content covered in Unit 2. These questions yielded a score ranging from 0 to 19, with a higher score indicating greater mastery of content. Overall content knowledge score were stratified into three categories: low (scores 0-5), medium (scores 6-13), and high (scores 14-19). In addition, of these 19 questions, 11 were questions directly related to energy, energy balance, and energy intake/output. These items make up the variable: "C3 energy knowledge" (Figure 5.2). For analyses of responses from both surveys, the C3 energy knowledge score was stratified into three categories: low (0-3), medium (4-7) and high (8-11).

Figure 5.2. Mean Energy Knowledge Scores of C3 8th Grade Students by Condition from Pre-to-Post Survey, FY 2012-2013



The questions taken from the YRBS were used to calculate the nutrition and physical activity behaviors of the students in the intervention and comparison groups. If a student indicated that they consumed a food or beverage item "1 time per day," "2 times per day," or "3 times per day," the response was counted as one, two, or three times per day, respectively. If a student indicated that they consumed a food item "4 or more times per day," it was counted as four times per day. If a student reported consuming a food or beverage item at any rate lower than once per day, it was counted as zero times per day.

The number of times per day that students reported consuming fruit and 100% fruit juice were then combined to obtain an overall count of fruit consumption. Similarly, the number of times per day students consumed green salad, potatoes, carrots, and other vegetables were summed to obtain an overall count of vegetable consumption. Finally, the overall count of fruit consumption and the overall count of vegetable consumption reported were summed to obtain a cumulative frequency of fruit and vegetable consumption for each student. The total fruit and vegetable consumption frequency number was then used to split students into two groups: (1) those who ate fruits and vegetables five or more times per day; and (2) those who did not. This decision was

based on national recommendations that children should consume at least five servings of fruits and vegetables per day. [3]

iii. Methods

Pre- and post-surveys were administered to one 7th and one 8th grade classroom at each evaluation school. For classroom management purposes, all students present in the selected classrooms completed the surveys. Cases were then matched for analyses after completion of the post-survey.

For the 7th grade C3 evaluation component, a total of 621 students took either the pre- or post-survey. Of these, 295 (47.5%) were in the comparison group and 326 (52.5%) were in the intervention group. Out of the 621 students, 533 reported their gender, with 279 (52.3%) males and 254 (47.7%) females. The mean age, as reported by 502 students, was 12.87 years (SD=0.628), ranging from 11 to 15 years. As seen in Table 5.3, race/ethnicity was reported for 533 students in this sample, with the largest proportion of students being Black or African American (n=318, 59.7%) followed by Hispanic or Latino (n=118, 22.1%).

Table 5.3. Ethnicity of C3 Comparison and Intervention Participants, 7th Grade (N=533)

Race/Ethnicity	Overall n, (%)	Comparison (n=241), (%)	Intervention (n=292), (%)
Black or African American	318, (59.7)	158, (65.6)	160, (54.8)
White	43, (8.1)	11, (4.6)	32, (11.0)
Hispanic/Latino	118, (22.1)	42, (17.4)	76, (26.0)
Asian	47, (8.8)	24, (10.0)	23, (7.9)
More than 1 ethnicity	7, (1.3)	6, (2.5)	1, (0.3)

A "C3 health knowledge score" was calculated for a total of 354 students who participated in the pre- and post-surveys. The C3 health knowledge score was only calculated if students answered at least 12 of the 15 knowledge questions. The score was tallied by the correct answers to questions that were specifically derived from Unit 1 of the C3 curriculum. Responses from the pre- and post-surveys were then matched for analyses.

The 8th grade C3 sample included 622 students who took either the pre- or post-survey. Of the 622 students, 301 (48.5%) attended comparison schools, with the remaining 320 (51.5%) in the intervention schools. Of the students who reported their gender (n=525), 275 (52.4%) were male and 250 (47.6%) were female. The mean age reported by 464 students in the sample was 13.81 (SD=0.62), ranging from 12 to 16 years of age. Race/Ethnicity was reported by 524 students, with the largest proportion of students being Black or African American (n=332, 63.4%), followed by Hispanic or Latino (n=112, 21.4%), Table 5.4.

[3] The U.S. Department of Agriculture, 2010 Dietary Guidelines for Americans; The Centers for Disease Control and Prevention, http://www.cdc.gov/obesity/downloads/FandV_2011_WEB_TAG508.pdf

Table 5.4. Ethnicity of C3 Comparison and Intervention Participants, 8th Grade (N=524)

Race/Ethnicity	Overall n, (%)	Comparison (n=258) (%)	Intervention (n=266) (%)
Black or African American	332, (63.4)	174, (67.4)	158, (59.4)
White	34, (6.5)	5, (1.9)	29, (10.9)
Hispanic/Latino	112, (21.4)	53, (20.5)	59, (22.2)
Asian	37 (7.1)	22, (8.5)	15, (5.6)
More than 1 ethnicity	9, (1.7)	4, (1.6)	5, (1.9)

Due to an error in C3 lesson administration, 22 students in the 8th grade classroom at Adaire were removed from the analysis. After removing the 22 students from Adaire, and matching pre- and post-surveys of students who responded to at least 16 out of 19 C3 health knowledge questions on both surveys, the final matched sample was 290 students. Similar to the 7th grade C3 methods, the sum of correct responses to knowledge questions on the post-survey constituted the C3 health knowledge score. The knowledge questions on the 8th grade surveys focused on content specific to the C3 curriculum, Unit 2.

iv. Results

Student acquisition of content knowledge and behavior change was measured using pre-to-post-survey responses. All analyses were conducted using IBM SPSS® Statistical Package 19, and an *a priori* alpha level of 0.05 was used to determine statistical significance. The specifics of each outcome measure are detailed in the sections below.

a. 7th Grade

Of the 354 7th graders matched for analyses, 150 (42.4%) were in the comparison group and 204 (57.6%) were in the intervention group. The difference in conditions' sample sizes may be due to the intervention classrooms having more students than the comparison group classrooms. Two of the comparison schools selected for the C3 evaluation were charter or preparatory academies, which typically have fewer students per classroom than the District school classrooms. The mean age of the 7th grade students was 12.8 (SD=0.61), ranging from 12 to 15 years old. The sample was comprised of 53.4% males (n=189) and 46.6% females (n=165). The students in the sample were predominately Black or African American (56.8%), followed by Hispanic or Latino (21.2%), and Asian (9.6%).

For the pre-survey, the overall (both comparison and intervention groups) average C3 health knowledge score was 10.79 (SD=2.25) out of a possible 15 points. No students correctly answered all 15 health knowledge questions on the pre-survey. On the post-survey, 11 students correctly answered all 15 questions. Paired-samples *t*-tests concluded statistically significant differences in the knowledge score from pre-to-post-surveys (t=-8.035, p<0.001), with students scoring higher on the post (M=11.69, SD=2.31) than on the pre-survey (M=10.80, SD=2.25). This indicates that 7th grade students' knowledge about nutrition and physical activity concepts increased over the course of the C3 curriculum.

Independent samples *t*-tests indicated there was no significant difference in the overall (both comparison and intervention groups) C3 knowledge scores between males (M=10.68, SD=2.26) and females (M=10.93, SD=2.23) *t*(352)=-1.047, *p*=0.296 on the pre-survey. RM-ANOVA determined there was a significant within-subjects effect of time on knowledge scores for both males and females (main effect of time: *F*(1,352)=68.05, *p*<0.001 from pre- to post-survey). Overall, females scored higher on the post-survey knowledge questions than males (main effect of subjects' gender: *F*(1,352)=6.105, *p*=0.014). The interaction between gender and time reached statistical significance as well, *F*(1,352)=6.42, *p*=0.012. This indicates that all females, from both comparison and intervention groups, had higher knowledge around nutrition and physical activity concepts than males, prior to the evaluation. Therefore, gender was used as a covariate in the remaining RM-ANOVA tests.

Independent samples *t*-tests and RM-ANOVA were conducted in order to determine if there were significant differences pre- to post-intervention in C3 health knowledge scores between those who received C3 lessons and those who did not. The *t*-test did not yield significant differences in C3 content knowledge on the pre-survey between the intervention group (M=10.99, SD=2.12) and the comparison group (M=10.55, SD=2.39), *t*(354)=-1.82, p=0.070. The RM-ANOVA results indicated that there was no within-subjects effect of time on knowledge scores for either study conditions: *F*(1, 351)=0.169, *p*=0.681. Independently, the knowledge scores of each condition failed to reach statistical significance: *F*(1,351)= 2.105, *p*=0.148. Because the difference was not statistically significant, we cannot conclude that there was a significant growth in knowledge scores from pre- to post-survey for students who received the Unit 1 C3 intervention lessons. Students in both the comparison and intervention groups indicated descriptive, yet non-significant growth in health knowledge scores from pre- to post-survey (see Table 5.5). Gender remained a significant covariate in the equation *F*(1,351)=6.824, *p*=0.009.

Table 5.5. C3 Health Knowledge Scores from Pre- to Post-Survey by Condition, 2012-2013

Condition	Pre-Knowledge Score		Post-Knowledge Score		RM-ANOVA Results
7th Grade*	Mean	SD	Mean	SD	Main effect of interaction:
Comparison (n=150)	10.55	2.39	11.65	2.33	*F*=1.919, *p*=0.167
C3 Intervention (n=204)	10.99	2.12	11.72	2.30	
8th Grade	Mean	SD	Mean	SD	Main effect of interaction:
Comparison (n=144)	9.25	2.60	9.93	2.57	*F*=0.512, *p*=0.475
C3 Intervention (n=146)	9.46	2.71	10.35	3.14	

**Controlled for gender*

Food & Activity Environment

In order to test the effects of Unit 1 of the C3 curriculum, our evaluation focused on the main concepts of the curriculum (choice, control, and change), including environment-specific knowledge questions. As the table in Appendix I indicates, independent samples *t*-tests determined no statistically significant differences in correct responses to choice (question 4), control (question 5), and change (question 6) knowledge questions between comparison and intervention classrooms. There were, however, significant differences between the intervention and comparison groups for questions around sweet tastes (*t*=-2.638, *p*=0.009) and sweet food choices (*t*=-2.041, *p*=0.042). However, when identifying differences in knowledge and gender, females scored significantly higher

on the change (t=-2.137, p=0.032) and choice (t=-3.381, p=0.001) knowledge questions than males during the pre-survey.

Furthermore, because no statistically significant differences were found between the environment-focused questions and gender or condition groups, RM-ANOVAs were conducted to evaluate differences in environment scores over time. Two environment-focused questions were asked on the knowledge survey: the first focused on the definition of environment and the second on the influence of the environment on physical activity. RM-ANOVA indicated that the intervention group scores on the environment definition question did not significantly differ from the comparison group from pre-to-post-survey (main effect of interaction: F=3.236, p=0.073). However, when asked about the influence of environment on physical activity, students in the intervention group showed a higher increase in knowledge than the control group from pre-to-post-survey (main effect of interaction: F=5.953, p=0.015).

Nutrition-Specific Content

Independent samples t-tests compared average post-survey knowledge among males and females, and among comparison and intervention groups. Consistent with previous results, females showed significantly higher knowledge in answering nutrition-specific questions than males. Using pre- and post-survey data, RM-ANOVAs were conducted to determine whether nutrition behaviors of C3 intervention and comparison students differed from each other over time. Gender differences over time were also analyzed. Detailed results are presented in Appendix J. After controlling for gender, overall C3 knowledge scores did not differ significantly over time between the comparison and intervention groups (main effect of interaction: F=1.919, p=0.167).

Significant differences did not exist from pre- to post-survey for daily intake of soda by gender (main effect of interaction: F=0.829, p=0.363) or condition (F=0.008, p=0.928). Males reported significantly more milk consumption on both the pre- and post-surveys than females (Main effect of gender: F=17.64, p<0.001), but no statistical significance was determined for the interaction of gender and time (Main effect of interaction: F=1.572, p=0.717), indicating C3 lessons did not have an impact on milk consumption.

Total fruit and vegetable consumption of all students decreased significantly over time (F=3.989, p=0.047; pre M=5.02, SD=3.83, post M=4.69, SD=3.62); however, when analyzing the differences across control and intervention groups, RM-ANOVA produced a significant interaction of time and condition (F(1,344)=5.197, p=0.023), indicating students receiving the C3 lessons reported significantly more fruit and vegetable consumption over the course of the study period. Additionally, a two-tailed Pearson correlation was conducted to analyze the relationship between students' overall health knowledge score and total fruit and vegetable consumption reported on the post-surveys. A significant negative correlation was found (r=-0.129, p=0.015), indicating that students who scored higher on the C3 knowledge questions reported lower total fruit and vegetable consumption.

Physical Activity Content

A two-tailed Pearson correlation was conducted to determine whether the condition group was associated with higher self-reported weekly physical activity on the post-survey. The condition group was correlated with the number of days in the past week that a student reported being physically active for at least 60 minutes. Analyses indicated a weak, but statistically significant positive association between the condition and reported physical activity (r=0.112, p=0.036), indicating that the students who were exposed to the C3 curriculum (n=204) reported a higher number of days of physical activity than students in the comparison group (n=150).

To test the association between post-survey C3 health knowledge scores and reports of physical activity, another two-tailed Pearson correlation was conducted. Similar to the association between C3 exposure and physical activity, results indicated a weak, but statistically significant positive correlation between the overall health knowledge scores and self-reported physical activity (r=0.156, p=0.003) at post-survey, indicating that increased health knowledge is correlated with greater physical activity. When knowledge scores and physical activity of each condition group were evaluated independently, only those students in the intervention group showed a significant positive correlation between knowledge score and reported physical activity (r=0.236, p=0.001); whereas comparison students showed a positive but non-significant correlation (r=0.050, p=0.544) on the post-survey.

Breakfast Knowledge & Behaviors

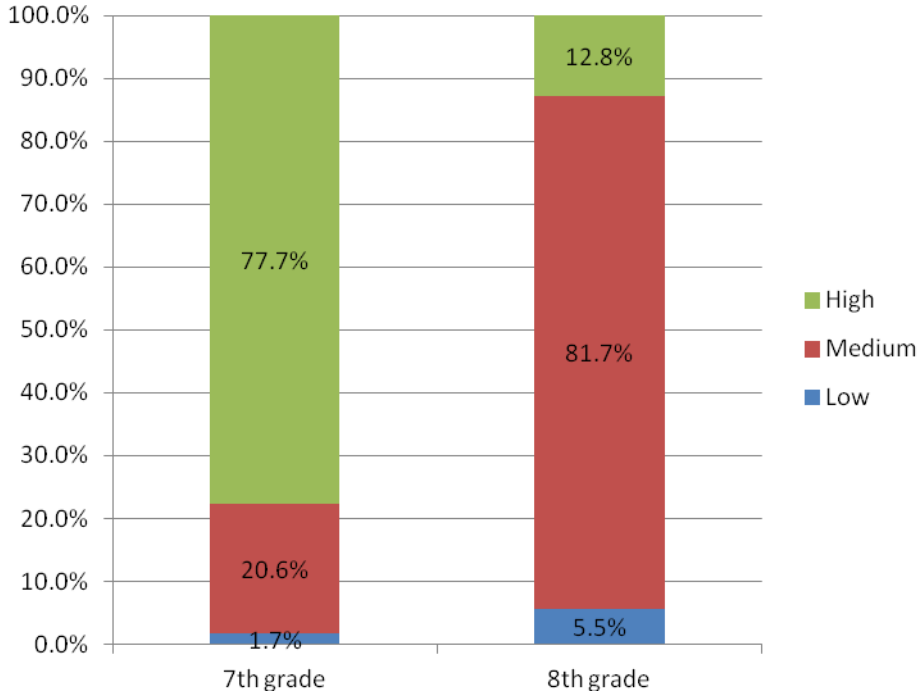
The C3 curriculum does not specifically address breakfast knowledge or behaviors; however, one general knowledge question and one behavior question pertaining to breakfast consumption were included in the evaluation to better understand breakfast behaviors of 7th and 8th grade students in Philadelphia. RM-ANOVA indicated that at both the pre- and post-survey, males (n=185; pre M=0.81, SD=0.393; post M=0.78, SD=0.416) reported significantly more breakfast consumption than females (n=159; pre M=0.64, SD=0.483; post M=0.57, SD=0.496) (F=24.074, p<0.001). There was no statistically significant increase in breakfast consumption from pre- to post-survey (main effect of time: F=2.792, p=0.096). Interestingly, although 325 students (92.9%) correctly answered the breakfast question: “It is not important to eat a healthy breakfast every morning,” only 225 (69.2%) of those students then reported eating breakfast ‘yesterday’. Chi-square analysis concluded the difference in breakfast eating behaviors and breakfast knowledge was descriptive, but non-significant (r=0.918, p=0.338).

b. 8th Grade:

Answers from the pre- and post-surveys were matched to construct a sample for analyses. The final matched sample included 144 (49.7%) students who attended comparison schools and 146 (50.3%) from intervention schools. Students’ mean age was 13.8 (SD=0.62) and ranged from 12 to 15 years old. Of the sample, 148 (51%) were males and 142 (49%) females. Similar to the 7th grade sample, the majority (64.6%) identified as Black or African American, while 22.2% were Hispanic or Latino and 8.7% were Asian.

Similar to the 7th grade evaluation, the C3 health knowledge score was calculated by summing the number of correct responses of the C3 content-specific questions during the pre- and post-surveys. Out of 19 possible points, the mean health knowledge score was 9.36 (SD=2.65) during the pre-survey and slightly increased to 10.14 (SD=2.88) at the post-survey. The majority of students (81.4%) scored within the "medium knowledge" C3 health range, Figure 5.6. There were no students who correctly answered all of the health knowledge questions at either the pre- or post-survey. Three students correctly answered 17 out of 19 knowledge questions during the post-survey. Paired-samples *t*-tests indicated statistically significant differences in knowledge scores from pre-to-post-surveys of all students (t=-5.367, p<0.001), with students scoring higher on the post (M=10.14, SD=2.88) than the pre (M=9.36, SD=2.65). Independent samples *t*-tests indicated no significant difference in the C3 knowledge scores of males (M=9.49, SD=2.68) and females (M=9.22, SD=2.62) during the pre-survey $t(288)$=0.860, p=0.390. Additionally, *t*-test results did not yield a significant difference in the content knowledge on the pre-survey between the intervention (M=9.46, SD=2.71) and comparison groups (M=9.25, SD=2.60); $t(288)$=-0.670, p=0.503.

Figure 5.6. Percentage of Knowledge Range Scores at Post-Survey for 7th and 8th Grade C3, FY 2013



To further analyze the differences in pre-to-post-survey knowledge scores, RM-ANOVAs were conducted. RM-ANOVA further determined there was a significant within-subjects effect of time on knowledge scores for both males and females (main effect of time: $F(1, 288)$=28.791, p<0.001) from pre- to post-survey. There were no significant differences in gender on the pre and post-surveys (main effect of subjects' gender: $F(1, 288)$=0.526, p=0.469). The interaction between gender and time did not reach statistical significance ($F(1,288)$=0.154, p=0.695). Therefore, gender was not used as a covariate in the remaining RM-ANOVA tests.

Independent samples *t*-tests and RM-ANOVAs were conducted in order to determine if there was a significant difference pre- to post-intervention in C3 health knowledge scores between those who received C3 lessons from nutrition educators and those who did not. Since *t*-test results indicated no statistically significant differences in the C3 health knowledge score on the pre-survey for the two condition groups, RM-ANOVA was performed to determine if the groups differed from pre- to post-survey. RM-ANOVA results indicated that there was a significant effect of time on knowledge scores for both study conditions: $F(1, 288)=28.698$, $p<0.001$. When analyzing the interaction of time and condition, statistical significance was not reached $F(1,288)= 0.512$, $p=0.475$. Because the effect of the interaction was not statistically significant, we cannot conclude that there was a significant growth in knowledge scores from pre- to post-survey for students who received the C3 intervention lessons.

Energy Knowledge

Unit 2 focused largely around understanding energy intake and energy expenditure. Students answered 11 energy-specific questions during the pre- and post-surveys. The 11 energy-specific responses were tallied together for each student to compose a total energy score. The majority ($n=185$, 63.8%) scored in the "medium energy knowledge" range, with 21.7% of students scoring "high energy knowledge" at the pre-survey. The independent samples *t*-test indicated no significant difference in total energy score during the pre-survey for students in the comparison and intervention groups ($t(288)=-1.321$, $p=0.188$). RM-ANOVA was conducted to examine the overall change in total energy knowledge scores from pre- to post-survey for comparison and intervention students (Figure 5.2). The main effect of time was statistically significant $F(1,288)=21.516$, $p<0.001$; however the main effects of condition $F(1,288)=3.383$, $p=0.067$ and interaction $F(1,288)=0.740$, $p=0.391$ were not significant.

Gender differences of energy knowledge scores were also examined. No significant differences were determined in pre-survey energy scores between males (M=5.99, SD=2.10) or females (M=5.73, SD=2.01), ($t(288)=1.107$, $p=0.269$). Since there were no significant differences at the pre-survey, RM-ANOVA was conducted to analyze energy knowledge scores over time and across gender groups. Energy knowledge scores significantly increased from pre- to post-survey for all students (main effects of time: $F(1,288)=21.621$, $p<0.001$), but the main effects of gender $F(1,288)=0.875$, $p=0.350$ and interaction $F(1,288)=0.246$, $p=0.621$ were not significant.

Further analyses of the energy-specific questions were conducted to determine if there were any changes in energy knowledge. No statistically significant differences between comparison and intervention groups were found during independent samples *t*-test analyses for any of the energy-specific questions. RM-ANOVAs were conducted to examine changes in individual energy knowledge questions from pre-to post-survey (Appendix K). When examining students' understanding of excess energy, RM-ANOVA indicated a significant effect of time on knowledge $F(1,284)=9.147$, $p=0.003$ and a significant main effect of condition, $F(1,284)=8.601$, $p=0.004$; however, the main effect of the interaction was not statistically significant, $F(1,284)=3.415$, $p=0.066$.

There was, however, one significant difference between intervention and comparison groups. Students were asked what happens "if you take in less energy than your body needs," and RM-ANOVA results indicated a significant effect of the interaction between time and condition, $F(1,285)=7.642$, $p=0.006$. Students who received the C3 curriculum (Pre M=0.38, SD=0.49, Post M=0.48, SD=0.50) had a significant increase in energy knowledge around weight loss than those in the comparison group (Pre M=0.38, SD=0.49; Post M=0.30, SD=0.46).

Nutrition-Specific Content

Independent samples *t*-test results did not indicate statistically significant differences in nutrition-specific knowledge responses of comparison and intervention classrooms. Using pre- and post-survey data, RM-ANOVAs were conducted to determine whether nutrition knowledge of C3 intervention and comparison students differed from each other over time. Detailed results are presented in Appendix L. Overall nutrition-specific knowledge scores did not differ significantly over time between the comparison and intervention groups (main effect of interaction: $F(1,288)=0.010$, $p=0.922$).

Gender differences in fruit and vegetable consumption were examined. Males reported higher daily consumption of fruits and vegetables (M=5.51, SD=4.04) than females (M=4.39, SD=3.36) on the pre-survey, $t(287)=2.398$, $p=0.017$. Differences in fruit and vegetable consumption between comparison and intervention groups were also analyzed. RM-ANOVA indicated no significant within-subjects effect of time $F(1,285)=0.160$, $p=0.689$ or interaction between time and condition groups $F(1,285)=1.76$, $p=0.185$. Moreover, the C3 intervention group reported a descriptive but non-significant increase in total fruit and vegetable consumption from pre- (M=4.75, SD=3.77) to post-survey (M=4.99, SD=3.66), whereas the comparison students' consumption decreased from pre- (M=5.17, SD=4.23) to post-survey (M=4.72, SD=3.59).

Similarly, males reported significantly higher consumption of milk than females during the pre-survey, $t(287)=2.398$, $p=0.017$. Males reported significantly more milk consumption on both the pre- and post-surveys than females (Main effect of gender: $F=19.90$, $p<0.001$) but no statistical significance was determined for the interaction of gender and time (Main effect of interaction: $F(1,284)=0.048$, $p=0.827$). RM-ANOVA results indicated no significant difference in the reported milk consumption of intervention students versus comparison students over time ($F(1,284)=0.975$, $p=0.324$).

Furthermore, significant differences did not exist from pre- to post-survey for daily intake of soda by gender (main effect of interaction: $F=1.975$, $p=0.161$) or condition (main effect of interaction: $F=0.204$, $p=0.652$). Although non-significant, there was a descriptive decrease in soda consumption of all students from pre- to post-survey, with the intervention group (M=1.32, SD=1.27) reporting less soda consumption than the comparison group at post-survey (M=1.39, SD=1.35) (Main effect of time: $F(1,284)=0.871$, $p=0.352$).

Additionally, a two-tailed Pearson correlation was conducted to analyze the relationship between students' overall health knowledge score and total fruit and vegetable consumption reported on the post-surveys. Similar

to the 7th grade C3 findings, a significant negative correlation was determined (r=-0.215, p<0.001) indicating that those students who scored higher on the C3 knowledge questions reported lower total fruit and vegetable consumption post-intervention.

Physical Activity Content

A two-tailed Pearson correlation was conducted to determine whether the condition group was associated with higher self-reported weekly physical activity on the post-survey. The condition group was correlated with the number of days in the past week that a student reported being physically active for at least 60 minutes. Analyses indicated a marginally significant positive association between the condition and reported physical activity (r=0.113, p=0.056), indicating that the students who were exposed to C3 curriculum reported a slightly higher number of days of physical activity than students in the comparison group.

To test the association between post-survey C3 health knowledge scores and reports of physical activity, another two-tailed Pearson correlation was conducted. The correlation between the overall health knowledge scores and self-reported physical activity at post-survey was not significant (r=-0.002, p=0.974). When knowledge scores and physical activity of each condition group were evaluated independently, students in the intervention group showed a positive but non-significant correlation between knowledge score and reported physical activity (r=0.079, p=0.344).

Breakfast Behaviors

Similar to the 7th grade C3 lessons, Unit 2 did not focus directly on breakfast consumption for the 8th grade students. However, the battery of behavioral questions asked during the pre- and post-survey asked one question around breakfast consumption. Independent samples t-test results indicated males reported eating breakfast more frequently than females at the pre-survey $t(271)=5.276$, p<0.001. An independent samples t-test and RM-ANOVA were conducted in order to determine if there was a significant difference pre-to-post intervention in the C3 health knowledge scores between those who received C3 lessons and those who did not. There was a non-significant difference in the frequency of breakfast consumption on the pre-survey between comparison (M=0.65, SD=0.478) and intervention groups (M=0.72, SD=0.451); $t(283)=-1.215$, p =0.225. RM-ANOVA results indicated that the frequency of breakfast consumption did not increase significantly over time from pre to post-survey for those students receiving the C3 lessons, $F(1,280)=1.517$, p=0.219.

v. Discussion

Findings from the C3 evaluation for 7th and 8th grade were mixed, especially comparing C3 health knowledge scores of those who received the intervention and those who did not. For both 7th and 8th grades there were non-significant gains in knowledge that were directly tied to the C3 units. While there were small gains made pre-to-post for both intervention and comparison groups, they were only descriptive (see Table 5.5). Even after receiving the tailored curriculum on choice, control, and change there were no differences in post-survey knowledge between those who received the intervention to those who did not. Moreover, for one variable, "choice," the 8th grade comparison group students who did not receive the curriculum scored higher during the

post-survey than the 8th graders who did receive the intervention. This is troubling given the length of time and amount of lessons delivered to intervention students. One possible explanation for this finding could be that the actual C3 content and the way in which it was taught did not resonate with the intervention students, perhaps because the information was confusing or presented in a way that was not consistent across nutrition education messages.

A few positives were found with the evaluation of the C3 curriculum, namely around physical activity. For both 7th and 8th grades there were positive correlations between student-reported physical activity and receiving the C3 curriculum, meaning those who received the C3 lessons reported more frequent physical activity for at least 60 minutes a day. This is consistent with the energy expenditure content throughout the C3 units. For 7th grade only, there was another positive finding: as students increased their overall health knowledge, there was a significant increase in their physical activity. This finding indicates that those students who scored higher on overall health knowledge also reported frequent participation in physical activity. This is one of the few examples throughout the study which pointed to a translation of knowledge to behaviors (e.g., being physically active). This is encouraging, and the program office should continue to enforce the importance for students to not only eat healthy, but also participate in physical activity for at least 60 minutes a day.

Another mixed finding was the 8th grade students' energy balance knowledge from pre- to post-survey. It is assumed that those who received the tailored-curriculum on energy balance would do significantly better in overall energy score, when compared to those who did not receive the curriculum. This was not the case. While there were increases in energy knowledge pre-to-post for both groups, these were not significant, meaning the difference that was observed could be due to chance.

Another troubling finding is the relationship between C3 knowledge and fruit and vegetable consumption. For both 7th and 8th grades, there was a significant negative correlation between C3 knowledge and fruit and vegetable consumption, indicating that as students improved on their knowledge of the C3 units, their consumption of healthy fruits and vegetables decreased. This was particularly troubling given that it was the educators' hope that as students' knowledge improved, so would their healthy eating behaviors. This particular phenomenon was not observed for other food groups. Seasonal availability of fruits and vegetables may have been a possible explanation for the observed disconnect between knowledge and fruit and vegetable consumption.

Another example of a breakdown in the translation of knowledge to behaviors was around breakfast consumption. As previously noted, a high percentage of 7th grade students knew that breakfast was important to eat every morning; however, when asked to report their breakfast consumption, considerably fewer students stated they had eaten breakfast in the day prior. For 7th grade students there was an over 20% difference between those who correctly answered the breakfast knowledge question (93%) and those who indicated eating breakfast (69%). This finding, coupled with the significant differences between males and females consuming breakfast in both 7th and 8th grades, point to a troubling trend for Philadelphia students. Furthermore, all students in this evaluation attend SNAP-Ed eligible schools, which provide breakfast to classrooms. Perhaps students are not arriving to school on time to receive breakfast or do not like the options being served. If

students do not have the time or resources at home to eat breakfast, more information on the importance of breakfast needs to be transferred to the students' guardian(s).

There were several limitations to the C3 evaluation. Firstly, ORE did not set a time frame for when the C3 lessons had to be implemented. Some partners did the lessons as a series (i.e., consecutive lessons were implemented for 8 weeks), while others spread the lessons out across several months. This inconsistency may have affected some of the results contained within this report. For FY 14, ORE is enforcing a strict lesson implementation schedule, where all partners will be administering lessons weekly.

Secondly, due to the fact that ORE only required two 7th and two 8th grade classrooms per school to receive the C3 curricula, as opposed to the entire grade, there was one instance (at Adaire School), where after the pre-survey students received some C3 lessons, and by the post-survey, the students had switched rooms. This caused ORE to lose the ability to compare pre-to-post results for this one set of students. As a result, for FY 14, ORE is requiring community partners to implement the C3 lessons in all sections of 8th grade for schools enrolled in the evaluation study.

Lastly, there was anecdotal evidence that some educators were more adept at providing the rigorous, science-based education than other less experienced teachers. One community partner emailed the evaluators about her concern that some of her educators needed additional training. This inconsistency in education may have had an effect on the students' understanding of the key C3 concepts. As a result, for FY 14 SDP will provide training to all participating educators for all community partners, so that there is a consistent level of understanding of the science-based curriculum. This will help to provide a standard education for all students.

a. Suggestions for Program Improvement for C3

While there were several negatives findings throughout this report, they may serve as areas of opportunity. The following is a list of suggestions on how to improve the current C3 program for our middle school students:

1. *Standardize implementation of lessons*. For the 2012-13 SY, community partners were able to administer the C3 lessons over an unspecified period of time. This may have contributed to some of the decreases in knowledge from pre to post surveys. If a long period of time occurred between lessons, students may not have retained what they learned. Also, no reinforcement of what was taught occurred, which could have negatively impacted the results. By standardizing the implementation of lessons across all partners, ORE will increase the internal validity of the study. For FY 14, community partners will be implementing lessons weekly for the duration of the unit (8 weeks). A pre- and post-survey will be administered before and after the curriculum.

2. *Increase educator understanding of curriculum*. There is some evidence from the results, as well as anecdotal comments from community partners, that some educators are more comfortable than others with the C3 lesson content. Given that for the most basic C3 concepts (e.g., choice, control, and change), we did not observe any significant differences in knowledge between those who received C3 and those

who did not receive the C3, it is clear that more attention needs to be given to boosting educators' knowledge around the key, core concepts of the C3 curriculum.

3. *Find ways to engage students and make lessons relevant*. When looking at the knowledge scores before and after the C3 curriculum for those students who received it, it is evident that there were not large gains in knowledge. This could be due to the fact that students are having a hard time understanding the energy-related concepts, or that these concepts simply are not resonating with them. Educators need to find ways to make the content more relevant to students, perhaps expanding upon some of the key concepts to include local, Philadelphia references. If students are more engaged in the curriculum, they are more likely to remember and better understand the concepts being taught.

4. *Continue to stress physical activity*. One of the most significant gains in students' knowledge, from pre to post, was around physical activity. Moreover, we know that students who received the C3 reported more healthy physical activity. Given these findings, it is critical for educators to continue stressing the importance of physical activity (or energy expenditure) coupled with good nutrition.

5. *More awareness of differences in males and females*. It is apparent from our results that educators need to be aware of the differences in nutrition and physical activity behaviors between males and females. While it is well documented in the literature that pre-adolescent/adolescent males consume more food than females, there does seem to be a stark contrast (including significant differences) in fruits, vegetables, milk, and breakfast consumption. Educators should be on the look-out for social pressures for girls to not eat certain foods, and continue to teach the importance for all students, regardless of sex, to engage in healthy nutrition and physical activity.

VII. Assembly Programming

i. Overview

School-based nutrition education programs have demonstrated increases in students' nutrition and physical activity knowledge, with some indication that improved knowledge translates to positive behavior change.[76,77] Among students in grades K-12, educational theater programs, including school assemblies, have demonstrated statistically significant increases ($p \leq 0.05$) in content knowledge on various health subjects, including nutrition and sexual health education.[78,79,80] There is also evidence that theater-based education increases long-term retention of events and main ideas due to mental stimulation through the use of positive emotion, such as humor.[81,82,83,84,85] Based on this evidence, in spring of 2012-2013[86], the Office of Research and Evaluation (ORE) conducted an evaluation of existing PA TRACKS nutrition education assembly programming.

During the 2012-2013 school year (SY), The School District of Philadelphia (SDP) administered nutrition and physical activity-related assembly programming to SNAP-Ed eligible schools. The assemblies ranged in focus; some were solely nutrition-focused while others were strongly physical activity-focused, but all contained nutrition messaging based on the 2010 USDA Dietary Guidelines. In SY 2012-2013, a total of five assemblies were available:

1. *FoodPlay*
2. *Taddo: Healthy Bodies Strong Minds*
3. *Jump with Jill*
4. *Rapping about Prevention*; and
5. *Stages of Imagination*

[76] Contento, S., et al (2010). Adolescents demonstrate improvement in obesity risk behaviors after completion of Choice, Control & Change, a curriculum addressing personal agency and autonomous motivation. *Journal of the American Dietetic Association*, 110(12):1830-1839.
[77] Prelip, M., et al (2012). Evaluation of a school-based multi-component nutrition education program to improve young children's fruit and vegetable consumption. *Journal of Nutrition Education and Behavior*, 44(4):310-318.
[78] Cheadle, A., et al (2012). Engaging youth in learning about healthful behavior and active living: An evaluation of educational theater programs. *Journal of Nutrition Education and Behavior*, 44: 160-165.
[79] Hillman, E., et al (1991). Pregnancy, STDs, and AIDS prevention: Evaluation of new image teen theatre. *AIDS Education and Prevention*, 3(4):328-340.
[80] Perry, CL., et al (2002). Evaluation of theater production about eating behavior of children. *Journal of School Health,* 72(6): 256-261.
[81] McGaugh, JL. (2004). The amygdala modulates the consolidation of memories of emotionally arousing experiences. *Annual Review of Neuroscience*, 27: 1-28.
[82] Labar, K., Cabeza, R. (2006). Cognitive neuroscience of emotional memory. *Nature Reviews*, 7: 54-64.
[83] Peleg, R., Baram-Tsabari, A. (2011). Atom surprise: Using theatre in primary science education. J*ournal of Science Education Technology*, 20: 508-524.
[84] Garner, RL. (2006). Humor in pedagogy: How ha-ha can lead to aha! *College Teaching*, 54(1): 177-180.
[85] Baum, L., Hughes, C. (2001). Ten years of evaluating science theater at the Museum of Science, Boston. *Curator*, 44(4): 355-369.
[86] FNS did not approve amendment to include school assembly evaluation until February 15, 2013.

The assembly evaluation assessed the impact of assembly performances on the following factors:

- Students' knowledge of key nutrition and physical activity messages;
- Students' reactions to the assemblies and teachers' perceptions of their students' reactions;
- Student and teacher satisfaction with the assemblies; and
- Teachers' interest in, and use of, the assembly supplemental materials

Due to limited time and evaluation capacity, only three of five assembly programs were evaluated: "*FoodPlay," "Jump with Jill,"* and *"Rapping About Prevention (R.A.P.)".* These three assemblies were the most densely populated, and were selected for this reason. The evaluations were conducted with student and teacher samples in order to obtain a diverse range and scope of feedback for analysis. A strategic decision was made to focus the student evaluation using only one grade, resulting in a large sample size, rather than several smaller sample sizes across many grades. This decision also eliminated the need to tailor several versions of the assembly surveys to students' reading levels (e.g., surveys for K-2, surveys for 3-5, and surveys for grades 6-8). The 5th grade was chosen because they were not involved in any evaluation activities, and all three assembly programs were viewed by that grade. A convenience sample of SNAP-Ed eligible District and charter school K-8 teachers was used for the teacher evaluation component.

ii. Design

a. Student Evaluation Component

A pre/post-survey design was employed for the student evaluation of the assemblies. Pre and post-surveys were administered to a selected sample of participating classrooms approximately 1-2 weeks prior to the assembly, and 1 week following the assembly, respectively. Sampling was based on a prediction of nine performances at nine K-8 schools (3 per assembly program) presented to an average of three classrooms of 30 5th grade students per school. School selection criteria included: 5th grade was scheduled to view the assembly; the school did not participate in the 5th Grade Vegetable Core Follow-up Study; and there was no overlap between post-survey administration date and spring break.

Pre- and post-surveys contained six identical multiple choice questions: four tailored knowledge questions addressing key points presented during the assembly, and two broad nutrition and physical activity knowledge questions to be used for comparison across groups. Because the main topics presented during the performance differed for each assembly program, tailored knowledge questions focused on nutrition-only content for *FoodPlay*, physical activity-only content for *R.A.P.*, and both nutrition and physical activity content for *Jump with Jill*.

The post-survey included four additional questions regarding: perception of new knowledge gained (open-ended format), overall satisfaction with the assembly, and the emotional affect of the assembly on students. Based on prior methods found in the literature,[4,10] emotional affect was measured by asking students how the assembly made them feel, choosing from a list of adjectives such as "excited" (positive affect) or "bored" (negative affect).

b. Teacher Evaluation Component

In the past, simple satisfaction surveys were administered to teachers and staff of schools who had received assembly programming. Consistently high satisfaction scores indicated a potential ceiling effect, with limited information gathered from the data. A new post-survey was designed as a replacement in order to obtain a more comprehensive analysis of teachers' perception of the assemblies. Three different surveys were designed to assess the three selected assemblies; each contained the same items, but had one item tailored to the assembly's main content. The evaluation team inferred these main points after reading through each of the assembly scripts. For example, the *Jump with Jill* assembly survey asked, "To what extent do you think the assembly helped students understand how to resist 'junk food' marketing tricks?" while the *FoodPlay* survey asked to what extent the assembly helped "students understand how to eat healthier using MyPlate." The survey further assessed teachers' perceptions of the assembly's emotional affect on students, knowledge gained by students, and resonance of the assembly's main ideas with students. Items also measured teachers' level of interest in completing follow-up activities, and their opinions regarding the strengths and weaknesses of the assembly, such as age appropriateness, student engagement, message clarity, and entertainment value.

Surveys were created in Survey Monkey and administered through District email to a widely cast convenience sample of K-8 teachers who viewed at least one of the three assembly programs performed at 75 schools between January and May 2013. Teachers and staff who viewed assemblies prior to January 2013 were excluded, since the evaluation of the assemblies was not approved by USDA FNS until February 2013. Surveys were distributed in monthly "waves," in accordance with the timing of when each school viewed the assembly. All electronic surveys were collected by June 2013 with a target response rate of 25%.

iii. Methods

A total knowledge score on the pre- and post-surveys was calculated by tallying the number of correct responses to six nutrition and physical activity knowledge questions. Of the six questions, four were content-specific to the assembly students viewed, while two questions remained broad regarding nutrition and physical activity knowledge. The two broad knowledge questions asked across the three assemblies were tallied to create a "general knowledge score" for cross-comparison analyses. Correct responses to the remaining four questions were tallied together for an "assembly specific score." The mean scores of broad and content-specific questions were analyzed from pre to post-survey using independent samples *t*-tests.

The student post-survey and teacher electronic survey included a series of questions to gauge the emotional affect of the assembly on students. Students responded "very," "kind of," or "not at all" to the following list of emotions felt during the assembly: excited, upset, happy, bored, hopeful, and tired. Coding for the students' responses were as follows: very=2, kind of=1, not at all=0. The negative emotions were reverse-scored and summed together with the positive emotion scores to provide an overall emotional affect. Three categories were used to identify the level of emotional affect: a score of 0-3 indicated negative emotional affect, 4-8 neutral emotional affect, and 9-12 positive emotional affect. Individual student emotional affect scores were examined by gender and assembly program using independent samples *t*-tests and ANOVAs. Additionally,

student affect scores were compared to perceived emotional affect scores that teachers reported on their students' engagement during the selected assemblies.

Students and teachers were also asked to respond to open-ended questions on the post-survey. Coding and theme delineation from student and teacher responses were conducted using NVIVO 10 qualitative analysis software (QSR International, 2013). From student responses, themes were identified and further grouped into sub-themes. Individual references to themes and subthemes were then quantified. In some instances, a student's response contained more than one reference to a theme (e.g., the sentence: "I learned how to exercise and eat fruits and vegetables" references both exercise and nutrition); thus, there were more references than actual student responses. Relative percentages were calculated from the total number of references to relevant themes and sub-themes. Teacher comments had only one theme reference per response, unlike student responses. Percent frequencies of the themes and subthemes mentioned by teachers were calculated from the total number of teacher responses.

iv. Results

a. Assembly Programming: Student Results

Pre- and post-surveys were completed by 434 students across nine schools that viewed one of the three assemblies selected for evaluation. This sample was almost evenly divided by gender: 219 (50.5%) were females and 215 (49.5%) were males. The age range of students was 10.18 to 13.33 years, with a mean age of 11.57, SD=0.45.

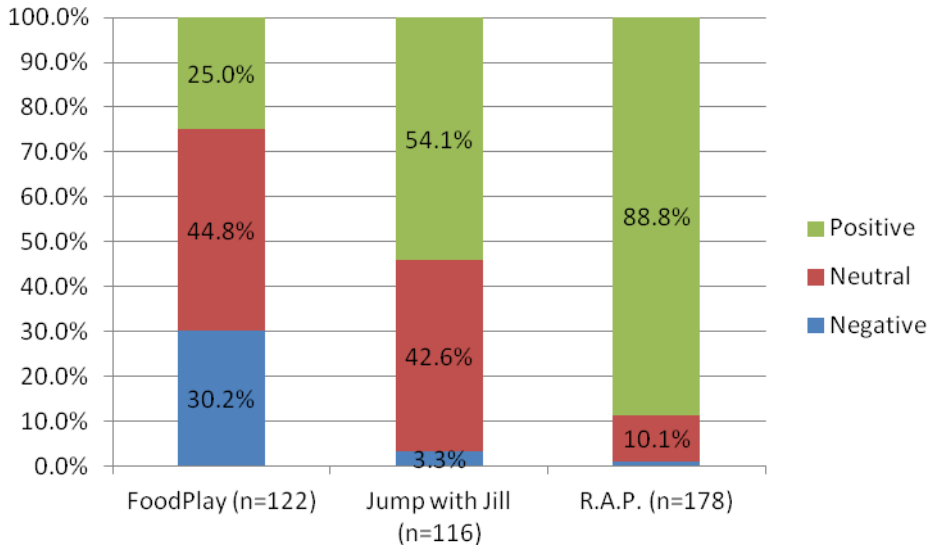
Two general knowledge questions around physical activity and fruit and vegetable servings were asked across the three assemblies. The mean general knowledge score at the pre-survey for all students was 1.14 (out of 2 total), SD=0.72. At post-survey, the mean general knowledge score slightly increased to 1.26, SD=0.70. Paired samples *t*-tests were conducted to determine differences in knowledge from pre- to post-survey. Students' general knowledge scores significantly differed from pre- to post-survey, $t(455)=-3.445$, $p=0.001$.

Independent samples *t*-tests and repeated-measures ANOVA (RM-ANOVA) were conducted to determine if there were significant differences in general knowledge scores of students by gender. Appendix M details the results of the RM-ANOVA tests. Males scored significantly higher than females at both the pre- ($p=0.020$) and post-surveys ($p=0.012$) (Appendix M, Figure A). Gender was then used as a covariate in RM-ANOVA to test the difference in general knowledge scores from pre- to post-survey; however, no significant effect of time or interaction of time and gender were determined (main effect of time: $F(1,426)=2.232$, $p=0.136$; main effect of interaction: $F(1,426)=0.1874$, $p=0.668$).

Students were also asked questions around the emotional affect of the selected assembly viewed. In summary, 253 (60.8%) of students found the assemblies to have a positive emotional affect, followed by 122 (29.3%) reporting a neutral affect, and 41 (9.9%) reporting a negative affect. The total affect scores were compared across the three selected assemblies using Chi-Square analysis. Results indicated significant association between the assembly and emotional affect ($X^2(4, N = 416) = 155.2$, $p<0.001$) (Figure 6.1). *Rapping About Prevention* had

the greatest positive emotional affect on students (88.8%), while students who viewed *FoodPlay* had the highest reported negative emotional affect (30.2%).

Figure 6.1. Students' Emotional Affect Range by Assembly (n=416), FY 2013



b. Assembly Programming: Teacher Results

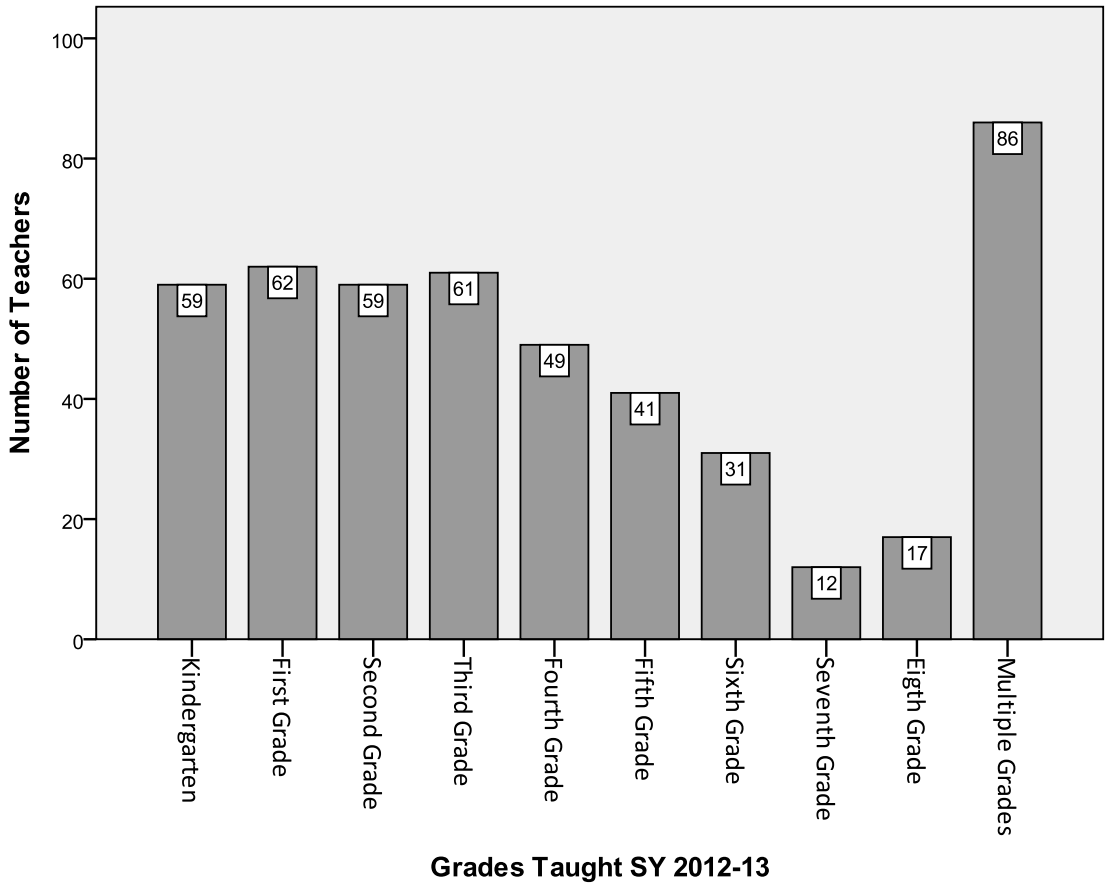
Electronic surveys were emailed to a total of 1,178 teachers at 75 schools (25 schools per assembly). Teachers were asked to complete the survey whether they physically attended the assembly or not; to capture the use of supplemental lessons in the classroom. The overall target response rate of 25% was surpassed for all three assemblies (Table 6.2). Only completed surveys (n=477) were used for analyses. *Jump with Jill* respondents had the highest number of completed surveys (n=204) followed by *FoodPlay* (n=140) and *Rapping About Prevention* (n=133).

Table 6.2. Teachers' Electronic Survey Response Rate (N=1,718), FY 2013

Assembly	Surveys Sent n	Respondents n (% of sent)	Surveys Completed n (% of sent)	Unresponded n (% of sent)
FoodPlay	542	170 (31.4)	140 (25.8)	372 (68.6)
Jump with Jill	596	225 (37.8)	204 (34.2)	371 (62.2)
R.A.P.	580	149 (25.7)	133 (22.9)	431 (74.3)
Total	1,718	544 (31.7)	477 (27.8)	1,174 (68.3)

Figure 6.3 details the grade level that respondents taught in the 2012-13 school year, with the majority of teachers instructing K-3rd grade. Almost all of the teachers (n=443, 92.9%) indicated that they physically attended the selected assembly from January-May 2013.

Figure 6.3. Grade Level Taught by Respondents in SY 2012-2013 (N=477)



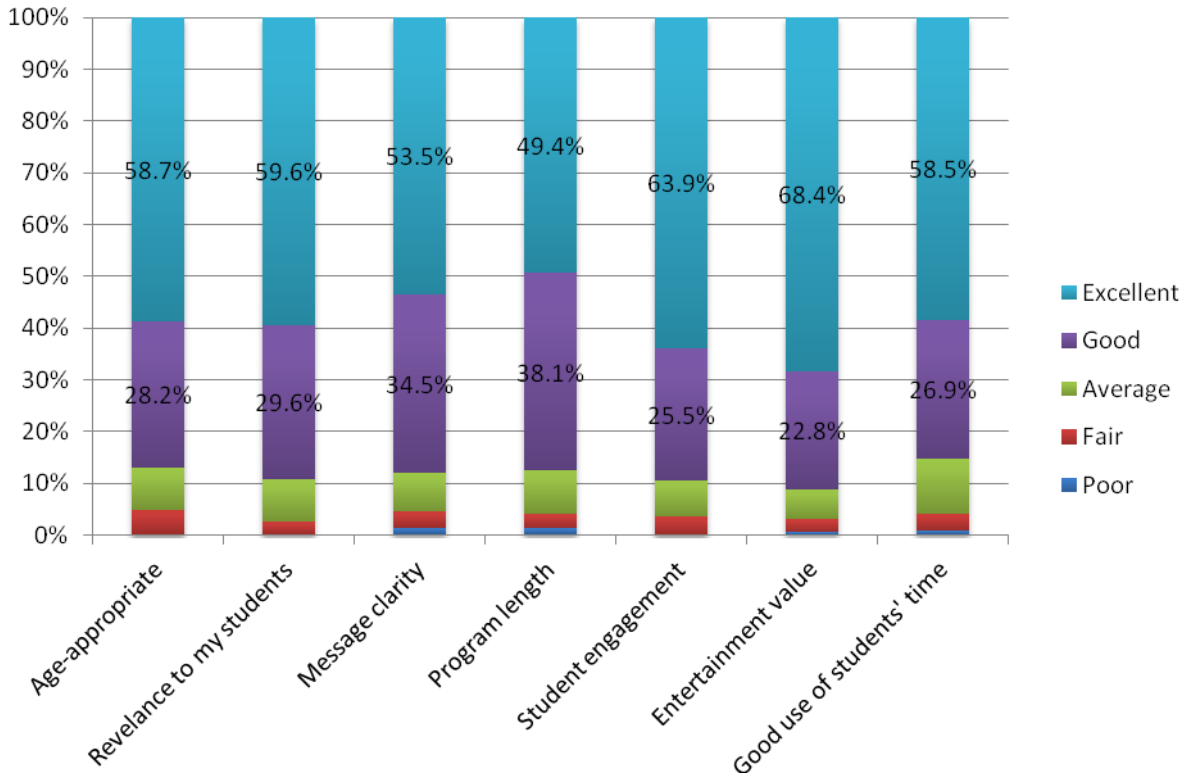
Teachers were asked to rank general nutrition assembly messages by level of importance, based on what they perceived their students had learned during the assembly. The "importance of healthy eating" message was the highest ranked across all three assemblies (n=140, 31.6%) followed by "what foods to eat more often" (n=109, 24.6%). The message that teachers found to be the least received by students during the assembly was "possible health complications from a poor diet" (n=295, 66.6%).

As seen in Figure 6.4, the majority (n=385, 86.9%) of teachers felt the assemblies were "good" or "excellent" in reference to age-appropriateness. Similarly, responses were largely positive for the remaining categories: relevance to my students, message clarity, program length, student engagement, entertainment, and use of students' educational time (Figure 6.4). There was less variation seen in the perception of emotional affect reported by teachers than what was reported by students. In summary, 324 teachers responded to the emotional affect component, indicating their perceptions of how students felt during the assemblies. A majority reported an overall positive emotional affect (n=290, 89.5%) on students, followed by neutral (n=33, 10.2%) and negative (n=1, 0.3%).

In addition, teachers reported their use of the supplemental lessons that were provided with each assembly performance. Overall, 376 (78.8%) of teachers used the supplemental lessons in their classrooms. Of those

teachers, 200 (53.2%) reported that they taught the lessons in class and 93 (24.7%) reported the nutrition educator taught the supplemental lessons. There were 101 teachers who did not use the supplemental activity lessons; main reasons for non-use were lack of time (n=51, 50.5%) and not receiving the supplemental activity packets (n=26, 25.7%).

Figure 6.4. Teachers' Rating of Nutrition Assemblies (N=477), FY 2013



To further evaluate the impact of each assembly on student knowledge and emotional affect, additional analyses were conducted at the assembly group level for student and teacher responses. Detailed results follow in assembly sections below.

c. FoodPlay

Student Survey Results:

FoodPlay pre- and post-surveys were completed by 124 students with a mean age of 11.66 years, SD=0.43. There were slightly more females (n=67, 54.0%) than males (n=57, 46.0%). Almost half the sample was Hispanic or Latino (n=61, 49.2%) followed by Black or African American (n=39, 31.5%), Asian (n=15, 12.1%), White (n=8, 6.5%), and multiracial (n=1, 0.8%). Out of six possible points, the average total knowledge score on the pre- and post-survey was 3.73 (SD=1.26) and 3.96 (SD=1.31), respectively. All students answered at least one question correctly on both the pre- and post-surveys. Fourteen students (11.3%) answered all six knowledge questions

correctly on the post-survey. The mean assembly specific knowledge score on the pre-survey was 2.77 (out of 4), SD=1.00 and 2.94, SD=1.08 on the post-survey. A total of 58 (46.8%) students reported that they learned something new from the assembly.

Paired samples *t*-tests were conducted to determine differences in knowledge from pre- to post-survey (Table 6.5). Students' total knowledge score (Q1-6) did not significantly differ over time, *t*=-1.935, *p*=0.055. Results indicated there were no significant differences in total correct responses from pre- to post-survey for the assembly specific questions, *t*=-1.784, *p*=0.077, or on the general nutrition and physical activity questions, *t*=-0.929, *p*=0.355. However, significantly more students correctly answered the assembly-specific knowledge question about salt intake causing high blood pressure on the post-survey, *t*=-3.569, *p*=0.001.

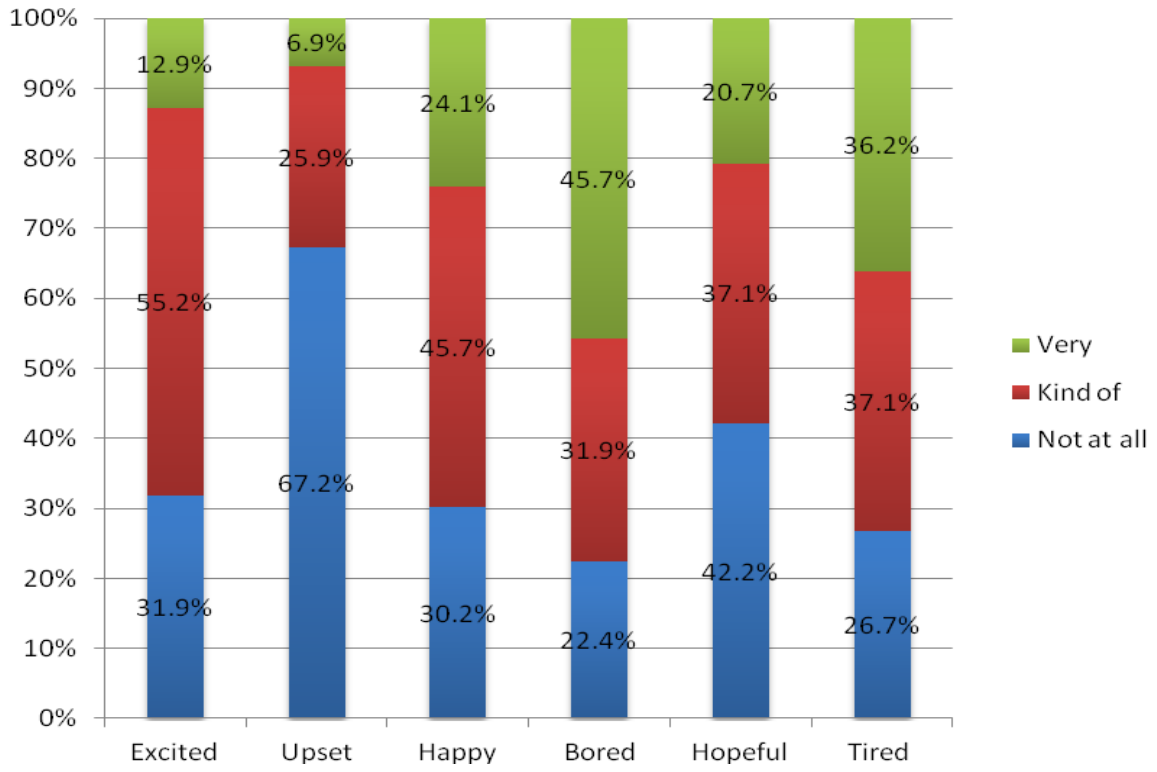
Table 6.5. Results of Paired Samples *t*-tests for *FoodPlay*, FY 2013

Survey Measure (Question Number)	Pre-Survey n, Mean, SD			Post-Survey Mean, SD		Mean Difference	*t*-test statistic	*p*-value significance	95% Confidence Interval
Fruit & Vegetable Servings (Q1)	122	0.46	0.50	0.50	0.50	-0.03	-0.601	0.549	-0.14071, 0.07514
Minutes of Physical Activity (Q2)	124	0.52	0.50	0.54	0.50	-0.02	-0.537	0.592	-0.11333, 0.06494
Healthy Food Choice (Q3)	124	0.66	0.48	0.65	0.48	0.02	0.332	0.740	-0.08000, 0.11225
Unhealthy Food Choice (Q4)	124	0.64	0.48	0.65	0.48	-0.02	-0.391	0.697	-0.09781, 0.06555
High Blood Pressure (Q5)	124	0.75	0.43	0.88	0.33	-0.13	-3.569	**0.001**	-0.20060, -0.05747
Fried Foods (Q6)	124	0.72	0.45	0.76	0.43	-0.04	-0.844	0.400	-0.13487, 0.05423
Total Knowledge (Q1-6)	124	3.73	1.26	3.96	1.31	-0.23	-1.935	0.055	-0.45679, 0.00517
General knowledge (Q1-2)	122	0.98	0.75	1.04	0.70	-0.07	-0.929	0.355	-0.20525, 0.07410
Assembly Specific Knowledge (Q3-6)	124	2.78	0.99	2.92	1.07	-0.17	-1.784	0.077	-0.35726, 0.01855

Independent samples *t*-tests were conducted to determine if there were significant differences in knowledge scores of students by gender. Females scored significantly higher than males on both the pre- (*p*=0.010) and post-surveys (*p*=0.009), (Appendix M, Figure B). Gender was used as a covariate in RM-ANOVA to test the difference in total knowledge scores from pre- to post-survey; however, no significant effect of time or interaction of time and gender were determined (main effect of time: *F*(1,133)=3.653, *p*=0.058; main effect of interaction: *F*(1,133)=0.014, *p*=0.904).

116 students completed the emotional affect measure on the post-survey. Percentages of responses are presented in Figure 6.6. The average *FoodPlay* emotional affect score was 5.81 out of 12 points, SD=3.21. This score falls within the "neutral affect" range (4-8) for assemblies (Appendix N, Table B).

Figure 6.6. Students' Responses to Emotional Affect Questions, *FoodPlay* Assembly, FY 2013

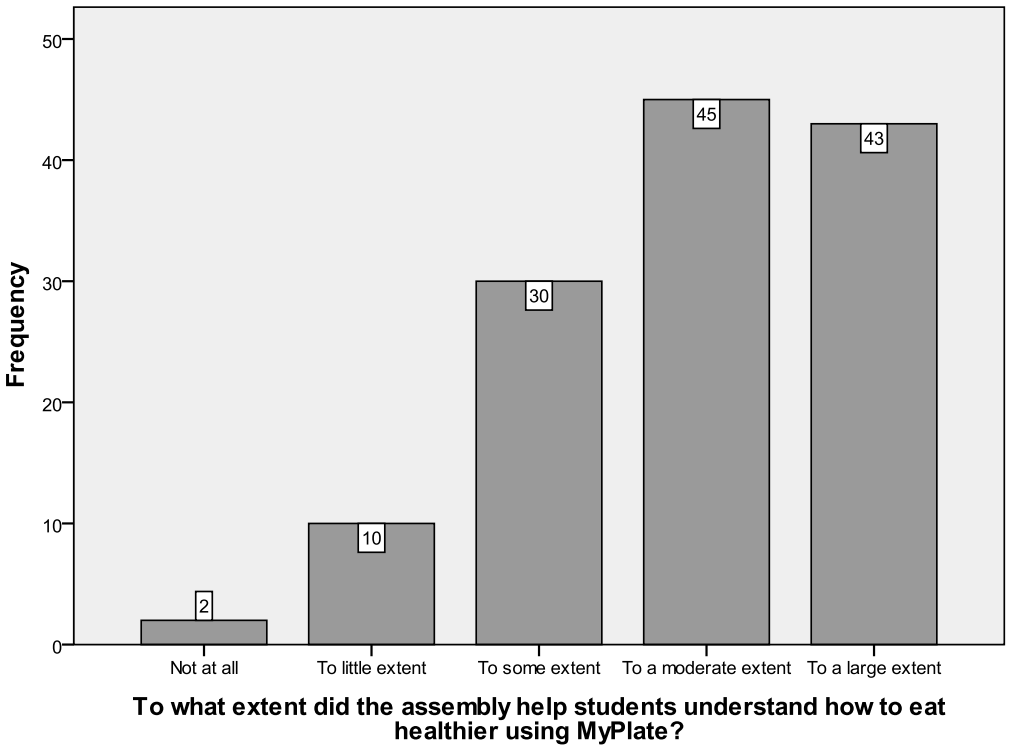


Teacher Survey Results:

140 teachers completed the electronic survey for the *FoodPlay* assembly. Respondents taught Kindergarten through 8th grade. The majority of teachers taught Kindergarten through 4th grade (n=103, 73.6%) and twenty-four teachers indicated teaching multiple grades in K-8 (n=24, 17.1%). 92.9% of respondents attended the *FoodPlay* assembly at their respective schools from January-May 2013.

Teachers identified which main messages on healthy eating were the most learned by students from attending the assembly: "what foods to eat more often" (n=40, 30.8%), "the importance of healthy eating" (n=39, 30.0%), "what foods to eat less often" (n=36, 27.7%). Only 8 teachers found "the importance of physical activity" to be the main message of the assembly. Possible health complications from a poor diet were the least received "take home" message (n=84, 64.6%). Generally, teachers found the *FoodPlay* assembly helped students understand how to eat healthier using MyPlate, the main assembly message identified by evaluators (Figure 6.7).

Figure 6.7. Extent of *FoodPlay* Main Message Learned by Students (n=130), FY 2013



Overall teacher perceptions of the *FoodPlay* assembly are provided in Figure 6.8. Teachers rated *FoodPlay* as above average on all measures. Almost half of all teachers perceived the entertainment value (48.5%) and student engagement (43.1%) to be "Excellent." Additionally, teachers perceived the emotional affect on students to be positive (n=70, 82.4%) and only one teacher perceived *FoodPlay* to have a negative emotional affect on students. Affect scores ranged from 2-12 points out of a possible 12, with a mean of 10.13, SD=1.96. Independent samples *t*-test was conducted to examine differences between teacher perceptions of the emotional affect of assemblies on students and what students reported their emotional affect to be. Results concluded there were statistically significant differences in teachers' perceived and students' actual emotional affect of the *FoodPlay* assembly on students (t=10.803, p<0.001). Teachers perceived a significantly greater positive affect (M=10.13, SD=1.96) than students reported (M=5.8, SD=3.18) (Figure 6.9).

Supplemental assembly lessons were used by 80% of teachers. Of the 112 teachers who used the lessons, 69 (61.6%) teachers taught the lessons in class while 35 (31.3%) had the nutrition educator lead the supplemental lesson. 64.3% of teachers assigned the assembly handouts as an in-class or take-home activity. 20% of teachers (n=28) did not use the supplemental assembly lessons, with lack of time being the most reported reason as to why (n=14, 50.0%). Nine teachers indicated never receiving the assembly lessons, and one teacher did not find the supplemental lessons useful to students.

Figure 6.8. Teachers' Rating of the *FoodPlay* Assembly (n=130), FY 2013

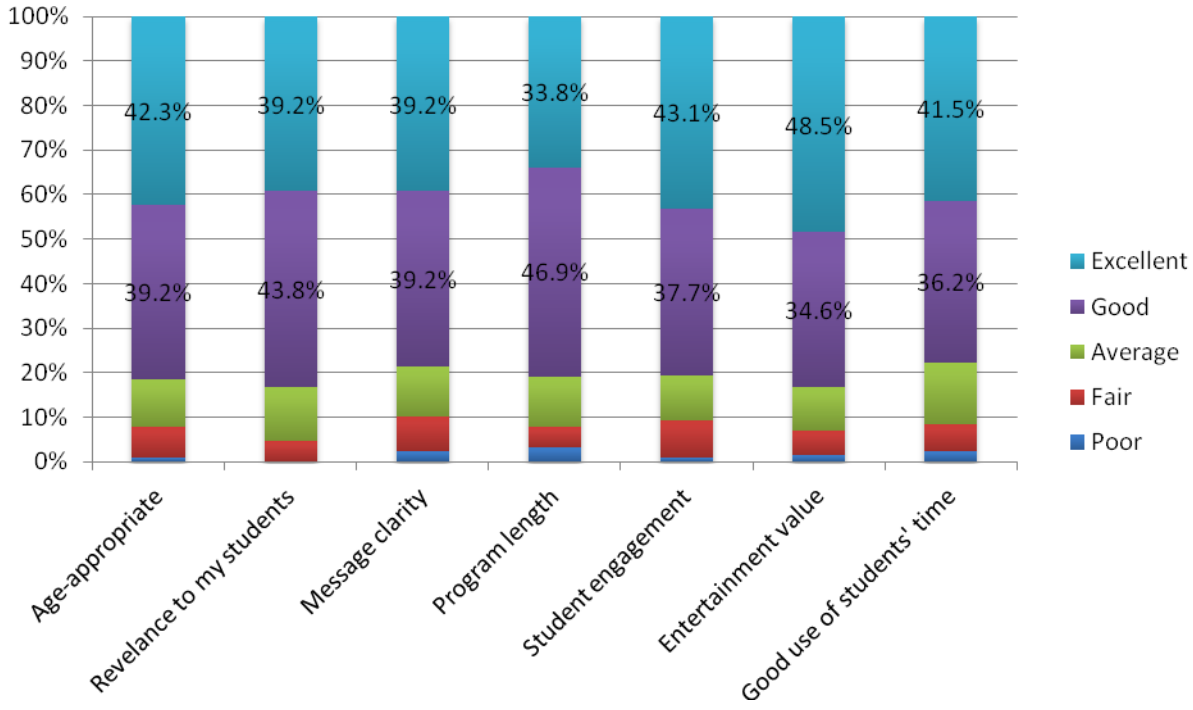
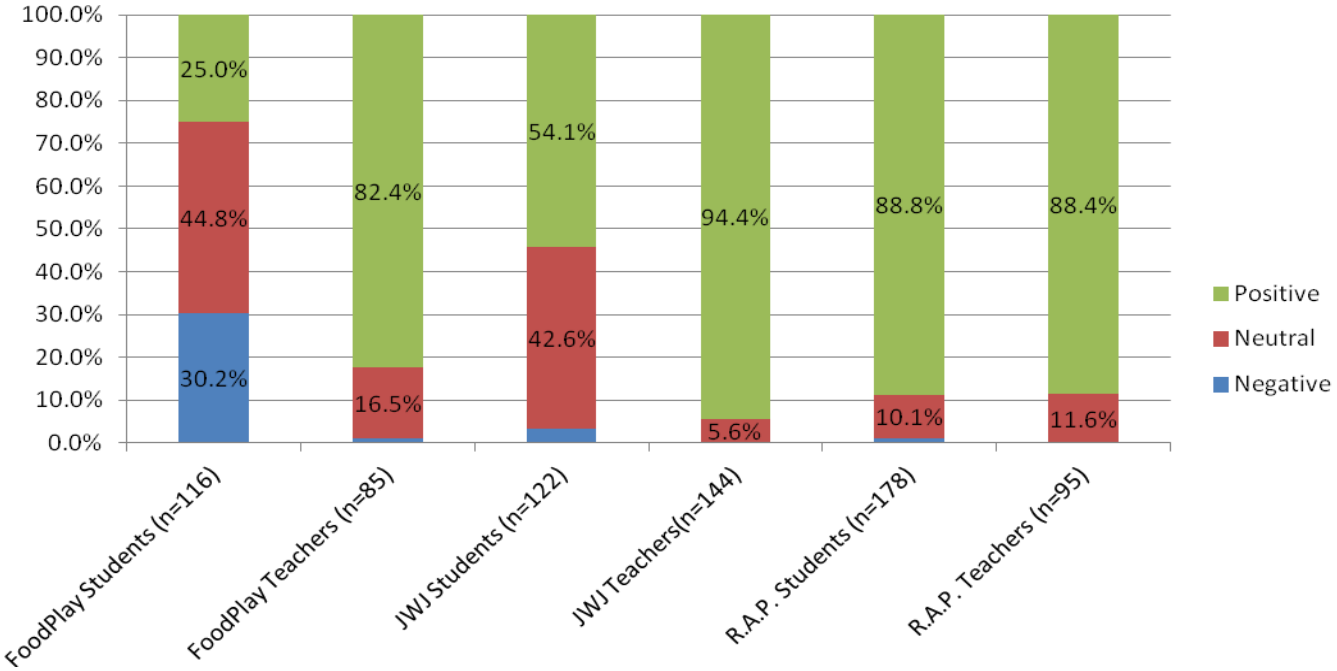


Figure 6.9. Perceived Teacher and Actual Student Emotional Affect Ranges by Assembly, FY 2013



d. Jump with Jill

Student Survey Results

Pre- and post-surveys for *Jump with Jill* were completed by 127 students with a mean age of 11.52 years, SD=0.44. Within this sample, 62 (48.8%) were females and 65 (51.2%) were males. The majority of students were Black (n=76, 59.8%), followed by White (n=23, 18.1%), multiracial (n=11, 8.7%), Asian (n=10, 7.9%) and Hispanic (n=7, 5.5%). The mean total knowledge score on the pre- and post-surveys was 5.14, SD=0.80 and M=5.15, SD=0.86, out of 6 possible points, respectively. The average assembly specific knowledge score (out of 4) was 3.83, SD=0.42 on the pre-survey and 3.83, SD=0.41 on the post-survey.

Paired samples *t*-tests were conducted to evaluate differences in knowledge from pre- to post-survey (Table 6.10). No statistically significant differences were determined for total knowledge (Q1-6) scores from pre- to post-survey, t=-0.114, p=0.910. The assembly specific knowledge scores yielded no statistically significant differences from pre- to post-survey, t=-1.544, p=0.125, nor on the general nutrition and physical activity questions, t=-0.208, p=0.836.

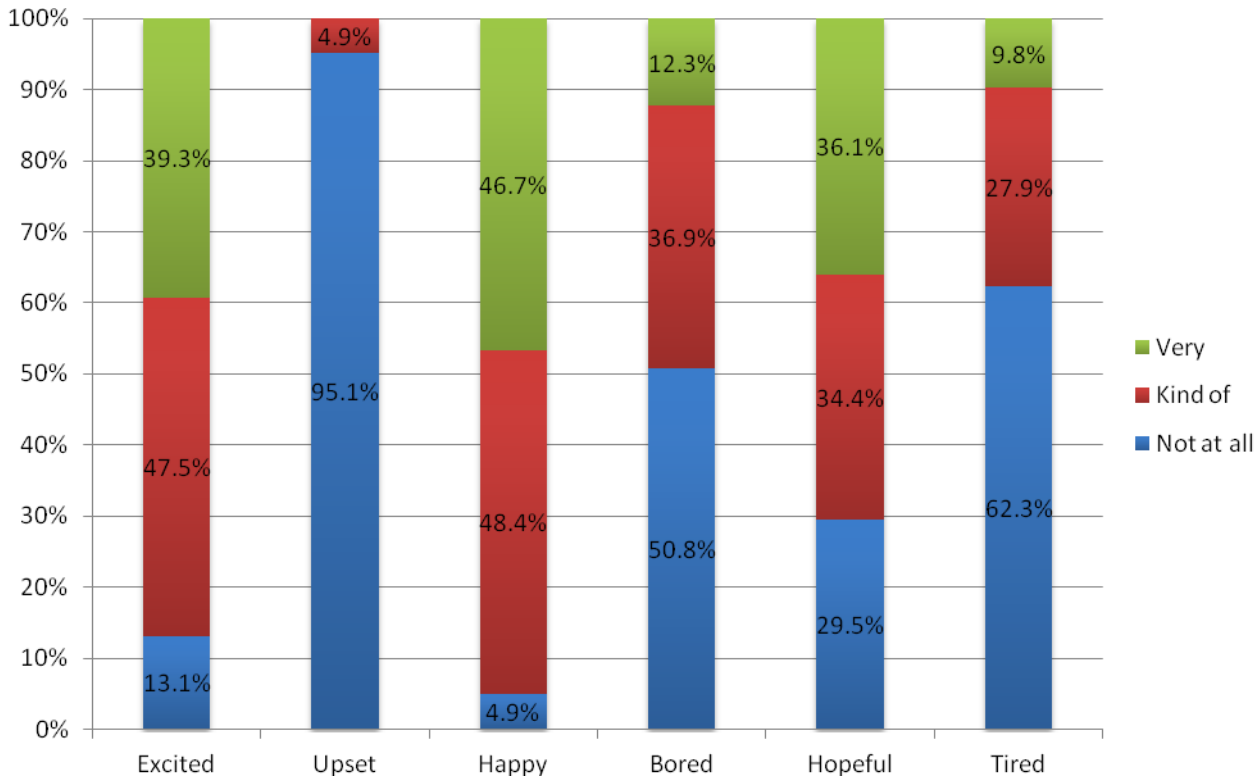
Table 6.10. Results of Paired Samples *t*-tests for *Jump with Jill* (n=127), FY 2013

Survey Measure (Question Number)	Pre-Survey Mean, SD		Post-Survey Mean, SD		Mean Difference	*t*-test statistic	*p*-value significance	95% Confidence Interval
Fruit & Vegetable Servings (Q1)	0.65	0.48	0.64	0.48	0.01	0.156	0.877	-0.09229, 0.10804
Minutes of Physical Activity (Q2)	0.67	0.47	0.68	0.47	-0.01	-0.242	0.809	-0.07236, 0.05661
Healthy Food Choice (Q3)	0.98	0.12	0.98	0.15	0.01	0.576	0.566	-0.01919, 0.03493
Vegetable Health Benefits (Q4)	0.99	0.09	0.98	0.12	0.01	0.576	0.566	-0.01919, 0.03493
Healthy Drink Choice (Q5)	0.96	0.20	0.99	0.09	-0.03	-2.024	0.045	-0.06229, -0.00070
Sugary Cereal Energy (Q6)	0.89	0.31	0.88	0.32	0.01	0.276	0.783	-0.04851, 0.06426
Total knowledge (Q1-6)	5.14	0.80	5.15	0.86	-0.01	-0.114	0.910	-0.14514, 0.12940
General knowledge (Q1-2)	1.32	0.64	1.32	0.71	0.00	0.000	1.000	-0.11914, 0.11914
Assembly Specific Knowledge (Q3-6)	3.83	0.42	3.83	0.41	-0.01	-0.208	0.836	-0.08289, 0.06714

Mean differences in scores of males and females were examined using independent samples *t*-tests. There were no significant differences between boys and girls for total knowledge (p=0.540), general knowledge (p=0.125), or assembly-specific knowledge (p=0.455) scores on the pre-survey. Males scored significantly higher (M=5.32, SD=0.77) on the post-survey for total knowledge when compared to their female counterparts (M=4.97, SD=0.92), t=2.357, p=0.020. Specifically, males indicated significantly higher knowledge on the general questions regarding fruit and vegetable servings and minutes of physical activity, t=2.430, p=0.017 (Appendix M, Figure C).

Half of the students reported liking *Jump with Jill* the same as the other assemblies viewed at school (n=64, 51.2%), and 27.2% (n=34) liked *Jump with Jill* more than the other assemblies. 122 students completed the emotional affect measure on the post-survey. Percentages of responses are presented in Figure 6.11. The average *Jump with Jill* emotional affect score was 8.61 out of 12 points, SD=2.70. This score indicates that *Jump with Jill* had a "positive affect" (score of 9-12) for students (Appendix N, Figure C).

Figure 6.11. Students' Responses to Emotional Affect Questions, *Jump With Jill* Assembly (n=122), FY 2013

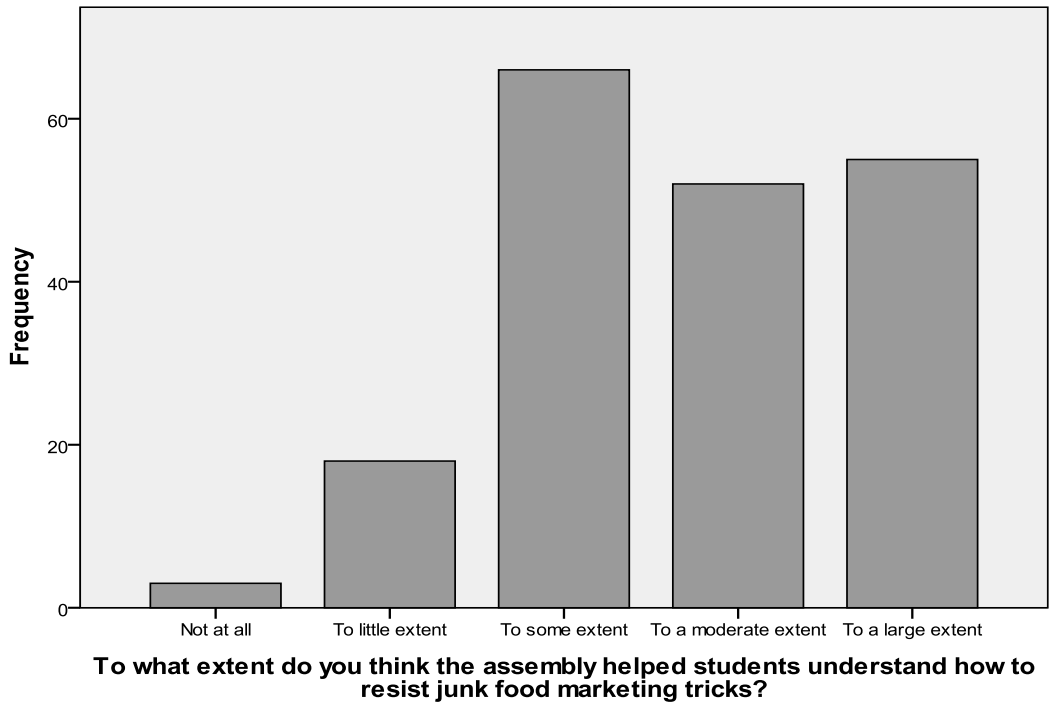


Teacher Survey Results:

Jump with Jill electronic surveys were completed by 204 teachers. The majority (n=180, 88.2%) of respondents taught grades K-6. The remaining 24 teachers indicated teaching multiple grades in K-8. Only 10 respondents (4.9%) did not attend the assembly during January-May 2013.

Similar to *FoodPlay*, teachers found the main messages to be focused on the importance of healthy eating (n=64, 33.0%) and what foods to eat more often (n=51, 26.3%). However, unlike *FoodPlay* responses, teachers found the importance of physical activity to be one of the main take home messages during the *Jump with Jill* assembly (n=42, 21.6%). Possible health complications from poor diet was the least ranked main message (n=147, 75.8%). Most teachers found the *Jump with Jill* assembly helped students understand how to resist junk food marketing tricks to some extent, the main assembly message identified by evaluators (n=66, 34.0%) (Figure 6.12).

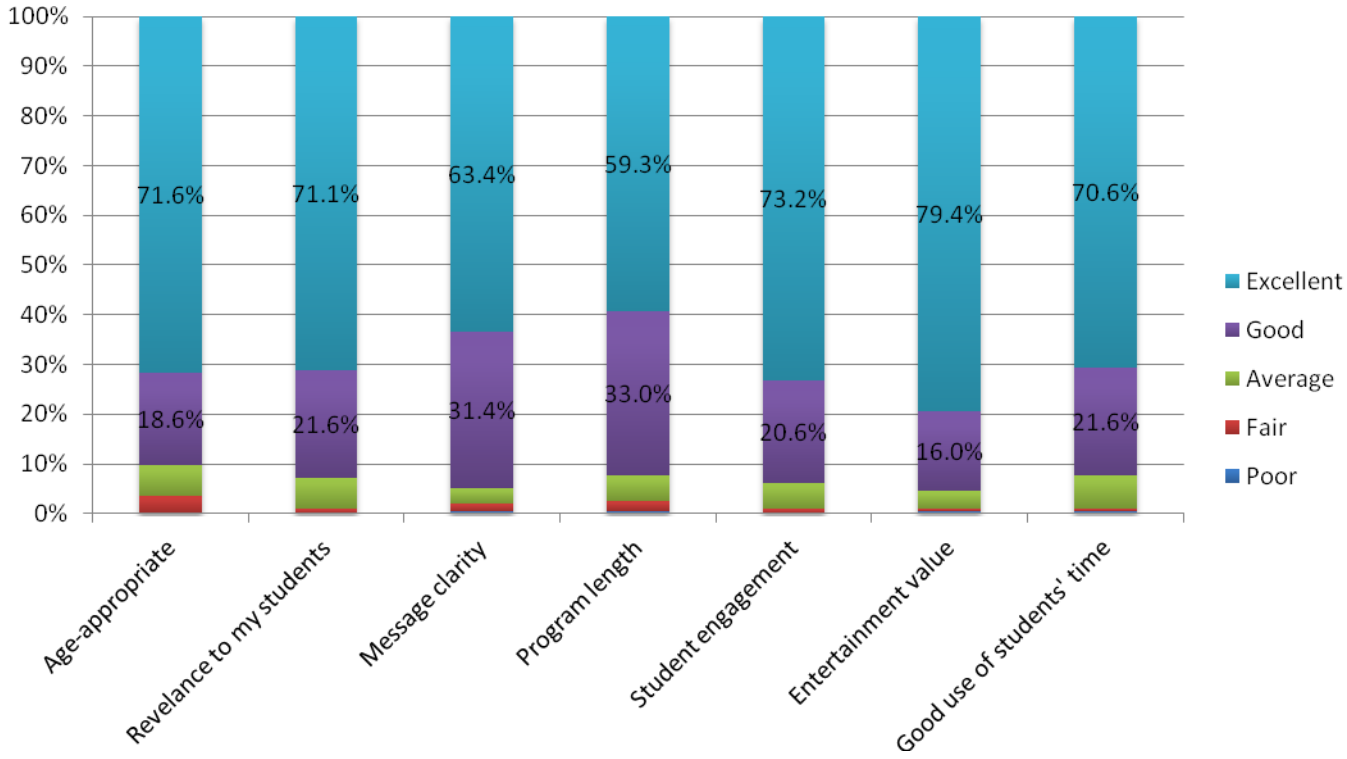
Figure 6.12. Extent of *Jump with Jill* Main Message Learned by Students (n=194), FY 2013



Teachers indicated a positive perception of the *Jump with Jill* assembly (Figure 6.13). Teachers found the assembly to be excellent in entertainment value (79.4%) and student engagement (73.2%). The emotional affect results (n=144) were similar to those of *FoodPlay*, where teachers perceived a typically positive emotional affect of the assembly on students. According to teachers, students were very excited (92.4%), very happy (92.4%), not at all upset (97.9%), not at all bored (94.4%) and not at all tired (89.6%). Total perceived emotional affect scores ranged from 7-12 out of 12 possible points, with a mean of 11.03, SD=1.11. An independent samples *t*-test examined mean differences between teacher perceptions of and actual student reports of the emotional affect of *Jump with Jill*. Teachers perceived a statistically significant higher positive affect (M=11.03, SD=1.11) than students reported (M=8.61, SD=2.70), t=9.251, p<0.001, (Figure 6.9).

The majority (n=171, 83.8%) of teachers used the supplemental assembly lessons in their classrooms, where 55.6% of teachers (n=95) taught the lessons, and 22.2% of classrooms (n=38) received the lesson from their nutrition educator. 68.7% of teachers (n=117) assigned the assembly handouts in class or as homework. Of the 33 teachers who did not use the supplemental assembly lessons, the main reason was lack of time (n=17, 51.5%). Eight teachers did not receive the supplemental assembly lessons for their classrooms (24.2%).

Figure 6.13. Teachers' Rating of the *Jump with Jill* Assembly (n=194), FY 2013



e. Rapping About Prevention

Student Survey Results

A total of 183 students viewed the *Rapping About Prevention* (R.A.P.) assembly and completed the pre- and post-surveys. Of these students, 93 students (50.8%) were male and 90 students (49.2%) were female. The mean age was 11.54 years, SD=0.46. Almost half (n=82, 44.8%) of the students were Black or African American, followed by White (n=40, 21.9%), Hispanic or Latino (n=30, 16.4%), Asian (n=24, 13.1%) and multiracial (n=7, 3.8%). On the pre-survey, the average total knowledge score was 4.74 out of 6 possible points (SD=1.03) and on the post-survey, M=5.03, SD=1.00. After isolating the R.A.P. assembly-specific questions, the mean pre-knowledge score was 3.63 (out of 4), SD=0.66; the post-knowledge score was M= 3.67, SD=0.62.

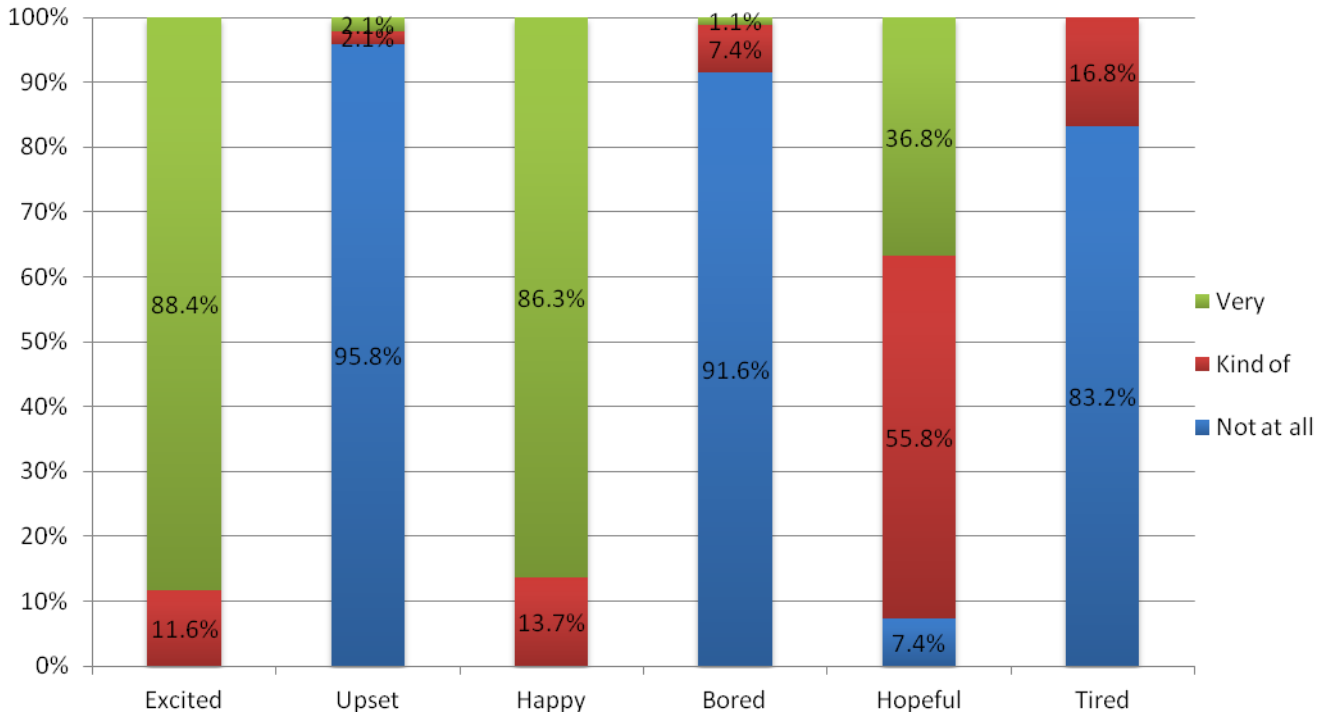
In order to test the significant differences in knowledge learned from the assembly, paired samples *t*-tests were conducted. Students' total knowledge score significantly increased from pre- to post-survey, t=-4.538, p<0.001. Results indicated there were no statistically significant differences in correct responses from pre- to post-survey for the assembly specific questions (p=0.249); however, statistically significant differences existed on the general nutrition and physical activity questions (p<0.001) (Table 6.14). Independent samples *t*-tests did not determine statistically significant differences at the p=0.05 level in scores of males and females on any measure.

Table 6.14. Results of Paired Samples *t*-tests for *Rapping About Prevention*, FY 2013

Survey Measure (Question Number)	Pre-Survey n, Mean, SD			Post-Survey Mean, SD		Mean Difference	*t*-test statistic	*p*-value significance	95% Confidence Interval
Fruit & Vegetable Servings (Q1)	180	0.52	0.50	0.68	0.47	-0.16	-3.998	**<0.001**	-0.24064, -0.08159
Minutes of Physical Activity (Q2)	182	0.61	0.49	0.69	0.47	-0.08	-2.511	**0.013**	-0.13738, -0.01647
Nutritious Food and Health (Q3)	182	0.85	0.36	0.87	0.33	-0.03	-1.092	0.276	-0.07713, 0.02218
Exercise (Q4)	182	0.95	0.23	0.95	0.22	-0.01	-0.446	0.656	-0.02979, 0.01880
Healthy Beverage (Q5)	182	0.86	0.34	0.87	0.34	-0.01	-0.258	0.797	-0.04733, 0.03640
Importance of Exercise (Q6)	183	0.97	0.16	0.98	0.15	-0.01	-0.446	0.656	-0.02963, 0.01870
Total knowledge (Q1-6)	183	4.74	1.03	5.03	1.00	-0.29	-4.538	**<0.001**	-0.41554, -0.16370
General knowledge (Q1-2)	179	1.15	0.71	1.38	0.66	-0.23	-4.864	**<0.001**	-0.32983, -0.13944
Assembly Specific Knowledge (Q3-6)	181	3.63	0.66	3.67	0.62	-0.04	-1.156	0.249	-0.11966, 0.03126

A majority of students (n=135, 73.8%) reported that they liked R.A.P. more than the other assemblies they have seen at school, while only 9 students (4.9%) liked R.A.P. less than other assemblies. 178 students completed the emotional affect measure on the post-survey. Results (Figure 6.15) indicate that R.A.P. had a "positive affect" on students, with an average emotional affect score of 10.41 out of 12 points, SD=1.86 (Appendix N, Figure D). This was the highest mean emotional affect score out of all three evaluated assemblies.

Figure 6.15. Students' Responses to Emotional Affect Questions, *Rapping About Prevention* Assembly (n=178), FY 2013

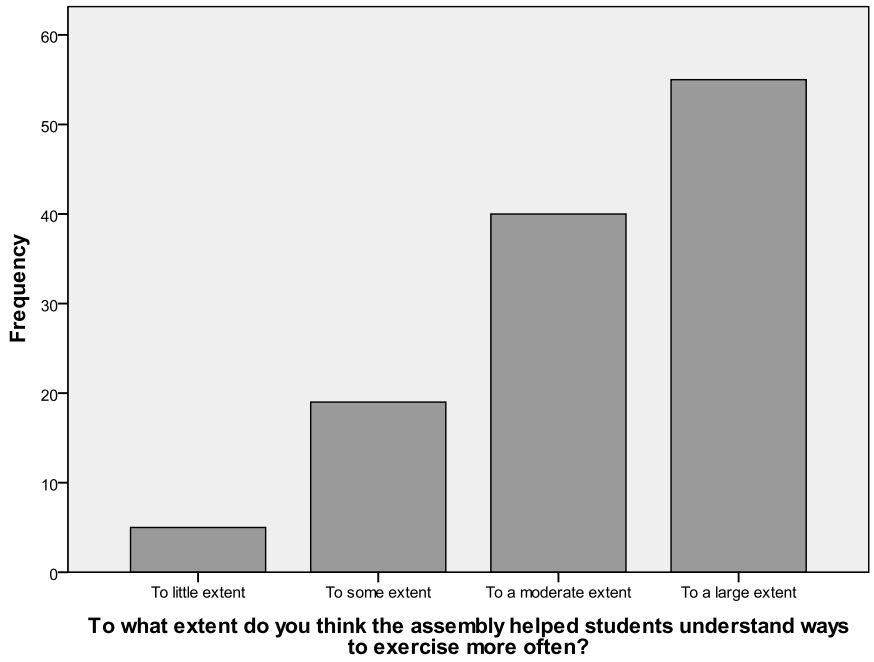


Teacher Survey Results

Rapping About Prevention (R.A.P.) assembly teacher feedback surveys were completed by 133 K-8 teachers. 64 respondents (48.1%) taught 5th-8th grades, while another 38 (28.6%) taught multiple grades in K-8. Of those who completed the survey, 119 (89.5%) attended the assembly between January and May 2013.

Teachers ranked the importance of physical activity as the most received take home message of students who attended the assembly (n=51, 42.9%). Furthermore, to a large extent teachers felt the assembly helped students understand ways to exercise more often (Figure 6.16). The importance of healthy eating was ranked the second most received message (n=46, 38.7%). In contrast with *FoodPlay* and *Jump with Jill*, teachers did not find what foods to eat more or less often to be a prominent main messages for R.A.P.

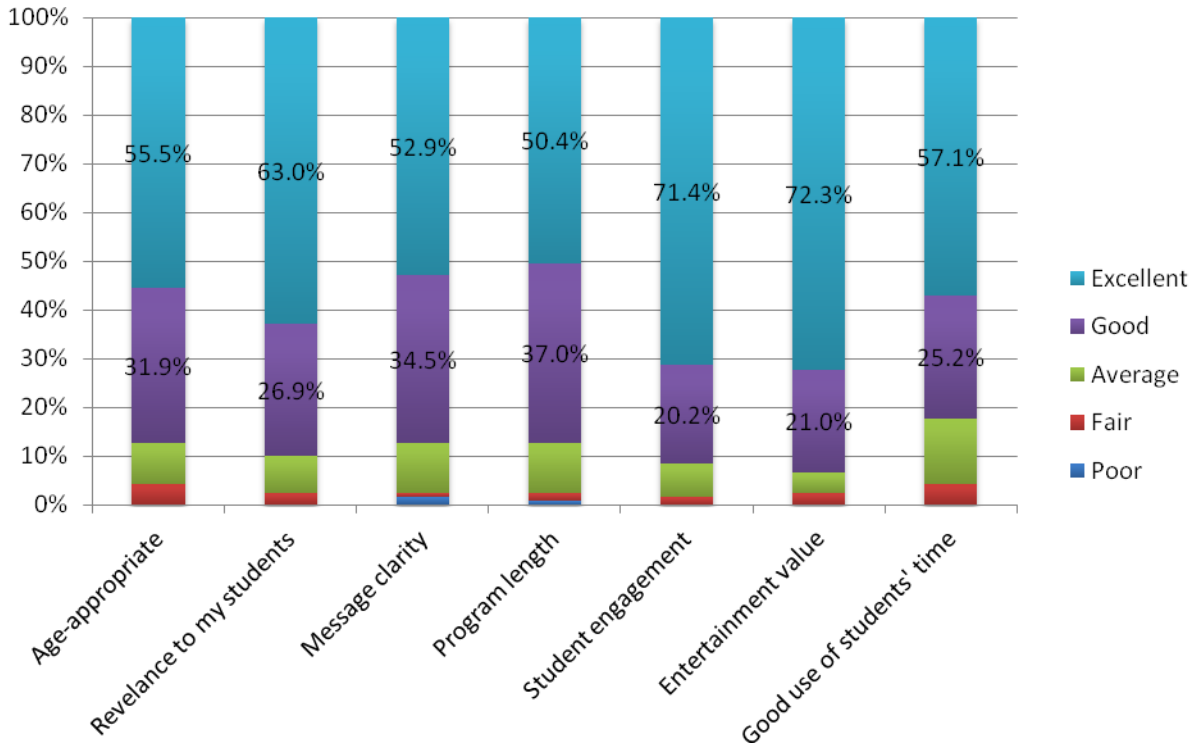
Figure 6.16. Extent of *Rapping About Prevention* Main Message Learned by Students (n=119), FY 2013



The majority of teachers found the *Rapping About Prevention* assembly to be "excellent" in regards to relevance to students (n=75, 63.0%) and student engagement (n=85, 71.4%). Overall, teachers felt the assembly was good or excellent (Figure 6.17). The emotional affect of R.A.P. on students was reported by 95 teachers (Figure 6.9). Similar to the two above-mentioned assemblies, teachers who attended R.A.P. found the students to be positively engaged, very excited (88.4%), very happy (86.3%), not at all tired (83.2%), and not at all bored (91.6%). The perceived emotional affect scores provided by teachers ranged from 7-12 points out of a possible 12. The mean score was 10.72, SD=1.38. Independent samples *t*-tests determined no statistically significant difference in the perceived mean emotional affect score of teachers and actual emotional affect scores reported

by students (M=10.41, SD=1.86), *t*=1.540, *p*=0.125. Both teachers and students found the *Rapping About Prevention* assembly to have a positive emotional affect on students.

Figure 6.17. Teachers' Rating of the *Rapping About Prevention* Assembly (n=119), FY 2013



93 teachers reported use of the supplemental assembly lessons. 63.4% of teachers assigned the handouts as in-class or homework assingments. Nutrition educators taught the supplemental lessons in 20 classrooms (21.5%) and 36 classroom teachers taught the lessons (38.7%). Forty teachers did not use the supplemental lessons. Of those teachers, 20 (50%) did not have enough time to teach the lessons and 9 (22.5%) were not given the lesson packets.

f. Student Responses: Newly Learned Concepts

Of those students who completed the post-survey, responses to the open-ended question, "What was something new that you learned from the assembly?" were analyzed for major themes (Ns=68, 85, and 116 responses for *FoodPlay*, *Jump with Jill*, and *RAP*, respectively). Results are presented in Tables A-C featured in Appendix O. Theme topics and the number of references to major themes differed across the assemblies (*ns*= 85, 102, and 120 references, respectively). After watching *FoodPlay*, almost half (44.7%, n=38) of students' references pertained to learning something new about unhealthy eating, including kinds of unhealthy foods and that unhealthy food should be eaten less often. Alternatively, of students who viewed *Jump with Jill*, more than half (60.8%, n=62) of references concerned learning something new about healthy eating, such as why they

should eat healthy foods more often, portions of the plate that should be filled with fruits and vegetables, and the importance of eating breakfast.

Compared to students who watched *FoodPlay*, students who watched the *Jump with Jill* assembly responded with more specific examples about why they should eat healthy foods, as well as kinds of healthy and unhealthy foods. For example, students who viewed *Jump with Jill* provided examples of healthy foods, such as fruits, vegetables, whole wheat bread, milk, cheese, and breakfast, and referenced MyPlate portions of fruits and vegetables (2.0%, n=2). *FoodPlay* viewers provided less detailed lists of healthy foods, with responses containing more generalized food categories like "fruits and vegetables," "milk," and "protein." However, compared to students who watched *Jump with Jill* or R.A.P., students who watched *FoodPlay* responded with more references concerning health problems related to eating a poor diet (24.7%, n=21): "If you eat [a] lot of sugar you could get diabetes;" "I learned that too much salt makes you have high blood pressure."

Among students who viewed *Rapping About Prevention*, most responses contained references to learning something new about exercise, such as what exercise is, types of exercise, and how it affects the body (34.1%, n=41 references). 27.5% (n=33) of references pertained to learning about why students should eat healthy food, and in particular, why eating healthy is important to the body. Some students (4.2%, n=5) commented that they learned about the importance of eating breakfast: "I learned that you have to eat a healthy breakfast every day;" "Breakfast gives you 'brain power' and helps you stay focused for the day;" "To eat a healthy breakfast every day." References describing that both nutrition and physical activity are important to being healthy were unique to students who viewed *Rapping About Prevention*, (6.7%, n=8). Students who viewed the other assemblies did not refer to this concept as something newly learned. Response examples included: "It's not just eating healthy that makes feel in the right shape;" "I learned that exercising and eating right helps me grow and become strong;" "I learned that I must exercise more and eat healthier."

In some instances, students reported incorrect information regarding nutrition and physical activity concepts, or stated that they did not learn anything new (n=10). This was not unique to any one assembly, and did not seem to occur with any great frequency. While most students did not supply a reason why they did not learn anything new, one student commented that he/she had seen the assembly before and already knew the material.

v. Teacher Feedback

a. Positive Feedback

Teacher comments and suggestions were collected from *FoodPlay*, *Jump with Jill*, and *Rapping About Prevention* (Ns=43, 63, and 40 responses, respectively). Findings are reported in Appendix P, Tables A-C. Overall, the majority of teachers had positive things to say about the assemblies. More than half of comments about *Jump with Jill* and *Rapping About Prevention* were positive (75%, n=47; 60%, n=24, respectively), with slightly fewer for *FoodPlay* (40%, n=17). The words most frequently used to describe the assemblies included "great", "enjoyed", and "excellent." Teachers' comments (n=7) acknowledged that while their younger students enjoyed *Jump with Jill* and *FoodPlay*, these assemblies may have been too immature for the older students. A few comments indicated that students were very engaged during the *Jump with Jill* and the *Rapping About*

Prevention assemblies (ns=2 and 3, respectively). One teacher commented that the "great direct instruction" provided in the *Jump with Jill* assembly was a positive aspect of the performance. Regarding the RAP assembly, teachers felt that the students were able to relate to the performers on a personal level, and were therefore more engaged (7.5%, n=3): "This was the first one [assembly] that my students totally and completely connected with. It was refreshing to see that they had young men who were African American, just like my students, doing the presentation." Another teacher stated: "The program was what the students need because they can relate to the performers, therefore the message of health registered for the students." This theme did not emerge for *FoodPlay* or *Jump with Jill*.

b. Negative Feedback

Some teachers commented that the assemblies were not age-appropriate for older students (n=4); where age was specified, it was recommended that 6th graders do not view *FoodPlay* (n=1), and 4th and 5th graders do not view *Jump with Jill* (n=1). Teachers commented that *Rapping About Prevention* was not appropriate for "older students" in general (n=2). The proportion of negative comments was greater for *FoodPlay* (40%, n=17) than for *Jump with Jill* and *Rapping About Prevention* (10%, n=6; 12.5%, n=5, respectively). The majority of negative comments about *FoodPlay* (59%, n=10) was related to the assembly performance being too loud, which made it less enjoyable for students and teachers alike: "You can't always hear them with the music so loud. My students missed some of the important things." Another teacher stated: "the volume of the program was too loud. The volume was a distraction and made it difficult for my students to enjoy the program." Negative comments about *Jump with Jill* (10%, n=6) concerned its fast-pace, which made it difficult for some students to follow (n=3), and the program's oversight of special needs students in attendance (n=2). 60% (n=3) of teachers' negative comments about *Rapping About Prevention* concerned the use of inappropriate slang and performer appearance, such as "dancers should not be shaking their butts", and "[Performers] shouldn't have tattoos all over their faces, necks, and hands—sends the wrong message."

c. Suggestions for Assembly Program Improvement

Several comments provided by teachers included suggestions on how to improve the assembly performances and supplemental materials for *FoodPlay*, *Jump with Jill*, and *Rapping About Prevention* (ns=9, 10, and 11, respectively). Across all three assemblies, teachers suggested that new content be added to the assemblies (n=3, 6, and 7, respectively). Many responded that students had already seen the assembly and remembered the same songs or scenes presented. Specific suggestions for improvement were made for each assembly program. For example, *FoodPlay* could include more interaction and student involvement (n=4). Teachers (n=4) suggested that there be interaction time outside of the performance for *Rapping About Prevention*, such as: "Maybe a little more interaction in the classroom prior to the assembly." Another teacher suggested that performers: "Go from class to class after assembly to meet students on a personal level." Suggestions for *Jump with Jill* involved improvements to the supplemental activities for students and teachers (n=4): "Along with the booklet, have an additional lesson to do after the program"; "Have handouts or worksheets that are related to or connected to the musical songs"; "It might make things more difficult, but if the handouts could be leveled by grade that would be great. Ours were a little difficult for kindergarten but we worked through it!"

vi. Discussion

Overall, the impact that assembly programming had on students varied with each assembly. A quantitative assessment of the change in students' nutrition and physical activity knowledge, combined with analysis of their written responses about newly learned concepts, provided some insight about the extent to which students learned from each assembly performance. *FoodPlay* demonstrated no significant differences in knowledge following the performance, with the exception of some increased understanding about the relationship between eating salty foods and having high blood pressure. Findings from students' written responses about what they learned from watching *FoodPlay* further suggested that this show is somewhat effective in teaching children about health complications related to poor diet.

No significant differences in general or assembly-specific knowledge were found among students who viewed *Jump with Jill*. The limited change is most likely due to the high knowledge scores obtained on the pre-survey, which left only a small margin for improvement on the post-survey. ORE inferred that high knowledge scores on the pre-survey were caused by the simplicity of the evaluation survey tool (i.e., the knowledge questions posed were easy enough for students to answer without having viewed the assembly). Although the quantity and variety of students' written responses about new concepts learned from *Jump with Jill* indicated that new knowledge was gained, extent to which their knowledge increased remains ambiguous. Therefore, no strong conclusions could be drawn regarding the effect of *Jump with Jill* on students' nutrition and activity knowledge.

Rapping About Prevention demonstrated a significant, positive impact on students' knowledge concerning MyPlate portions and the recommended daily amount of physical activity for children. However, the lack of significant change in assembly-specific knowledge implies that the assembly did not sufficiently emphasize its primary learning objectives. Additionally, ORE staff may have misinterpreted the main objectives from the materials used to create the specific knowledge questions, resulting in a discrepancy between what was asked in the surveys and what was actually taught during the assembly. However, *Rapping About Prevention* was the only assembly from which students significantly gained general nutrition and physical activity knowledge, and specifically reported learning about the benefits of both healthy eating and physical activity. These findings suggest that *Rapping About Prevention* is uniquely effective in teaching students about both healthy eating and exercising and why it is most beneficial to do both.

In general, teachers felt that the all three assemblies were excellent at providing age-appropriate and entertaining educational programming to their students. *Rapping About Prevention* scored the highest regarding its relevance to students, which coincides with teachers' feedback about the performance as being relatable to students. Alternatively, *Jump with Jill* scored highest on entertainment value, and teacher feedback further indicated that students' responded well to the music and CD tracks provided with the assembly performance. *FoodPlay* also scored highest in the areas of entertainment value and student engagement, but there was no further explanation from teachers as to why it was ranked that way.

Teachers felt that the message of *FoodPlay* and *Jump with Jill* that resonated the most with students was the importance of healthy eating; however for R.A.P., teachers regarded the importance of physical activity as the main message received by students. These variations are also reflected in students' responses about what they

learned from the assemblies, as more students referenced learning about exercise/physical activity from *Rapping About Prevention*, and healthy eating from *Jump with Jill* and *FoodPlay*. These findings confirm that the assemblies vary in the messages they convey to students, and teach students about a range of different topics concerning nutrition and physical activity. Since many students view more than one assembly show per school year, it is important to acknowledge that they are not exposed to the same topics, and are able to build a broader knowledge base from watching multiple assemblies.

Teachers' perceptions of students' emotional reactions to the assemblies significantly differed from students' self-reported emotions for *FoodPlay* and *Jump with Jill*. Teachers felt that their students enjoyed the assemblies more than they actually did. One explanation for the differences may be that the teacher survey collected information from teachers of grades other than 5th grade. Therefore, the findings might reflect the teachers' perceptions of younger students, who may have reacted with more energy and exaggerated emotion to the assembly performances. This is particularly true for *FoodPlay* and *Jump with Jill*, since most of the teachers who responded to these surveys taught grades below 5th. The results imply that younger grade groups may have responded more positively to *FoodPlay* and *Jump with Jill* than 5th graders. No significant differences were found between mean student emotional affect and teachers' perceived emotional affect for *Rapping About Prevention*. *Rapping About Prevention* was created for older students in grades 4 through 8, and is more commonly performed for these grades. More teachers of these older grades completed the *Rapping About Prevention* survey, and had observed the emotional responses of students closer in age and grade group to the 5th grade students in the sample. Moreover, *Rapping About Prevention* features music and dancing that is popular among a variety of age groups, thus providing entertainment for children and teachers alike. The emotional affect findings provide rationale for gathering more information about the impact of assemblies on a range of grades and age groups. Overall, *FoodPlay* received the least favorable responses from students and teachers regarding emotional affect. Teachers perceived that students enjoyed *Jump with Jill* the most, while students reported having the greatest positive emotional affect during the R.A.P assembly.

Lack of time was reported as the primary reason why teachers did not use the supplemental assembly lessons. Teachers who viewed *Rapping About Prevention* used the supplemental lessons less than those who viewed the other two assemblies. This may have occurred because more of these teachers instruct older grades (5 through 8), and did not have as much available class time for supplemental activities. Additionally, there was at least a two month overlap when the Pennsylvania state-wide standardized test (PSSA) was being administered to grades 3 through 8 and this evaluation was being conducted. These results imply that while teachers may have found the supplemental lessons to be good resources for students (more than half of teachers used the lessons overall), time was a barrier to lesson implementation, especially during PSSA testing periods. Creating supplemental lessons that require less time, or that can be completed easily by students at home, may be one option to overcoming this barrier to utilization. In order to measure teacher utilization of supplemental lessons when statewide testing does not occur, SDP ORE plans to evaluate ERN assembly programming in the fall of the 2013-2014 SY.

Analysis of teacher feedback revealed that school teachers and staff are an excellent resource for suggestions on how to improve assembly programming. Teachers can be a valuable source of information on how to enhance

other aspects of programming when conducting future evaluations. In general, teachers offered positive comments about the assemblies, highlighted their strong resonance with students, and deeply encouraged their continuation in future years. This feedback, along with students' survey responses, indicates that assembly programming is useful in reinforcing messages that many students receive from classroom-based *EAT.RIGHT.NOW.* (ERN) programming. In particular, the *Rapping About Prevention* assembly uniquely emphasized the importance of both healthy eating and physical activity, a core concept taught in numerous ERN lessons.

In spite of the overwhelming positive feedback about the assemblies, teachers made a number of suggestions of how to improve the shows. The most frequently mentioned improvements included the following:

- Improving the sound quality of the *FoodPlay* performances
- Adding new content to all of the assemblies
- Increasing *FoodPlay* performers' interaction with students in the audience and encouraging more interaction between performers and students outside of the show for R.A.P.
- Creating more detailed supplemental activities for *Jump with Jill*, such as grade-specific workbooks, and new handouts related to the songs

There were several limitations regarding the evaluation of ERN assembly programming. First, due to limited ORE resources, the study design and sampling range were kept minimal by only evaluating the impact of three assemblies for one grade level. Therefore, any significant findings obtained in the evaluation are applicable to 5th grade only; they are not transferable to younger or older grades. Feedback from teachers implied that the assemblies affect students of various ages differently; thus, it is important to continue to evaluate assembly program impact across multiple grade levels.

Second, students written responses and teacher feedback suggested that some students have seen the assembly performances more than once. Thus, students having prior knowledge about the subject matter presented, or boredom related to having already seen the assembly, may have contributed somewhat to the lack of knowledge gained, as demonstrated by the quantitative results. This also may have impacted students' emotional affect from the assembly.

Finally, the overwhelmingly high level of nutrition and physical activity knowledge that students demonstrated on the pre-survey did not allow for substantial variation in the post-survey responses. Consequently, this may account for the little change in knowledge reported after the students watched the assembly. This could have been partly because the wording for the survey questions was written at a level too easy for the 5th grade students. The evaluators could not adequately draw strong conclusions on the knowledge changes from pre- to post-surveys due to the high level of knowledge pre-assembly. Furthermore, as a result of the little marked differences in total, general, and specific knowledge from pre and post-survey, ORE was unable to examine the relationship between students' knowledge and emotional affect score. Since a positive association between

emotion and learning ability has been previously outlined in the literature,[87,88] ORE plans to re-examine this research question in fiscal year (FY) 2014 using an improved evaluation tool. Due to FNS not approving the assembly evaluation until February of the 2013 school year, ORE did not have adequate time to pilot test the surveys. For FY 2014, ORE will pilot test the assembly survey to ensure wording is at an appropriate level for the target audience.

[87] Labar, K., Cabeza, R. (2006). Cognitive neuroscience of emotional memory. *Nature Reviews*, 7: 54-64.
[88] Hillman, E., et al (1991). Pregnancy, STDs, and AIDS prevention: Evaluation of new image teen theatre. *AIDS Education and Prevention*, 3(4):328-340.

VIII. Conclusions and Recommendations

The evaluation activities presented in this report assessed the effects of the ***EAT.RIGHT.NOW.*** (**ERN**) program's evidence-based core curricula and other practice-based nutrition education curricula on achieving PA TRACKS' goals and objectives. Results from each evaluation project highlighted many positives, along with areas for improvement across multiple aspects of nutrition education programming led by ERN community partners.

The following provides a comprehensive list for areas of improvement, grounded in the results of ORE's extensive evaluation:

- **PROGRAM REACH AND SCOPE:**
  - Limitations of the STARtracks reporting system, combined with inconsistencies in lesson classification among partners, resulted in issues when capturing the program's reach and scope. In Quarter 1 of FY 2014, ORE advises that community partners clarify their reporting of lesson content objectives and lesson type classifications in STARtracks to enhance the internal validity of reporting activities. These discussions should occur with the Management Entity.
  - ORE encourages community partners to be as specific as possible when selecting lesson content objectives, so as to reduce the skewed reporting that results from "MyPlate/MyPyramid" as the default objective.
- **LONGITUDINAL IMPACT STUDY, YEAR 1:**
  - Findings demonstrated that all three curricula (nutrition-only, physical activity-only, and combination) positively influenced students' nutrition knowledge. However, the combination nutrition and physical activity lessons were most effective in increasing students' physical activity behaviors. Thus, lessons including both topics may be most effective in producing behavior change; continuation of the Longitudinal Impact Study may also reinforce this conclusion.
  - For FY 2014, lesson content will remain relatively similar to that of FY 2013, but the level of difficulty will be enhanced to reflect the advancement of students to 4th grade.
  - In order to improve internal validity of the study, evaluators will require all community partners to deliver tailored lessons during a specific time frame for FY 2014.
  - Starting in FY 2014, due to District budget cuts and lack of resources, the ORE will discontinue the school implementation level component of this study, meaning schools will not be classified as low, medium, or high levels of school implementation.
- **VEGETABLE CORE FOLLOW-UP STUDY and 5th GRADE BEHAVIORS:**
  - Nutrition knowledge was fairly well maintained over time, but mean scores for attitude and preference towards vegetables decreased. In order to sustain knowledge, attitudes, and self-efficacy toward healthy eating behaviors, ORE recommends that nutrition education curricula include multiple reinforcing activities or follow-up lessons to encourage sustainability of nutrition knowledge over time.
  - A strong relationship was found between students' participation in family mealtime and vegetable preference, indicating a need for ERN programming involving parents/caregivers in healthy mealtime preparation and eating behaviors.

- **CHOICE, CONTROL & CHANGE (C3) CURRICULUM:**
  - 7th and 8th grade girls were significantly less physically active than their male peers; more efforts should be made to increase physical activity levels among girls, especially during the transition to adolescence.
  - Similar to the Longitudinal Impact Study, in order to improve internal validity of the C3 study, evaluators will require all community partners to deliver lessons during a specified time frame for FY 2014.
  - Training, in consultation with the C3 author and researcher, will be provided to C3 nutrition educators in order to improve consistency in the administration of lessons.
- **ASSEMBLY PROGRAMMING**:
  - Improvements to the assemblies were suggested by teachers, including new content for assemblies that have been shown for several years; more interaction with student audience members; and the need for better sound quality.
  - Students' survey responses suggested that material featured in *FoodPlay* is juvenile and not engaging for the 5th grade age group; this should be considered when scheduling assembly programs in future years.
  - *Rapping About Prevention* showed the greatest impact on knowledge scores from pre- to post-surveys. Students and teachers had the most positive emotional responses to R.A.P. compared to the other assemblies.
  - Teachers indicated time was a barrier for teaching supplemental assembly lessons, especially during PSSA testing periods.
  - For FY 2014 ORE will continue to evaluate up to three nutrition assemblies, using similar techniques as outlined in this report.

The following table summarizes the major findings by evaluation project:

Table 7.1. Summary of evaluation measures and key outcomes, *EAT.RIGHT.NOW.*, FY 2013

Program Component/ Evaluation Project	Evaluation Measure	Key Outcome
ERN Program Reach and Scope	· Quantity of program activities by partners · Types of lessons provided (e.g.- single, series, afterschool, assembly) · Content objectives covered in program curricula	· 228,414 direct nutrition education events were completed in FY 2013. · From FY 2012 total activities decreased by 3.8%. · *MyPlate/MyPyramid* was the most taught content objective. · The *Skills/Goals* objective was the least taught.
Longitudinal Impact Study: Year 1	· Impact of different curricula on student knowledge · Impact of different curricula on student behavior · Differences in student knowledge and behavior across school implementation level	· Nutrition knowledge scores significantly increased from pre- to post-survey for all students. · There was a strong, significant association between breakfast knowledge and breakfast behaviors of all students on the post-survey. · For all cohorts, there was a weak, significant correlation between student knowledge scores and reported weekly physical activity. · The group who received both nutrition and phys. activity had a significant correlation between physical activity knowledge and behavior. · School implementation levels did not have a significant effect on changes in knowledge.
Vegetable Core Follow-Up Study and 5th Grade Behaviors	· Sustainability of student knowledge 1-year post-4th Grade Vegetable Core intervention · Student nutrition and physical activity behaviors	· Knowledge scores were fairly maintained over time from 4th grade baseline to 5th grade follow-up. · Attitudes and vegetable preferences declined from post-intervention to follow up. · No significant changes in self-efficacy were noted, with females having consistently higher scores. · No significant associations between nutrition knowledge and behaviors · Strong correlation found between family mealtime participation and vegetable preference.
Choice, Control & Change (C3)	· Impact of curriculum on student knowledge · Impact of curriculum on student behavior	· Participation in the C3 curriculum had limited impact on 7th & 8th grade students' knowledge and behaviors. · Gender differences in diet and physical activity levels were noted.
Assembly Programming	· Impact of assembly programs on student knowledge · Student and teacher satisfaction · Teacher use of supplemental lessons	· Students learned about different topics from each assembly. · Students gained significantly more knowledge after attending *Rapping About Prevention*. · Over 50% of teachers reported use of supplemental assembly lessons in the classroom.

i. Evaluation Strengths and Limitations

There were several strengths associated with the evaluation projects presented in this report. The extent of ERN programming throughout The School District of Philadelphia allowed ORE to gather a large sample of student

data for each evaluation project, collected across multiple school sites throughout the city. The size and diversity of the samples used for evaluation of select ERN activities were generally representative of students in grades K-8 receiving PA TRACKS/ERN programming in Philadelphia. Furthermore, the assessment of 3rd, 5th , 7th and 8th grade nutrition and physical activity behaviors utilized validated and reliable survey tools: for 3rd and 5th grades, an adapted version of the 4th Grade School Physical Activity and Nutrition (SPAN) questionnaire, and for 7th and 8th grades, questions adapted from the Centers for Disease Control and Prevention Youth Risk Behavior Survey.[89,90] The modified-SPAN questionnaires, in addition to survey tools developed by ORE staff, collected practical information regarding students' nutrition and physical activity attitudes and behaviors that may be relevant for use in future research conducted by The District. Lastly, an in-depth examination of ERN program reach and scope data revealed issues with how data are entered into the STARtracks system. Concerns related to the classification and entry of lesson content objectives were identified by ORE and relayed to ERN community partners. As a result, ORE and ERN community partners will work with the Management Entity to address concerns and ensure more accurate reporting of content objectives in STARtracks. The goal of using standardized classification of content objectives is to improve the internal validity of evaluation projects in future grant years.

The foremost limitations of the FY 2013 ERN evaluation were around the data collection process and data validity. As mentioned earlier, issues with classifying lesson content objectives were identified by ORE staff and reported to ERN community partners. The communication of STARtracks entry errors was considered a strong aspect of this evaluation because it will prevent future problems; however, these errors negatively affected the reach and scope output for FY 2013. Differences in the delivery schedule of the *Choice, Control, and Change* lessons among the community partners also led to issues regarding the internal validity of the C3 evaluation. Since some students were exposed to the C3 lessons over a period of several months while others received a more concentrated dose of lessons (although not more than one lesson per week), ORE was unable to determine that all lessons were delivered in the same manner, which was reflected in the evaluation findings.

Moreover, difficulties with collecting FY 2013 follow-up data from past Vegetable Core participants limited the sample size of the Vegetable Core Follow-up Study, which hindered the ability to draw more representative conclusions. However, the complicated process of finding and matching students for a longitudinal study design is considered a lesson learned. In addition, collecting data for the evaluation of assembly programming was also troublesome and complex; there were many concerns with confirming that 5th grade students viewed the selected assembly performances.

[89] Hoelscher DM, Day S, Lee ES, Frankowski RF, Kelder SH, Ward JL, and Scheurer ME. (2004) Measuring the prevalence of overweight in Texas schoolchildren. *American Journal of Public Health*. 94:1002-1008

[90] Centers for Disease Control and Prevention. (2011) Youth Risk Behavior Survey. Available at: www.cdc.gov/yrbs. Accessed October, 2012.

ii. Future Evaluation and Research

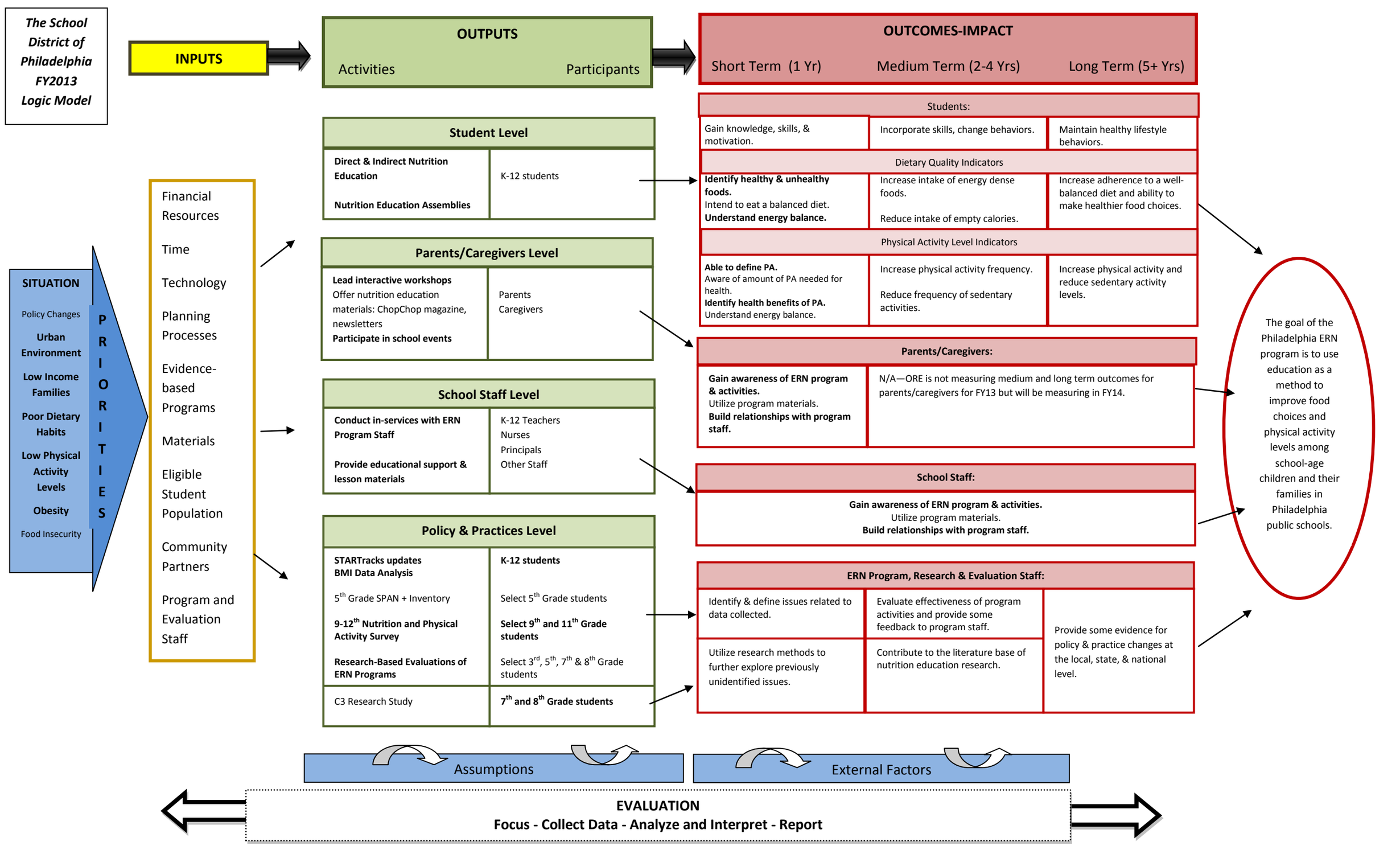
a. Continuing Evaluation Activities

Based on ORE's findings from the FY 2013 ERN program evaluation, along with guidance from the ME, several research and evaluation activities will be continuing in FY 2014. Continuing program evaluation activities include: (1) Longitudinal Impact Study: Year 2, (2) *Choice, Control & Change* (C3) outcome evaluation, and (3) the extensive teacher and student evaluation of assembly programming. Some changes to the evaluation of these programs will be made for FY 2014. For instance, fourth grade students will be assessed in the Longitudinal Impact Study in order to remain aligned with the study's longitudinal design. Cohort categories and curricula will remain the same, but with some increases in lesson difficulty. Additionally, the *Choice, Control & Change* (C3) outcome evaluation will only include 8th grade students in FY 2014. A research study, partly based on the findings from the FY 2013 *Choice, Control & Change* (C3) evaluation will also be conducted in FY 2014. Finally, the assembly programming evaluation will continue with the addition of a new assembly program, "The Adventures of Nick Nutrition and His Dog Fiber," along with two other highly populated assemblies.

b. New Evaluation Activities for FY 2014

In collaboration with the ERN community partners and the ME, new evaluation activities will take place in FY 2014. Firstly, feasibility studies will be implemented by ORE for SDP-ERN Adult Track programs. The Adult Track programs comprise nutrition education for parents/caregivers both in and outside of the school-setting. Additional evaluation of 5th grade nutrition education curricula will be conducted by the ME in cooperation with community partners. These activities will not be performed by SDP ORE, but implemented and managed by Penn State.

Appendix A


The School District of Philadelphia FY2013 Logic Model
INPUTS
OUTPUTS
Activities
Participants
OUTCOMES-IMPACT
Short Term (1 Yr)
Medium Term (2-4 Yrs)
Long Term (5+ Yrs)
SITUATION
Policy Changes
Urban Environment
Low Income Families
Poor Dietary Habits
Low Physical Activity Levels
Obesity
Food Insecurity
PRIORITIES
Financial Resources
Time
Technology
Planning Processes
Evidence-based Programs
Materials
Eligible Student Population
Community Partners
Program and Evaluation Staff
Student Level
Direct & Indirect Nutrition Education
Nutrition Education Assemblies
K-12 students
Parents/Caregivers Level
Lead interactive workshops
Offer nutrition education materials: ChopChop magazine, newsletters
Participate in school events
Parents
Caregivers
School Staff Level
Conduct in-services with ERN Program Staff
Provide educational support & lesson materials
K-12 Teachers
Nurses
Principals
Other Staff
Policy & Practices Level
STARTracks updates
BMI Data Analysis
K-12 students
5th Grade SPAN + Inventory
Select 5th Grade students
9-12th Nutrition and Physical Activity Survey
Select 9th and 11th Grade students
Research-Based Evaluations of ERN Programs
Select 3rd, 5th, 7th & 8th Grade students
C3 Research Study
7th and 8th Grade students
Students:
Gain knowledge, skills, & motivation.
Incorporate skills, change behaviors.
Maintain healthy lifestyle behaviors.
Dietary Quality Indicators
Identify healthy & unhealthy foods.
Intend to eat a balanced diet.
Understand energy balance.
Increase intake of energy dense foods.
Reduce intake of empty calories.
Increase adherence to a well-balanced diet and ability to make healthier food choices.
Physical Activity Level Indicators
Able to define PA.
Aware of amount of PA needed for health.
Identify health benefits of PA.
Understand energy balance.
Increase physical activity frequency.
Reduce frequency of sedentary activities.
Increase physical activity and reduce sedentary activity levels.
Parents/Caregivers:
Gain awareness of ERN program & activities.
Utilize program materials.
Build relationships with program staff.
N/A—ORE is not measuring medium and long term outcomes for parents/caregivers for FY13 but will be measuring in FY14.
School Staff:
Gain awareness of ERN program & activities.
Utilize program materials.
Build relationships with program staff.
ERN Program, Research & Evaluation Staff:
Identify & define issues related to data collected.
Evaluate effectiveness of program activities and provide some feedback to program staff.
Utilize research methods to further explore previously unidentified issues.
Contribute to the literature base of nutrition education research.
Provide some evidence for policy & practice changes at the local, state, & national level.
The goal of the Philadelphia ERN program is to use education as a method to improve food choices and physical activity levels among school-age children and their families in Philadelphia public schools.
Assumptions
External Factors
EVALUATION
Focus - Collect Data - Analyze and Interpret - Report

Appendix B

The School District of Philadelphia

Office of Research and Evaluation

3rd Grade Nutrition and Physical Activity Knowledge Survey

Pennsylvania Nutrition Education TRACKS

2012–2013

3rd Grade Nutrition and Physical Activity Survey

Instructions: Please circle the correct answer for each question.

1. Which food is a **fruit**?
   a. Banana
   b. Carrots
   c. Cheese
   d. Chicken

2. Which food is a **green vegetable**?
   a. Strawberry
   b. Onion
   c. Broccoli
   d. Corn

3. Which food has **calcium**?
   a. Cheese
   b. Chicken
   c. Rice
   d. Grapes

4. Eating breakfast everyday_____.
   a. Makes my teacher nicer
   b. Makes my body healthy
   c. Makes it hard to learn
   d. Makes me fall asleep

5. Do **vitamins** help keep my body healthy?
   a. Yes
   b. No

6. Which drink is **unhealthy**?
    a. Milk
    b. Water
    c. Soda
    d. 100% Fruit Juice

7. Can **sugar** in soda cause cavities?
    a. Yes
    b. No

8. Which activity will **not** make my heart beat faster?
    a. Running
    b. Swimming
    c. Watching TV
    d. Dancing

9. What is physical activity?
    a. Movement of the body that requires energy.
    b. Movement of the body that does **not** require energy.

10. How many minutes of physical activity should I get in one day?
    a. 5 minutes
    b. 20 minutes
    c. 40 minutes
    d. 60 minutes

11. Is a **body cue** a signal or message that tells me that my body is working?
    a. Yes
    b. No

12. What makes my bones and muscles strong?
    a. Watching television
    b. Eating candy
    c. Physical activity
    d. Reading a book

13. Children should not spend more than ____ hours each day in front of a TV or computer.
    a. 2 hours
    b. 3 hours
    c. 4 hours
    d. 5 or more hours

14. Is playing a sport like football, basketball, or soccer a good way to get physical activity?
    a. Yes
    b. No

15. Does **sedentary** mean being physically active?
    a. Yes
    b. No

16. Is physical activity the **only** thing I need to be healthy?
    a. Yes
    b. No

17. For each food, circle the food group where it belongs.

 Cheese	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**
 Potato	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**
 Grapes	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**
 Eggs	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**
 Pasta	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**
 Nuts	**Grains**	**Vegetables**	**Fruits**	**Dairy**	**Protein**

18. For each snack, circle whether it is **healthy** or **unhealthy**.

 Cheese and Crackers	Healthy	Unhealthy
 Cookies	Healthy	Unhealthy
 Candy	Healthy	Unhealthy
 Yogurt	Healthy	Unhealthy
 Cake	Healthy	Unhealthy
 Celery and Peanut Butter	Healthy	Unhealthy

The School District of Philadelphia

Office of Research and Evaluation

3rd Grade Nutrition & Physical Activity Behaviors Assessment

Pennsylvania Nutrition Education TRACKS

2012–2013

3rd Grade Nutrition & Physical Activity Behaviors Assessment

Directions: The following questions are about what students your age eat. *This is not a test, and there are no right or wrong answers*. Remember, you answers will be kept private.

Please read each question carefully and pick the answer that is true for you. Mark that answer on your survey as shown in the example below.

Example:
What state do you live in?

- O Ohio
- O New York
- O New Jersey
- ● Pennsylvania

1. Yesterday, did you drink any kind of milk?
   Count chocolate or other flavored milk, milk on cereal, or drinks made with milk.

O No, I didn't drink any milk yesterday.

O Yes, I drank milk **1 time** yesterday.

O Yes, I drank milk **2 times** yesterday.

O Yes, I drank milk **3 or more times** yesterday.

2. Yesterday, did you eat cheese by itself or on your food?
   Count cheese on pizza or in dishes such as tacos, enchiladas, sandwiches, cheeseburgers, or macaroni and cheese.

O No, I didn't eat cheese yesterday.

O Yes, I ate cheese **1 time** yesterday.

O Yes, I ate cheese **2 times** yesterday.

O Yes, I ate cheese **3 or more times** yesterday.

3. Yesterday, did you eat <u>yogurt</u> or <u>cottage cheese</u> or drink a <u>yogurt drink</u>?

Do NOT count frozen yogurt.

O No, I didn't eat any of these foods yesterday.

O Yes, I ate one of these foods **1 time** yesterday.

O Yes, I ate one of these foods **2 times** yesterday.

O Yes, I ate one of these foods **3 or more times** yesterday.

4. Yesterday, did you eat <u>French fries</u> or <u>chips</u>?
Chips are potato chips, tortilla chips, Cheetos®, corn chips, or other snack chips.

O No, I didn't eat any of the foods listed above yesterday.

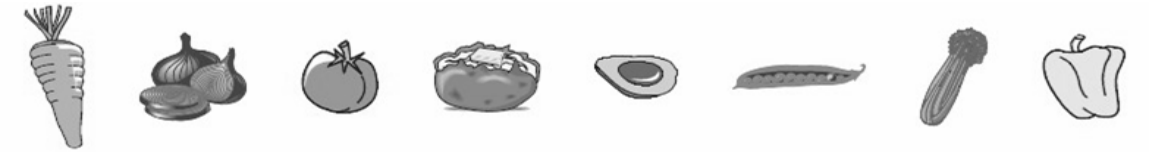
O Yes, I ate one of these foods **1 time** yesterday

O Yes, I ate one of these foods **2 times** yesterday.

O Yes, I ate one of these foods **3 or more times** yesterday.

5. Yesterday, did you eat any <u>vegetables</u>?
Vegetables are all cooked and uncooked vegetables; salads; and boiled, baked and mashed potatoes.

Do NOT count French Fries.



O No, I didn't eat any vegetables yesterday.

O Yes, I ate vegetables **1 time** yesterday.

O Yes, I ate vegetables **2 times** yesterday.

O Yes, I ate vegetables **3 or more times** yesterday.

6. Yesterday, did you eat any <u>fruit</u>?
   Include fresh, frozen, canned, or dried fruit.

   Do NOT count fruit juice.

   O No, I didn't eat any fruit yesterday.

   O Yes, I ate fruit **1 time** yesterday.

   O Yes, I ate fruit **2 times** yesterday.

   O Yes, I ate fruit **3 or more times** yesterday.

7. Yesterday, did you drink <u>100% fruit juice</u>?
   Fruit juice is a drink, which is 100% juice, like orange juice, apple juice, or grape juice.

   Do NOT count punch, Kool-Aid®, sports drinks, or other fruit-flavored drinks.

   O No, I didn't drink any fruit juice yesterday.

   O Yes, I drank fruit juice **1 time** yesterday.

   O Yes, I drank fruit juice **2 times** yesterday.

   O Yes, I drank fruit juice **3 or more times** yesterday.

8. Yesterday, did you drink any <u>soda, punch, Kool-Aid®, sports drinks, or other fruit-flavored drinks</u>?

   Do NOT count 100% fruit juice.

   O No, I didn't drink any of these drinks yesterday.

   O Yes, I drank one of these drinks **1 time** yesterday.

   O Yes, I drank one of these drinks **2 times** yesterday.

   O Yes, I drank one of these drinks **3 or more times** yesterday.

9. Yesterday, did you eat <u>breakfast</u>?

O No, I didn't eat breakfast yesterday.

O Yes, I ate breakfast at **home** yesterday.

O Yes, I ate breakfast at **school** yesterday.

O Yes, I ate breakfast at **home and school** yesterday.

O Yes, I ate breakfast at **somewhere other than home or school** yesterday.

10. During the past week, on which days did you exercise, play a sport, or participate in physical activity for <u>at least 60 minutes</u>?

O I didn't participate in physical activity any days last week for 60 minutes or more.

O Monday

O Tuesday

O Wednesday

O Thursday

O Friday

O Saturday

O Sunday

11. On most <u>school days</u>, how many hours per day do you watch TV, DVDs, or movies away from school?

O I don't watch TV, DVDs, or movies

O Less than 1 hour

O 1 hour

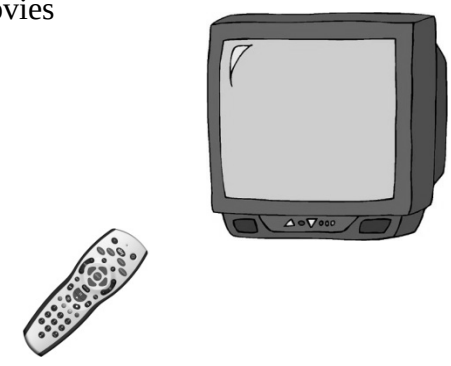
O 2 hours

O 3 hours

O 4 hours

O 5 hours

O 6 or more hours



12. On most school days, how many hours per day do you spend on a computer away from school? *Time on the computer includes time spent surfing the Internet, instant messaging, and playing online video or computer games.*

O I don't use a computer

O Less than 1 hour

O 1 hour

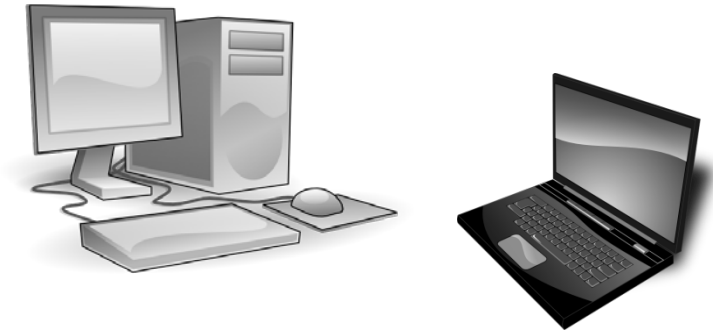
O 2 hours

O 3 hours

O 4 hours

O 5 hours

O 6 or more hours



13. On most school days, how many hours per day do you usually spend playing video games like Nintendo® Wii or DS, Sega®, Playstation®, Xbox®, GameBoy®, or arcade games away from school?

O I don't play video games

O Less than 1 hour

O 1 hour

O 2 hours

O 3 hours

O 4 hours

O 5 hours

O 6 or more hour

Thank you for completing this survey!

Appendix C

The School District of Philadelphia

Office of Research & Evaluation

5th Grade Nutrition Behaviors Assessment

Pennsylvania Nutrition Education TRACKS

2012–2013

5th Grade Nutrition Behaviors Assessment

Directions: The following questions are about what students your age eat. *This is not a test, and there are no right or wrong answers*. Remember, you answers will be kept private.

Please read each question carefully and pick the answer that is true for you. Mark that answer on your survey as shown in the example below.

Example:
What state do you live in?

- ○ Ohio
- ○ New York
- ○ New Jersey
- ● Pennsylvania

1. Yesterday, did you drink any kind of milk?
   Count chocolate or other flavored milk, milk on cereal, or drinks made with milk.

O No, I didn't drink any milk yesterday.
O Yes, I drank milk **2 times** yesterday.
O Yes, I drank milk **1 time** yesterday.
O Yes, I drank milk **3 or more times** yesterday.

2. Yesterday, did you eat <u>cheese</u> by itself or on your food?
   Count cheese on pizza or in dishes such as tacos, enchiladas, sandwiches, cheeseburgers, or macaroni and cheese.

O No, I didn't eat cheese yesterday.
O Yes, I ate cheese **2 times** yesterday.
O Yes, I ate cheese **1 time** yesterday.
O Yes, I ate cheese **3 or more times** yesterday.

3. Yesterday, did you eat <u>yogurt</u> or <u>cottage cheese</u> or drink a <u>yogurt drink</u>?

   Do NOT count frozen yogurt.

O No, I didn't eat any of these foods yesterday.
O Yes, I ate one of these foods **1 time** yesterday.
O Yes, I ate one of these foods **2 times** yesterday.
O Yes, I ate one of these foods **3 or more times** yesterday.

4. Yesterday, did you eat <u>French fries</u>?

O No, I didn't eat any French fries yesterday.
O Yes, I ate French fries **1 time** yesterday.
O Yes, I ate French fries **2 times** yesterday.
O Yes, I ate French fries **3 or more times** yesterday.

5. Yesterday, did you eat any <u>vegetables</u>?
Vegetables are all cooked and uncooked vegetables; salads; and boiled, baked and mashed potatoes.

Do NOT count French Fries.

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

6. Yesterday, did you eat <u>beans</u> such as pinto beans, baked beans, kidney beans, refried beans, black beans, hummus, or rice and beans?

Do NOT count green beans.

O No, I didn't eat any beans yesterday.
O Yes, I ate beans **2 times** yesterday.
O Yes, I ate beans **1 time** yesterday.
O Yes, I ate beans **3 or more times** yesterday.

7. Yesterday, did you eat <u>fruit</u>?
Include fresh, frozen, canned, or dried fruit.

Do NOT count fruit juice.

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

8. Yesterday, did you drink <u>100% fruit juice</u>?
Fruit juice is a drink, which is 100% juice, like orange juice, apple juice, or grape juice.

Do NOT count punch, Kool-Aid®, sports drinks, or other fruit-flavored drinks.

O No, I didn't drink any fruit juice yesterday.
O Yes, I drank fruit juice **1 time** yesterday.
O Yes, I drank fruit juice **2 times** yesterday.
O Yes, I drank fruit juice **3 or more times** yesterday.

9. Yesterday, did you drink any <u>soda, punch, Kool-Aid®, sports drinks, or other fruit-flavored drinks</u>?

Do NOT count 100% fruit juice.

O No, I didn't drink any of these drinks yesterday.
O Yes, I drank one of these drinks **1 time** yesterday.
O Yes, I drank one of these drinks **2 times** yesterday.
O Yes, I drank one of these drinks **3 or more times** yesterday.

10. Yesterday, did you eat <u>breakfast</u>? O Yes O No

    a. If you selected "yes," was it a school breakfast? O Yes O No

11. Yesterday, did you eat <u>lunch</u>? O Yes O No

    a. If you selected "yes," was it a school lunch? O Yes O No

12. Yesterday, did you eat dinner <u>with your family</u>? O Yes O No

Thank you for completing this survey!

The School District of Philadelphia

Office of Research & Evaluation

5th Grade Nutrition and Physical Activity Assessment

Pennsylvania Nutrition Education TRACKS

2012–2013

5th Grade Nutrition and Physical Activity Assessment

Directions: Please read each question and fill in the bubble to indicate your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. For the following section, please select ONLY ONE answer for each question

Example:
What state do you live in?

- O Ohio
- O New York
- O New Jersey
- ● Pennsylvania

1. _____ give(s) you energy.
   - O Calories
   - O Vitamins
   - O Water
   - O Minerals

2. _____ is a mineral that helps keep bones and teeth strong.
   - O Vitamin C
   - O Iron
   - O Zinc
   - O Calcium
3. Enriched white flour is a whole grain.
   - O True
   - O False

4. Trans fats increase your risk for heart disease.
   - O True
   - O False

5. This is part of a nutrition label on a snack. If you eat the whole package, you will eat 20 calories.
   - O True
   - O False

Nutrition Facts
Serving Size 1 cup (150g)
Servings Per Container 2

Amount Per Serving

Calories 20	Calories from Fat 5

6. Which of the following is a healthy snack choice?
   - O Whole-wheat crackers
   - O Potato chips
   - O A cookie
   - O Fruit-flavored snacks (NOT actual fruit)

7. Which of the following is a healthy drink choice?
   - O Soda
   - O Sports drink
   - O Water
   - O Fruit-flavored drink (NOT 100% fruit juice)

8. Kids and teenagers should be physically active at least 60 minutes a day.
   - O True
   - O False

9. During the past week, how many days did you exercise, play a sport, or participate in physical activity that made you sweat and breathe hard?
   - O 0 days
   - O 1 day
   - O 2 days
   - O 3 days
   - O 4 days
   - O 5 days
   - O 6 days
   - O 7 days

10. Do you make food with your family?
    - O Yes
    - O No

11. A snack is any food that you eat or drink before, after, or between meals. How often do you choose your own snacks?

O I **almost always** chose my own snacks.

O I **usually** choose my own snacks.

O I **sometimes** choose my own snacks.

O I **hardly ever** or **never** choose my own snacks.

12. How do you feel about the taste of vegetables?

O I **really like** the taste of vegetables.

O I **kind of like** the taste of vegetables.

O **I don't like** the taste of vegetables.

O I **really don't like** the taste of vegetables.

O I'm **not sure if I like** the taste of vegetables.

13. How do you feel about making snacks with vegetables?

O I **really like** to make snacks with vegetables.

O I **kind of like** to make snacks with vegetables.

O I **don't like** to make snacks with vegetables.

O I **really don't like** to make snacks with vegetables.

O I'm **not sure if I like** to make snacks with vegetables.

14. I can make a snack with vegetables.

O **YES!**	O **Yes**	O **No**	O **NO!**	O **Not sure**

15. I can eat many kinds of vegetables each week.

O **YES!**	O **Yes**	O **No**	O **NO!**	O **Not sure**

16. Broccoli has vitamin C which helps keep my gums and teeth healthy.

O True

O False

17. Carrots and corn are in the same vegetable group.

O True

O False

18. Vegetables help keep me from getting sick.

O True

O False

19. Beans are high in fiber.

O True

O False

20. What amount of vegetables is best for me to eat each day?

O Amounts that equal **4 ½ cups**

O Amounts that equal **1 cup**

O Amounts that equal **2 ½ cups**

O Amounts that equal **6 cups**

21. For each food pictured, please fill in the circle under the one face that reflects how you feel about that food.

	I really like it.	I like it.	I don't like it.	I really don't like it.	I don't know if I like it.
Romaine Lettuce 	○	○	○	○	○
Celery 	○	○	○	○	○
Carrots 	○	○	○	○	○
Black Beans 	○	○	○	○	○
Tomato 	○	○	○	○	○
Peppers 	○	○	○	○	○
Corn 	○	○	○	○	○
Broccoli 	○	○	○	○	○
Peas 	○	○	○	○	○
Spinach 	○	○	○	○	○

Appendix D

The School District of Philadelphia

Office of Research & Evaluation

Choice, Control, & Change: Unit 1 Assessment

Pennsylvania Nutrition Education TRACKS

2012–2013

Choice, Control, & Change: Unit 1 Assessment

The following questions are from Unit 1 of the *Choice, Control, & Change* nutrition education curriculum. The questions are part of a study to learn more about your knowledge and behaviors around nutrition and physical activity. By answering these questions, you are agreeing to participate in this study. *This is not a test*. Please answer all of the questions. If you are unsure of a question, take your best guess as to the correct answer and move onto the next question. All of your answers will remain private.

Name:_____

Student ID:_____

Directions: Please circle only one answer for each question.

1. What is your age?
    a. 10 years old
    b. 11 years old
    c. 12 years old
    d. 13 years old
    e. 14 years old
    f. 15 years old

2. What is your gender?
    a. Male
    b. Female

3. What is your race/ethnicity? **(You may select more than one.)**
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. Native Hawaiian or Pacific Islander
    f. White

4. Which of the following is the best example of having a choice in your health?
    a. Deciding to eat a salad instead of a burger for lunch
    b. A vending machine that only offers soda
    c. Only having one grocery store in your community
    d. Your school cafeteria offering just chips as a snack

5. Which of the following is the best example of taking control over your health?
    a. Taking the bus to school instead of walking
    b. Increasing your amount of physical activity by taking the stairs
    c. Never helping your family decide what food to make
    d. Not reading the nutrition labels on the food you eat

6. Which of the following is the best example of making a change in your health?
    a. Decreasing the amount of fast food you eat
    b. Watching TV every day
    c. Always eating foods high in sugar
    d. Playing video games instead of basketball

7. It is a good idea to ask your doctor for information on nutrition and physical activity.
    a. True
    b. False

8. Eating fast food and drinking sweetened beverages will lead to good health.
    a. True
    b. False

9. How many servings of fruit and vegetables should you eat in a day?
    a. 0 servings
    b. 1 serving
    c. 2-3 servings
    d. 4 or more servings

10. It is not important to eat a healthy breakfast every morning.
    a. True
    b. False

11. Humans are born with a tendency to like _____ tastes.
    a. Sweet
    b. Sour
    c. Bitter
    d. Salt

12. If you wanted to have something sweet, which of the following is an example of a healthy choice?
    a. A candy bar
    b. A soda
    c. A piece of fruit
    d. Fruit-flavored snacks (NOT 100% fruit)

13. In 20 ounces of soda there are 17 teaspoons of sugar. Is this more or less than the recommended amount of daily sugar for a person who eats about 2,000 calories per day?
    a. More than the recommended amount
    b. Less than the recommended amount

14. For a person who eats 2,000 calories per day, what is the recommended amount of fat?
    a. 25 teaspoons per day
    b. 17 teaspoons per day
    c. 3 teaspoons per day
    d. 13 teaspoons per day

15. Frying foods is healthier than grilling foods.
    a. True
    b. False

16. If you wanted to eat a hamburger, which of the following would be the <u>healthiest</u> choice to make?
    a. Eating a double hamburger with cheese
    b. Eating a small hamburger with a side of fries
    c. Eating a small hamburger with lettuce and tomato
    d. Eating a small hamburger with a side of large fries

17. When talking about physical activity, what does the word environment mean?
    a. Where you do the physical activity
    b. What kinds of activities you do
    c. How long you do the physical activity
    d. Why you do physical activity

18. Which of the following can influence your physical activity?
    a. Going to the movies
    b. The types of food you eat
    c. Availability of parks, biking paths, and streets near your house
    d. Going to the doctor

19. Commercials on TV or the radio can sometimes use misleading words to sell their products.
    a. True
    b. False

Directions: The following questions ask you about the food you ate and drank yesterday only.

Choose only one answer per question.

20. Yesterday, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do NOT count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
    a. I did not drink 100% fruit juice yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

21. Yesterday, how many times did you eat fruit? (Do NOT count fruit juice.)
    a. I did not eat fruit yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

22. Yesterday, how many times did you eat green salad?
    a. I did not eat green salad yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

23. Yesterday, how many times did you eat potatoes? (Do NOT count French fries, fried potatoes, or potato chips.)
    a. I did not eat potatoes yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

24. Yesterday, how many times did you eat carrots?
    a. I did not eat carrots yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

25. Yesterday, how many times did you eat other vegetables? (Do NOT count green salad, potatoes, or carrots.)
    a. I did not eat other vegetables yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

26. Yesterday, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do NOT count diet soda.)
    a. I did not drink soda yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

27. Yesterday, how many glasses of milk did you drink? (Count the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)
    a. I did not drink milk yesterday.
    b. 1 glass per day
    c. 2 glasses per day
    d. 3 glasses per day
    e. 4 or more glasses per day

28. Yesterday, did you eat breakfast?
    a. No
    b. Yes

Directions: The following questions ask you about your physical activity for last week. Choose only one answer per question

29. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
    a. 0 days
    b. 1 day
    c. 2 days
    d. 3 days
    e. 4 days
    f. 5 days
    g. 6 days
    h. 7 days

NEXT PAGE

30. During the past 7 days, on how many days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
    a. 0 days
    b. 1 day
    c. 2 days
    d. 3 days
    e. 4 days
    f. 5 days
    g. 6 days
    h. 7 days

Thank you for completing this survey!

Appendix E

The School District of Philadelphia

Office of Research & Evaluation

Choice, Control, & Change: Unit 2 Assessment

Pennsylvania Nutrition Education TRACKS

2012–2013

Choice, Control, & Change: Unit 2 Assessment

The following questions are from Unit 2 of the *Choice, Control, & Change* nutrition education curriculum. The questions are part of a study to learn more about your knowledge and behaviors around nutrition and physical activity. By answering these questions, you are agreeing to participate in this study. *This is not a test*. Please answer all of the questions. If you are unsure of a question, take your best guess as to the correct answer and move onto the next question. All of your answers will remain private.

Name:_____

Student ID:_____

Directions: Please circle only one answer for each question.

1. What is your age?
    a. 10 years old
    b. 11 years old
    c. 12 years old
    d. 13 years old
    e. 14 years old
    f. 15 years old

2. What is your gender?
    a. Male
    b. Female

3. What is your race/ethnicity? **(You may select more than one.)**
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. Native Hawaiian or Pacific Islander
    f. White

Directions: Please circle only one answer for each question.

4. Which of the following would be considered energy intake (energy in)?
    a. The food and drink you consume
    b. The amount of physical activity you get

5. Which of the following would be considered energy expenditure (energy out)?
    a. Food and drink you consume
    b. Amount of physical activity you get

6. In order to maintain energy balance, you need to make sure...
    a. the amount of energy coming into your body is less than the amount of energy going out of your body
    b. the amount of energy coming into your body is greater than the amount of energy going out of your body
    c. the amount of energy coming into your body is the same as the amount of energy going out of your body

7. What is positive energy balance?
    a. When you take in more energy than your body needs
    b. When you take in less energy than your body needs
    c. When you do nothing

8. If you take in MORE energy than your body needs, you will _____.
    a. gain weight
    b. need less sleep
    c. lose weight
    d. feel more energetic

9. What is negative energy balance?
    a. Taking in more energy than my body needs
    b. Taking in less energy than my body needs
    c. When you do nothing

10. If you take in LESS energy than your body needs, you will _____.
    a. gain weight
    b. need less sleep
    c. lose weight
    d. feel more energetic

11. Nutrients from the food we eat are absorbed into the blood through the _____.
    a. salivary glands
    b. stomach
    c. gallbladder
    d. walls of the small intestine

12. The large intestine removes water from the remaining food left in your digestive system.
    a. True
    b. False

13. Glucose is a _____.
    a. vitamin
    b. protein
    c. sugar
    d. carbohydrate

14. The pancreas makes _____.
    a. fat
    b. insulin
    c. glucose
    d. protein

15. You can lower your blood sugar by _____.
    a. eating less sugary foods
    b. drinking more sugar sweetened beverages
    c. exercising less
    d. watching more TV

16. Enzymes are substances that slow down chemical reactions in the digestive system.
    a. True
    b. False

17. Obesity can increase your risk of _____.
    a. eye problems
    b. low blood pressure
    c. high blood sugar
    d. All of the above

18. What happens right after saliva mixes with food?
    a. The small intestine breaks down food molecules into smaller ones.
    b. The mushy food is pushed down the esophagus.
    c. The stomach stores the swallowed food and liquid.
    d. The pancreas breaks down the food using enzymes.

19. Energy in food is measured in_____.
    a. total fat units
    b. kilowatts
    c. calories
    d. grams

20. Through metabolism, your cells break down nutrients from the bloodstream and make them into _____.
    a. oxygen
    b. energy
    c. protein
    d. carbohydrates

21. When you give your body more energy than it needs, your body stores it as _____.
    a. nutrients
    b. fat
    c. vitamins
    d. protein

22. Which of the following activities uses the <u>most</u> energy?
    a. Sleeping
    b. Sitting down playing video games
    c. Texting on your cell phone
    d. Playing basketball

Directions: The following questions ask you about the food you ate and drank yesterday only. Choose only one answer per question.

23. Yesterday, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do NOT count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
    a. I did not drink 100% fruit juice yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

24. Yesterday, how many times did you eat fruit? (Do NOT count fruit juice.)
    a. I did not eat fruit yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

25. Yesterday, how many times did you eat green salad?
    a. I did not eat green salad yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

26. Yesterday, how many times did you eat potatoes? (Do NOT count French fries, fried potatoes, or potato chips.)
    a. I did not eat potatoes yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

27. Yesterday, how many times did you eat carrots?
    a. I did not eat carrots yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

28. Yesterday, how many times did you eat other vegetables? (Do NOT count green salad, potatoes, or carrots.)
    a. I did not eat other vegetables yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

29. Yesterday, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do NOT count diet soda.)
    a. I did not drink soda yesterday.
    b. 1 time per day
    c. 2 times per day
    d. 3 times per day
    e. 4 or more times per day

30. Yesterday, how many glasses of milk did you drink? (Count the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)
    a. I did not drink milk yesterday.
    b. 1 glass per day
    c. 2 glasses per day
    d. 3 glasses per day
    e. 4 or more glasses per day

31. Yesterday, did you eat breakfast?
    a. No
    b. Yes

NEXT PAGE

Directions: The following questions ask you about your physical activity for last week. Choose only one answer per question

32. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
    a. 0 days
    b. 1 day
    c. 2 days
    d. 3 days
    e. 4 days
    f. 5 days
    g. 6 days
    h. 7 days

33. During the past 7 days, on how many days did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?
    a. 0 days
    b. 1 day
    c. 2 days
    d. 3 days
    e. 4 days
    f. 5 days
    g. 6 days
    h. 7 days

Thank you for completing this survey!

Appendix F

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Pre-Survey

FoodPlay

EAT.RIGHT.NOW.
Nutrition Education Program

Spring 2013

FoodPlay Assembly Pre-Survey

Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

   a. One quarter (1/4) b. One half (1/2) c. Three quarters (3/4) d. The whole plate

2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Which of the following is a "Go" food?

   Note: "Go" foods are foods that you should eat more often.

   a. Soda
   b. White Rice
   c. Low-fat Milk
   d. Fried Chicken

4. Which of the following is a "Whoa" food?

   Note: "Whoa" foods are foods you should eat less often.

   a. Brown Rice
   b. Biscuits
   c. Vegetables
   d. Yogurt

5. Someone who has high blood pressure might be eating foods with too much **salt**.
   a. True
   b. False

6. Which kind of chicken is **unhealthy**?
   a. Grilled
   b. Broiled
   c. Fried
   d. Steamed

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Pre-Survey

Jump with Jill

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Nutrition Education Program

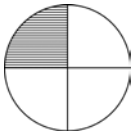
Spring 2013

Jump with Jill Assembly Pre-Survey

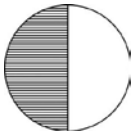
Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

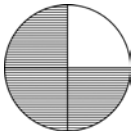
a. One quarter (1/4)



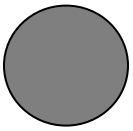
b. One half (1/2)



c. Three quarters (3/4)



d. The whole plate



2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Which of the following breakfast foods is **unhealthy**?
   a. Eggs
   b. Whole wheat toast with peanut butter
   c. Donuts
   d. Yogurt

4. Which of the following foods helps make your skin, hair, muscles and bones healthier?
   a. Fruit snacks (like Gushers® or Fruit by the Foot®)
   b. Vegetables
   c. Potato chips
   d. Ice cream

5. Which of the following drinks is best to have **after** you exercise?
   a. Soda
   b. Fruit juice
   c. Lemonade
   d. Water

6. Which of the following foods gives your body the **least** amount of energy?
   a. Sugary cereal
   b. Fruit
   c. Whole wheat bread
   d. Cheese

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Pre-Survey

Rapping about Prevention

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Nutrition Education Program

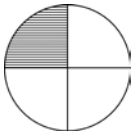
Spring 2013

Rapping about Prevention Assembly Pre-Survey

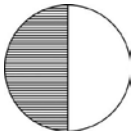
Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

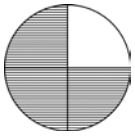
a. One quarter (1/4)



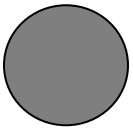
b. One half (1/2)



c. Three quarters (3/4)



d. The whole plate



2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Is eating nutritious food the **only** thing you need to be healthy?
   a. Yes
   b. No

4. Which activity is an example of exercise?
   a. Sleeping
   b. Watching TV
   c. Reading a book
   d. Dancing

5. Other than water, which of the following drinks is the healthiest?
   a. 100% Fruit Juice
   b. Soda
   c. Fruit Punch like Hawaiian Punch®
   d. Sports drinks like Gatorade® or Powerade®

6. Why is exercising an important part of being healthy?
   a. I get to do less homework.
   b. My teachers tell me to do it.
   c. It strengthens my heart and muscles.
   d. It helps me to gain weight.

Appendix G

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Post-Survey

FoodPlay

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Nutrition Education Program

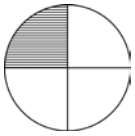
Spring 2013

FoodPlay Assembly Post-Survey

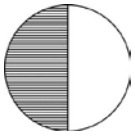
Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

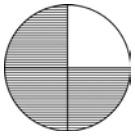
   a. One quarter (1/4)

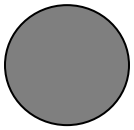
   b. One half (1/2)

   c. Three quarters (3/4)

   d. The whole plate

2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Which of the following is a "Go" food?

   Note: "Go" foods are foods that you should eat more often.

   a. Soda
   b. White Rice
   c. Low-fat Milk
   d. Fried Chicken

4. Which of the following is a "Whoa" food?

   Note: "Whoa" foods are foods you should eat less often.

   a. Brown Rice
   b. Biscuits
   c. Vegetables
   d. Yogurt

5. Someone who has high blood pressure might be eating foods with too much **salt**.
   a. True
   b. False

6. Which kind of chicken is **unhealthy**?
   a. Grilled
   b. Broiled
   c. Fried
   d. Steamed

7. Did you learn anything **new** during the assembly?
    a. Yes
    b. No

    a. **If you answered "yes," what did you learn?**

_____

_____

_____

8. Compared to other assemblies you've seen at school, what did you think about FoodPlay?

    a. I liked FoodPlay **more** than the other assemblies.
    b. I liked FoodPlay the **same** as the other assemblies.
    c. I liked FoodPlay **less** than the other assemblies.
    d. I haven't seen any other assemblies.

9. How did the FoodPlay assembly make you **feel**?

Excited 	Very	Kind of	Not at all
Upset 	Very	Kind of	Not at all
Happy 	Very	Kind of	Not at all
Bored 	Very	Kind of	Not at all
Hopeful 	Very	Kind of	Not at all
Tired  Zzzz	Very	Kind of	Not at all

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Post-Survey

Jump with Jill

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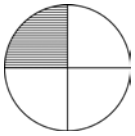
Spring 2013

Jump with Jill Assembly Post-Survey

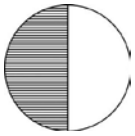
Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

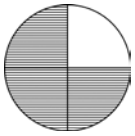
a. One quarter (1/4)



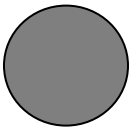
b. One half (1/2)



c. Three quarters (3/4)



d. The whole plate



2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Which of the following breakfast foods is **unhealthy**?
   a. Eggs
   b. Whole wheat toast with peanut butter
   c. Donuts
   d. Yogurt

4. Which of the following foods helps make your skin, hair, muscles and bones healthier?
   a. Fruit snacks (like Gushers® or Fruit by the Foot®)
   b. Vegetables
   c. Potato chips
   d. Ice cream

5. Which of the following drinks is best to have **after** you exercise?
   a. Soda
   b. Fruit juice
   c. Lemonade
   d. Water

6. Which of the following foods gives your body the **least** amount of energy?
   a. Sugary cereal
   b. Fruit
   c. Whole wheat bread
   d. Cheese

7. Did you learn anything **new** during the assembly?
    a. Yes
    b. No

    a. **If you answered "yes," what did you learn?**

_____

_____

_____

8. Compared to other assemblies you've seen at school, what did you think about Jump with Jill?

    a. I liked Jump with Jill **more** than the other assemblies.
    b. I liked Jump with Jill the **same** as the other assemblies.
    c. I liked Jump with Jill **less** than the other assemblies.
    d. I haven't seen any other assemblies.

9. How did the Jump with Jill assembly make you **feel**?

Excited 	Very	Kind of	Not at all
Upset 	Very	Kind of	Not at all
Happy 	Very	Kind of	Not at all
Bored 	Very	Kind of	Not at all
Hopeful 	Very	Kind of	Not at all
Tired  Zzzz	Very	Kind of	Not at all

The School District of Philadelphia

Office of Research and Evaluation

5th Grade Assembly Programming Evaluation Post-Survey

Rapping about Prevention

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Nutrition Education Program

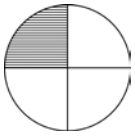
Spring 2013

Rapping about Prevention Assembly Post-Survey

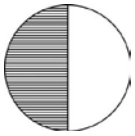
Instructions: Please read each question and circle your answer. If you do not know the answer to a question, just take your best guess and move on to the next question. Please only select ONE answer for each question.

1. How much of your plate should be filled with fruits and vegetables?

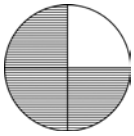
a. One quarter (1/4)



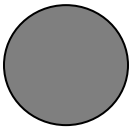
b. One half (1/2)



c. Three quarters (3/4)



d. The whole plate



2. How many minutes of physical activity should you get every day?
   a. 5 minutes
   b. 20 minutes
   c. 40 minutes
   d. 60 minutes

3. Is eating nutritious food the **only** thing you need to be healthy?
   a. Yes
   b. No

4. Which activity is an example of exercise?
   a. Sleeping
   b. Watching TV
   c. Reading a book
   d. Dancing

5. Other than water, which of the following drinks is the healthiest?
   a. 100% Fruit Juice
   b. Soda
   c. Fruit Punch like Hawaiian Punch®
   d. Sports drinks like Gatorade® or Powerade®

6. Why is exercising an important part of being healthy?
   a. I get to do less homework.
   b. My teachers tell me to do it.
   c. It strengthens my heart and muscles.
   d. It helps me to gain weight.

7. Did you learn anything **new** during the assembly?
    a. Yes
    b. No

    a. **If you answered "yes," what did you learn?**

_____

_____

_____

8. Compared to other assemblies you've seen at school, what did you think about Rapping About Prevention?

    a. I liked Rapping About Prevention **more** than the other assemblies.
    b. I liked Rapping About Prevention the **same** as the other assemblies.
    c. I liked Rapping About Prevention **less** than the other assemblies.
    d. I haven't seen any other assemblies.

9. How did the Rapping About Prevention assembly make you **feel**?

Excited 	Very	Kind of	Not at all
Upset 	Very	Kind of	Not at all
Happy 	Very	Kind of	Not at all
Bored 	Very	Kind of	Not at all
Hopeful 	Very	Kind of	Not at all
Tired  Zzzz	Very	Kind of	Not at all

Appendix H

****This survey was administered using Survey Monkey. Formatting and skip functions appear differently online than hardcopy.****

FoodPlay Assembly Teacher/Staff Survey

Instructions: This survey is about the FoodPlay assembly program that was at your school this spring. This survey should take no more than 5-10 minutes of your time. Your feedback is critical in helping to improve our assembly programs, in addition to providing us knowledge about how your students felt about the program. Your answers will remain confidential and will only be shared at the aggregate or group-level.

1. What grade(s) do you currently teach? (Select all that apply.)

_____Kindergarten	_____ 3rd grade	_____ 6th grade
_____1st grade	_____ 4th grade	_____ 7th grade
_____2nd grade	_____ 5th grade	_____ 8th grade

2. What school(s) do you currently teach at?
   a. _____

3. From January 2013 to present, did you attend the FoodPlay assembly at your school?
   a. Yes
   b. No [If no, skip function to Question 8]

4. During the assembly, to what extent did each of the following adjectives describe your students' emotions? (Select one for each.)

	Very	Kind of	Not at all	Not applicable
Excited				
Upset				
Happy				
Bored				
Hopeful				
Tired				

5. **RANK** the following program messages based on what you think your students learned most from the assembly. Assign each message a ranking using a scale of 1 to 5, with **1 being the most** received "take home" message, and **5 being the least** received "take home" message.

RANK	The message your students learned from the assembly:
	What foods to eat less often
	What foods to eat more often
	Possible health complications from poor diet
	The importance of healthy eating
	The importance of physical activity

6. To what extent do you think the assembly helped students understand how to eat healthier using MyPlate?
    a. Not at all
    b. To little extent
    c. To some extent
    d. To a moderate extent
    e. To a large extent

7. On a scale of poor to excellent, grade the assembly on the following criteria. (Select one circle for each.)

	Poor	Fair	Average	Good	Excellent
Age-appropriate					
Relevance to my students					
Message clarity					
Program length					
Student engagement					
Entertainment value					
A good use of students' educational time					

8. Did you use the supplemental assembly lessons in your classroom? (Note: these activities may have been supplied by your nutrition educator.)
    a. Yes
    b. No

9. If teacher answered "Yes" to Question 8:
   How did you use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

   _____ I taught supplemental assembly lessons in class.
   _____The nutrition educator taught supplemental assembly lessons in class.
   _____ I nor the nutrition educator provided in-class instruction, but I/we gave students the supplemental assembly handouts to take home.
   _____ Students completed supplemental assembly handouts in class or at home.
   _____ Other (please comment):_____

10. If teacher answered "No" to Question 8:
    Why did you <u>not</u> use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

    _____ I did not have enough time to teach supplemental assembly lessons.
    _____ I was not interested in the supplemental assembly lessons.
    _____ I was not given the supplemental assembly lessons.
    _____ I did not find the supplemental assembly lessons useful to my students.
    _____ Other (please comment):_____

11. Do you have any suggestions or comments to help improve the FoodPlay assembly program?

****This survey was administered using Survey Monkey. Formatting and skip functions appear differently online than hardcopy.****

Jump with Jill Assembly Teacher Survey

Instructions: This survey is about the Jump with Jill assembly program that was at your school this spring. This survey should take no more than 5-10 minutes of your time. Your feedback is critical in helping to improve our assembly programs, in addition to providing us knowledge about how your students felt about the program. Your answers will remain confidential and will only be shared at the aggregate or group-level.

1. What grade(s) do you currently teach? (Select all that apply.)

_____Kindergarten	_____ 3rd grade	_____ 6th grade
_____1st grade	_____ 4th grade	_____ 7th grade
_____2nd grade	_____ 5th grade	_____ 8th grade

2. What school(s) do you currently teach at?
   a. _____

3. From January 2013 to present, did you attend the Jump with Jill assembly at your school?
   a. Yes
   b. No [If no, skip function to Question 8]

4. During the assembly, to what extent did each of the following adjectives describe your students' emotions? (Select one for each.)

	Very	Kind of	Not at all	Not applicable
Excited				
Upset				
Happy				
Bored				
Hopeful				
Tired				

5. **RANK** the following program messages based on what you think your students learned most from the assembly. Assign each message a ranking using a scale of 1 to 5, with **1 being the most** received "take home" message, and **5 being the least** received "take home" message.

RANK	**The message your students learned from the assembly:**
	What foods to eat less often
	What foods to eat more often
	Possible health complications from poor diet
	The importance of healthy eating
	The importance of physical activity

6. To what extent do you think the assembly helped students understand how to resist "junk food" marketing tricks?
    a. Not at all
    b. To little extent
    c. To some extent
    d. To a moderate extent
    e. To a large extent

7. On a scale of poor to excellent, grade the assembly on the following criteria. (Select one circle for each.)

	Poor	Fair	Average	Good	Excellent
Age-appropriate					
Relevance to my students					
Message clarity					
Program length					
Student engagement					
Entertainment value					
A good use of students' educational time					

8. Did you use the supplemental assembly lessons in your classroom? (Note: these activities may have been supplied by your nutrition educator.)
    a. Yes
    b. No

9. If teacher answered "Yes" to Question 8:
   How did you use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

   _____ I taught supplemental assembly lessons in class.
   _____The nutrition educator taught supplemental assembly lessons in class.
   _____ I nor the nutrition educator provided in-class instruction, but I/we gave students the supplemental assembly handouts to take home.
   _____ Students completed supplemental assembly handouts in class or at home.
   _____ Other (please comment):_____

10. If teacher answered "No" to Question 8:
    Why did you <u>not</u> use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

    _____ I did not have enough time to teach supplemental assembly lessons.
    _____ I was not interested in the supplemental assembly lessons.
    _____ I was not given the supplemental assembly lessons.
    _____ I did not find the supplemental assembly lessons useful to my students.
    _____ Other (please comment):_____

11. Do you have any suggestions or comments to help improve the Jump with Jill assembly program?

****This survey was administered using Survey Monkey. Formatting and skip functions appear differently online than hardcopy.****

Rapping About Prevention (R.A.P.) Teacher Survey

Instructions: This survey is about the Rapping About Prevention (R.A.P.) assembly program that was at your school this spring. This survey should take no more than 5-10 minutes of your time. Your feedback is critical in helping to improve our assembly programs, in addition to providing us knowledge about how your students felt about the program. Your answers will remain confidential and will only be shared at the aggregate or group-level.

1. What grade(s) do you currently teach? (Select all that apply.)

_____Kindergarten	_____ 3rd grade	_____ 6th grade
_____1st grade	_____ 4th grade	_____ 7th grade
_____2nd grade	_____ 5th grade	_____ 8th grade

2. What school(s) do you currently teach at?
   a. _____

3. From January 2013 to present, did you attend the Rapping About Prevention (R.A.P.) assembly at your school?
   a. Yes
   b. No [If no, skip function to Question 8]

4. During the assembly, to what extent did each of the following adjectives describe your students' emotions? (Select one for each.)

	Very	Kind of	Not at all	Not applicable
Excited				
Upset				
Happy				
Bored				
Hopeful				

Tired				

5. **RANK** the following program messages based on what you think your students learned most from the assembly. Assign each message a ranking using a scale of 1 to 5, with **1 being the most** received "take home" message, and **5 being the least** received "take home" message.

RANK	**The message your students learned from the assembly:**
	What foods to eat less often
	What foods to eat more often
	Possible health complications from poor diet
	The importance of healthy eating
	The importance of physical activity

6. To what extent do you think the assembly helped students understand ways to exercise more often?
   a. Not at all
   b. To little extent
   c. To some extent
   d. To a moderate extent
   e. To a large extent

7. On a scale of poor to excellent, grade the assembly on the following criteria. (Select one circle for each.)

	Poor	Fair	Average	Good	Excellent
Age-appropriate					
Relevance to my students					
Message clarity					
Program length					
Student engagement					
Entertainment value					
A good use of students' educational time					

8. Did you use the supplemental assembly lessons in your classroom? (Note: these activities may have been supplied by your nutrition educator.)
    a. Yes
    b. No

9. If teacher answered "Yes" to Question 8:
   How did you use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

   _____ I taught supplemental assembly lessons in class.
   _____The nutrition educator taught supplemental assembly lessons in class.
   _____ I nor the nutrition educator provided in-class instruction, but I/we gave students the supplemental assembly handouts to take home.
   _____ Students completed supplemental assembly handouts in class or at home.
   _____ Other (please comment):_____

10. If teacher answered "No" to Question 8:
    Why did you <u>not</u> use the supplemental assembly lessons? Please select all that apply (Note: you may select more than one answer.)

    _____ I did not have enough time to teach supplemental assembly lessons.
    _____ I was not interested in the supplemental assembly lessons.
    _____ I was not given the supplemental assembly lessons.
    _____ I did not find the supplemental assembly lessons useful to my students.
    _____ Other (please comment):_____

11. Do you have any suggestions or comments to help improve the Rapping About Prevention (R.A.P.) assembly program?

Appendix I

7th Grade C3 Knowledge Question Results from Post-Survey by Gender and Condition, 2012-2013

Question	Gender		Results	Condition		Results
Main Concept	***Male*** *Mean, SD, n*	***Female*** *Mean, SD, n*	*Independent Samples T-test*	***Comparison*** *Mean, SD, n*	***Intervention*** *Mean, SD, n*	*Independent Samples T-test*
Choice (Q4)	0.84, 0.366, n=189	0.92, 0.280, n=165	*t*(346)=-2.147, **p=0.032**, 95% CI (-0.142, -0.006)	0.87, 0.341, n=150	0.88, 0.323, n=204	*t* (352)=-0.441, p=0.660, 95% CI (-0.086, 0.054)
Control (Q5)	0.82, 0.385, n=189	0.83, 0.377, n=165	*t* (352)=-0.251, p=0.802, 95% CI (-0.901, 0.070)	0.84, 0.368, n=150	0.81, 0.390, n=204	*t* (352)=0.641, p=0.522, 95% CI (0.054, 0.107)
Change (Q6)	0.85, 0.362, n=188	0.95, 0.215, n=165	*t* (311)=-3.381, **p=0.001**, 95% CI (-0.167, -0.044)	0.91, 0.293, n=149	0.89, 0.317, n=204	*T(* 351)=0.568, p=0.571, 95% CI (-0.046, 0.084)
Environment definition (Q17)	0.68, 0.469, n=189	0.74, 0.441, n=164	*t* (342)=-1.249, p=0.212, 95% CI (-0.156, 0.035)	0.66, 0.476, n=149	0.74, 0.440, n=204	*t* (351)=-1.660, p=0.098, 95% CI (-0.180, 0.015)
Environment influence (Q18)	0.66, 0.475, n=186	0.66, 0.474, n=163	*t* (351)=-0.025, p=0.980, 95% CI (-0.101, 0.099)	0.61, 0.490, n=148	0.70, 0.459, n=201	*t* (305)=-1.808, p=0.072, 95% CI (-0.195, 0.008)
Recommended amt. of fat (Q14)	0.13, 0.336, n=186	0.23, 0.422, n=165	*t* (313)=-2.465, **p=0.014**, 95% CI (-0.182, -0.020)	0.21, 0.407, n=149	0.15, 0.361, n=202	*t* (296)=1.301, p=0.194, 95% CI (-0.028, 0.137)
Grilling foods (Q15)	0.84, 0.366, n=189	0.91, 0.288, n=165	*t*(348.4)=-1.946, ***p*=0.052**, 95% CI (-0.136, 0.001)	0.89, 0.310, n=150	0.86, 0.350, n=204	*t*(340)=1.008, *p*=0.314, 95%CI (-0.034, 0.105)
Hamburger choice (Q16)	0.92, 0.271, n=189	0.92, 0.272, n=163	*t*(350)=0.013, *p*=0.989, 95%CI (-0.057, 0.057)	0.91, 0.283, n=149	0.93, 0.262, n=203	*t*(350)=-0.456, *p*=0.648, 95%CI (-0.071, 0.044)
Fast food leads to poor health (Q8)	0.94, 0.245, n=188	0.99, 0.078, n=164	*t*(229.5)=-3.057, ***p*=0.003,** 95%CI (-0.09495,-0.02052)	0.95, 0.212, n=150	0.97, 0.170, n=202	*t*(350)=-0.833, *p*=0.405, 95%CI (-0.057, 0.023)
FV servings (Q9)	0.57, 0.497, n=189	0.61, 0.489, n=165	*t*(352)=-0.875, *p*=0.382, 95% CI(-0.149, 0.057)	0.63, 0.485, n=150	0.56, 0.498, n=204	*t*(325.6)=1.286, *p*=0.199, 95% CI (-0.036, 0.17)
Misleading commercials (Q19)	0.85, 0.355, n=184	0.94, 0.240, n=164	*t*(323.4)=-2.665, ***p*=0.008,** 95% CI=-0.149, -0.022)	0.86, 0.345, n=146	0.92, 0.278, n=202	*t*(270)=-1.526, *p*=0.128, 95% CI (-0.121, 0.015)
RDA sugar (Q13)	0.66, 0.473, n=188	0.76, 0.426, n=165	*t*(350.8)=-2.062, ***p*=0.040**, 95% CI (-0.193, -0.005)	0.73, 0.445, n=149	0.70, 0.461, n=204	*t*(351)=0.725, *p*=0.469, 95% CI (-0.061, 0.132)
Sweet taste tendency (Q11)	0.87, 0.341, n=187	0.84, 0.371, n=165	*t*(350)=0.789, *p*=0.431, 95% CI 9 -0.045, 0.105)	0.79, 0.407, n=149	0.90, 0.305, n=203	*t*(262.5)=-2.638, ***p*=0.009** 95% CI (-0.183, -0.023)
Sweet food choice (Q12)	0.84, 0.366, n=189	0.91, 0.288, n=165	*t*(348.4)=-1.946, ***p*=0.052**, 95% CI (-0.136, 0.001)	0.91, 0.282, n=150	0.84, 0.365, n=204	*t*(351)=2.041, ***p*=0.042** 95% CI (0.003, 0.138)
Overall Pre Knowledge Score	10.7, 2.26, n=189	10.9, 2.23, n=165	*t*(352)=-1.047, p=0.296, 95%CI (-0.722, 0.220)	10.5, 2.39, n=150	11.0, 2.12, n=204	*t*(354)=-1.82, p=0.070, 95% CI (0.913, 0.035)
Overall Post Knowledge Score	11.3, 2.567, n=189	12.1, 1.89, n=165	*t*(352)=-3.33, **p=0.001**, 95% CI (-1.286, -0.332)	11.6, 2.33, n=150	11.72, 2.30, n=204	*t*(354)=-0.297, p=0.767, 95% CI (-0.563, 0.415)

Appendix J

7th and 8th Grade C3 RM-ANOVA Results for Time and Condition from Pre-to-Post-Survey, 2012-2013

Dependent Variable		Main Effect of Time	Main Effect of Condition	Main Effect of Interaction	Result
Breakfast consumption	7th	F(1, 342)=2.408, p=0.122	F (1,342)=7.479, **p=0.007**	F(1,342)=0.111, p=0.739	Main effect of condition was statistically significant.
	8th	F(1, 280)=0.582, p=0.446	F(1, 280)=0.219, p=0.640	F(1, 280)=1.517, p=0.219	No statistical significance.
Daily intake of all fruit	7th	F(1, 350)=6.017, **p=0.015**	F (1,350)=3.177, **p=0.076**	F(1,344)=3.798, **p=0.052**	Main effect of time, main effect of condition, and interaction were statistically significant.
	8th	F(1, 285)=2.134, p=0.145	F(1, 285)=0.872, p=0.351	F(1, 285)=1.680, p=0.196	No statistical significance.
Daily intake of all vegetables	7th	F(1, 345)=0.826, **p=0.047**	F (1,345)=1.282, p=0.258	F(1,345)=3.011, p=0.084	Main effect of time was statistically significant.
	8th	F(1, 285)=2.473, p=0.117	F(1, 285)=0.981, p=0.323	F(1, 285)=0.895, p=0.345	No statistical significance.
Daily intake of all fruits and vegetables	7th	F(1, 344)=3.989, **p=0.047**	F (1,344)=3.204, p=0.074	F(1,344)=5.197, **p=0.023**	Main effect of time and main effect of interaction were statistically significant.
	8th	F(1, 285)=0.160, p=0.689	F(1, 285)=0.047, p=0.828	F(1, 285)=1.762, p=0.185	No statistical significance.
Daily intake of milk	7th	F(1, 345)=1.811, p=0.179	F (1,345)=0.488, p=0.485	F(1,345)=0.52, p=0.819	No statistical significance.
	8th	F(1, 284)=1.332, p=0.249	F(1, 284)=0.001, p=0.975	F(1, 284)=0.975, p=0.324	No statistical significance.
Physical activity for 60+ minutes	7th	F(1, 345)=3.662, p=0.057	F (1,345)=0.966, p=0.326	F(1,345)=4.938, **p=0.027**	Main effect of interaction was statistically significant.
	8th	F(1, 283)=0.001, p=0.974	F(1, 283)=4.064, **p=0.045**	F(1, 283)=0.127, p=0.722	Main effect of condition was statistically significant.
Daily intake of soda	7th	F(1, 345)=0.008, p=0.928	F (1,345)=0.048, p=0.827	F(1,345)=0.008, p=0.928	No statistical significance.
	8th	F(1, 284)=0.871, p=0.352	F(1, 284)=0.078, p=0.781	F(1, 284)=0.204, p=0.652	No statistical significance.

7th and 8th Grade C3 RM-ANOVA Results for Time and Gender from Pre-to-Post-Survey, 2012-2013

Dependent Variable		Main Effect of Time	Main Effect of Gender	Main Effect of Interaction	Result
Breakfast consumption	7th	F(1, 345)=2.792, p=0.096	F (1,345)=24.074, **p<0.001**	F(1,345)=0.285, p=0.594	Main effect of gender was statistically significant.
	8th	F(1, 280)=0.655, p=0.419	F(1, 280)=27.509, **p<0.001**	F(1,280)=2.218, p=0.137	Main effect of gender was statistically significant.
Daily intake of all fruit	7th	F(1, 350)=4.502, **p=0.035**	F (1,350)= 4.013, **p=0.046**	F(1,350)=0.185, p=0.667	Main effect of time and main effect of gender were statistically significant.
	8th	F(1, 285)=2.160, p=0.143	F(1, 285)=13.424, **p<0.001**	F(1,285)=2.160, p=0.143	Main effect of gender was statistically significant.
Daily intake of all vegetables	7th	F(1, 345)=0.457, p=0.500	F (1,345)=5.599, **p=0.019**	F(1,345)=0.726, p=0.395	Main effect of gender was statistically significant.
	8th	F(1, 285)=2.421, p=0.121	F(1, 285)=8.815, **p=0.003**	F(1,285)=0.034, p=0.854	Main effect of gender was statistically significant.
Daily intake of all fruits and vegetables	7th	F(1, 344)=2.677, p=0.103	F (1,344)=6.321, **p=0.012**	F(1,344)=0.132, p=0.717	Main effect of gender was statistically significant.
	8th	F(1, 285)=0.149, p=0.700	F(1, 285)=13.671, **p<0.001**	F(1,285)=0.748, p=0.388	Main effect of gender was statistically significant.
Daily intake of milk	7th	F(1, 345)=1.986, p=0.160	F (1,345)=17.640, **p<0.001**	F(1,345)=1.572, p=0.211	Main effect of gender was statistically significant.
	8th	F(1, 285)=1.300, p=0.255	F(1, 285)=19.90, **p<0.001**	F(1,285)=0.048, p=0.827	Main effect of gender was statistically significant.
Physical activity for 60+ minutes	7th	F(1, 345)=5.408, **p=0.021**	F (1,345)=22.398, **p<0.001**	F(1,345)=0.295, p=0.588	Main effect of time and main effect of gender were statistically significant.
	8th	F(1, 285)=0.005, p=0.946	F(1, 285)=10.756, **p=0.001**	F(1,285)=6.353, **p=0.012**	Main effect of gender and interaction were statistically significant.
Daily intake of soda	7th	F(1, 345)=0.000, p=0.988	F (1,345)=1.233, p=0.268	F(1,345)=0.829, p=0.363	No statistical significance.
	8th	F(1, 285)=0.857, p=0.355	F(1, 285)=0.031, p=0.859	F(1,285)=1.975, p=0.161	No statistical significance

Appendix K

8th Grade C3 Energy-Specific Knowledge Questions, RM-ANOVA Results, 2012-2013

Question	**Comparison**		**Intervention**				
Energy Concepts	***Pre-Survey*** *Mean, SD, n*	***Post-Survey*** *Mean, SD, n*	***Pre-Survey*** *Mean, SD, n*	***Post-Survey*** *Mean, SD, n*	***Main Effect of Time***	***Main Effect of Condition***	***Main Effect of Interaction***
Energy intake (Q4)	0.68, 0.48, n=143	0.71, 0.45, n=143	0.64, 0.48, n=145	0.80, 0.40, n=145	**F(1,286)=10.428, p=0.001**	F(1,286)=0.710, p=0.400	F(1,286)=2.388, p=0.123
Energy expenditure (Q5)	0.69, 0.47, n=143	0.76, 0.43, n=143	0.63, 0.48, n=143	0.81, 0.39, n=143	**F(1,284)=15.972, p<0.001**	F(1,284)=0.001, p=1.000	F(1,284)=3.155, p=0.077
Energy balance (Q6)	0.51, 0.50, n=140	0.44, 0.50, n=140	0.54, 0.50, n=144	0.57, 0.50, n=144	F(1,282)=0.242, p=0.216	F(1,282)=3.041, p=0.082	F(1,282)=1.538, p=0.216
Positive energy balance (Q7)	0.67, 0.47, n=143	0.76, 0.43, n=143	0.77, 0.42, n=145	0.72, 0.45, n=145	F(1,286)=0.052, p=0.820	F(1,286)=0.361, p=0.548	F(1,286)=3.710, p=0.055
Weight gain (Q8)	0.21, 0.41, n=142	0.25, 0.43, n=142	0.28, 0.45, n=144	0.43, 0.50, n=144	**F(1,284)=9.147, p=0.003**	**F(1,284)=8.601, p=0.004**	F(1,284)=3.415, p=0.066
Negative energy balance (Q9)	0.39, 0.49, n=142	0.47, 0.50, n=142	0.40, 0.49, n=143	0.52, 0.50, n=143	**F(1,283)=9.070, p=0.003**	F(1,283)=0.351, p=0.554	F(1,283)=0.259, p=0.611
Weight loss (Q10)	0.38, 0.49, n=141	0.30, 0.46, n=141	0.38, 0.49, n=146	0.48, 0.50, n=146	F(1,285)=0.027, p=0.869	**F(1,285)=3.771, p=0.053**	**F(1,285)=7.642, p=0.006**
Energy stored as calories (Q19)	0.64, 0.48, n=140	0.67, 0.47, n=140	0.73, 0.44, n=146	0.71, 0.45, n=146	F(1,284)=0.051, p=0.822	F(1,284)=2.548, p=0.112	F(1,284)=0.700, p=0.403
Metabolism (Q20)	0.45, 0.50, n=137	0.45, 0.50, n=137	0.41, 0.49, n=145	0.42, 0.50, n=145	F(1,280)=0.037, p=0.848	F(1,280)=0.449, p=0.503	F(1,280)=0.037, p=0.848
Excess energy stored as fat (Q21)	0.41, 0.49, n=141	0.46, 0.50, n=141	0.45, 0.50, n=146	0.57, 0.50, n=146	**F(1,285)=5.968, p=0.015**	F(1,285)=2.273, p=0.133	F(1,285)=1.082, p=0.299
Cardiovascular activity energy (Q22)	0.77, 0.42, n=142	0.82, 0.39, n=142	0.83, 0.38, n=144	0.76, 0.43, n=144	F(1,284)=0.142, p=0.706	F(1,284)=0.000, p=0.988	**F(1,284)=4.939, p=0.027**

Appendix L

8th Grade C3 Nutrition-Specific Knowledge Questions, RM-ANOVA Results, 2012-2013

Question	**Comparison**		**Intervention**				
Nutrition Concepts	***Pre-Survey*** *Mean, SD, n*	***Post-Survey*** *Mean, SD, n*	***Pre-Survey*** *Mean, SD, n*	***Post-Survey*** *Mean, SD, n*	***Main Effect of Time***	***Main Effect of Condition***	***Main Effect of Interaction***
Small intestine function (Q11)*	0.26, 0.44, n=140	0.30, 0.46, n=140	0.16, 0.37, n=143	0.29, 0.46, n=143	**F(1,281)=6.515, p=0.011**	F(1,281)=1.804, p=0.180	F(1,281)=1.709, p=0.192
Large intestine function (Q12)	0.69, 0.46, n=142	0.71, 0.45, n=142	0.72, 0.45, n=142	0.61, 0.49, n=142	F(1,282)=1.344 p=0.247	F(1,282)=0.722, p=0.396	F(1,282)=3.025, p=0.083
Glucose is a sugar (Q13)	0.33, 0.47, n=139	0.35, 0.48, n=139	0.25, 0.44, n=142	0.31, 0.46, n=142	F(1,279)=1.120, p=0.291	F(1,279)=1.650, p=0.200	F(1,279)=0.394, p=0.531
Pancreas function (Q14)	0.25, 0.44, n=139	0.32, 0.47, n=139	0.26, 0.44, n=139	0.29, 0.45, n=139	F(1,276)=2.340, p=0.127	F(1,276)=0.113, p=0.737	F(1,276)=0.430, p=0.513
Lower blood sugar (Q15)	0.85, 0.36, n=143	0.86, 0.35, n=143	0.83, 0.38, n=146	0.88, 0.33, n=146	F(1,287)=1.085, p=0.298	F(1,287)=0.015, p=0.903	F(1,287)=0.603, p=0.438
Enzyme function (Q16)	0.54, 0.50, n=133	0.55, 0.50, n=133	0.54, 0.50, n=138	0.57, 0.50, n=138	F(1,269)=0.191, p=0.662	F(1,269)=0.016, p=0.899	F(1,269)=0.066, p=0.797
Obesity health risks (Q17)	0.41, 0.49, n=140	0.49, 0.50, n=140	0.46, 0.50, n=145	0.47, 0.50, n=145	F(1,283)=2.102, p=0.148	F(1,283)=0.063, p=0.802	F(1,283)=1.098, p=0.296
Esophagus function (Q18)	0.28, 0.45, n=140	0.29, 0.46, n=140	0.30, 0.46, n=142	0.37, 0.48, n=142	F(1,280)=1.345, p=0.247	F(1,280)=1.207, p=0.273	F(1,280)=0.591, p=0.443

*Significant differences found between condition groups: $t(275)=1.992$, $p=0.047$, 95%CI (0.00113, 0.18867), where comparison students scored significantly higher on Q11 than intervention students.

Appendix M

Figure A. Estimated Marginal Means of All Students' General Knowledge Scores by Gender (Males n=213; Females n=215), FY 2013

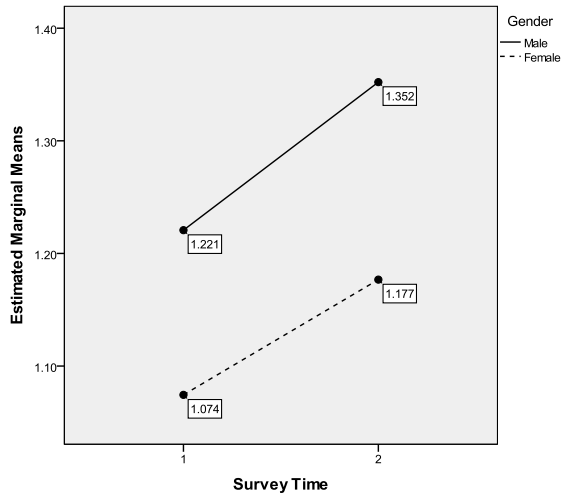


Figure B. Estimated Marginal Means of *FoodPlay* Total knowledge Scores by Gender (Males n=57; Females n=67), FY 2013

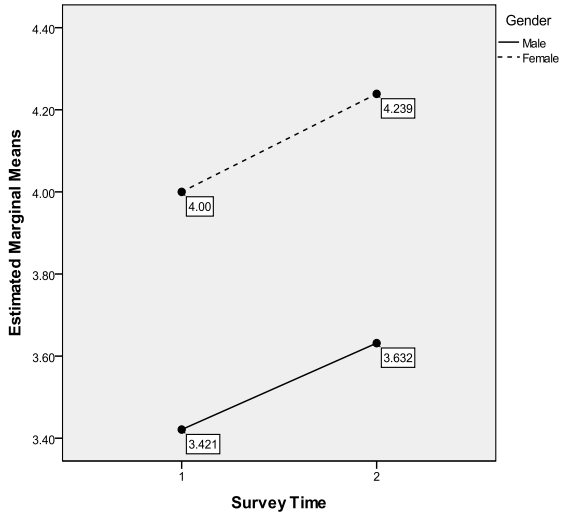


Figure C. Estimated Marginal Means of *Jump with Jill* General Knowledge Scores by Gender (Males n=65; Females n=62), FY 2013

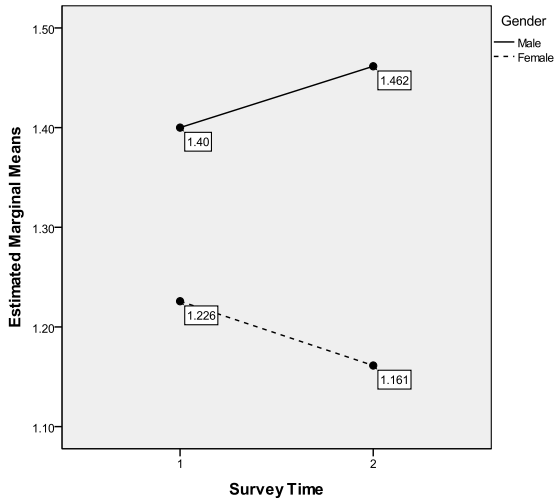
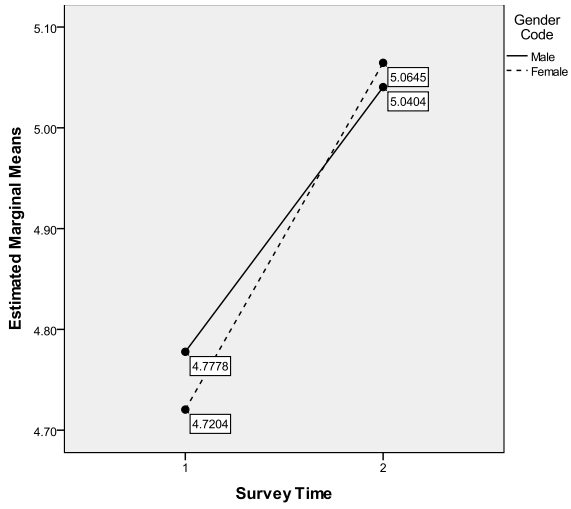


Figure D. Estimated Marginal Means of *R.A.P.* Total knowledge Scores by Gender (Males n=99; Females n=93), FY 2013



Appendix N

Figure A. Students' Emotional Affect Scores by Range, All Assemblies (n=716), FY 2013

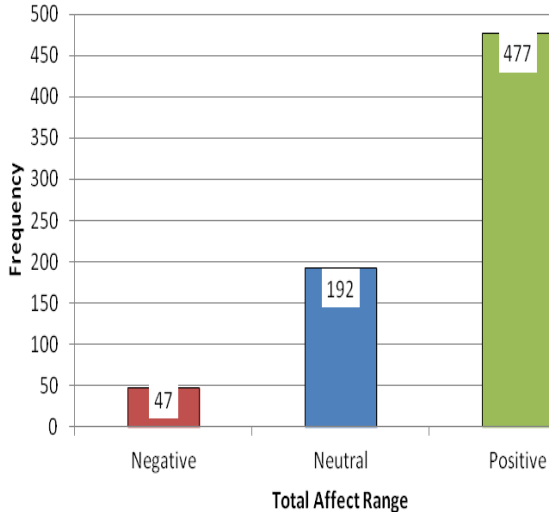


Figure B. Students' Emotional Affect Scores by Range, *FoodPlay* Assembly (n=116), FY 2013

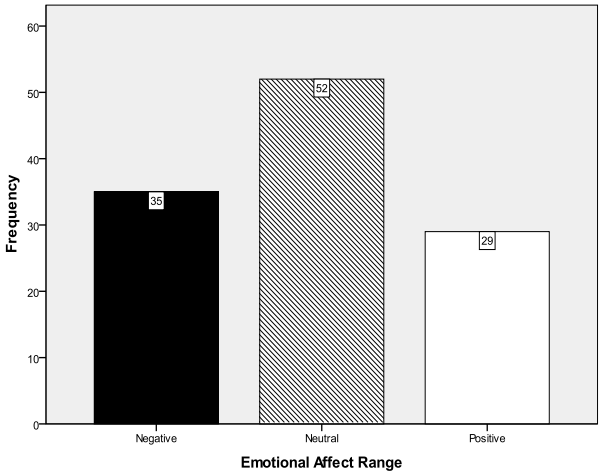


Figure C. Students' Emotional Affect Scores by Range, *Jump with Jill* (n=122), FY 2013

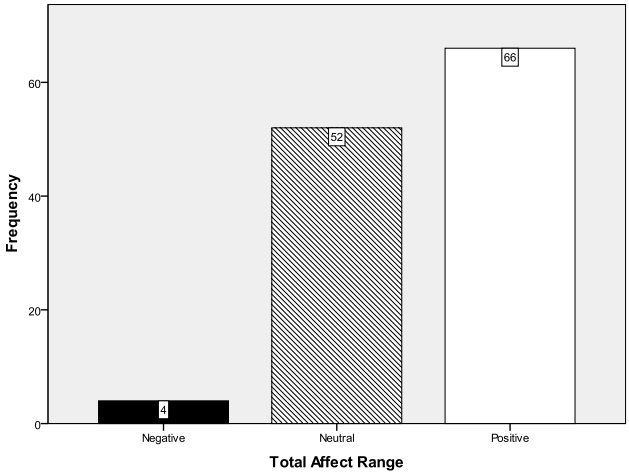
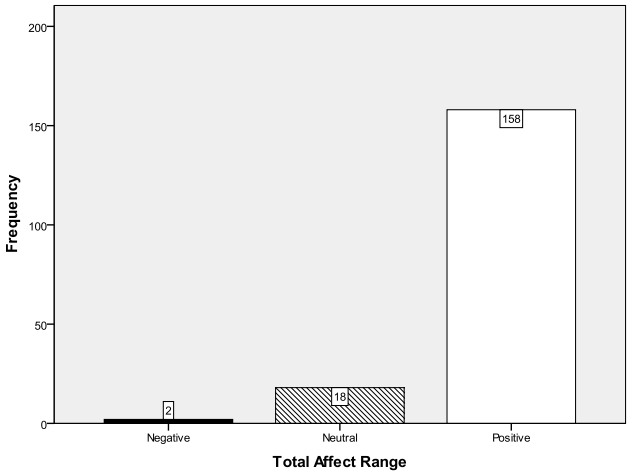


Figure D. Students' Emotional Affect Scores by Range, *R.A.P.* Assembly (n=178), FY 2013



Appendix O

Table A. Results from Student Post Survey Question 7A: *"What was something new that you learned from the assembly?"*

Assembly	Main themes (n=85 references)	Sub-themes	Response Examples
FoodPlay **(N=68 Student Responses)**	**41.2% (n=35)** of references were about healthy eating	**72.2% (n=26)** Kinds of healthy foods	*"I learned that you have to eat go foods more often."* *"I learned that you should eat more fruits and vegetables."* *"To always eat healthy and protein foods."* *"I learned to drink milk and be healthy."*
		27.8% (n=10) Importance of eating healthy	*"Yes I learned you should eat more healthy foods than unhealthy foods."* *"I learned that it is good to eat right."* *"I learned to eat healthier food to keep your body nice and strong."* *"I learned that if you eat 'go foods' then you can get lots of energy and you can be more healthy!"*
	44.7% (n=38) of references were about unhealthy eating	**44.7% (n=17)** Kinds of unhealthy foods	*"I learned that you are not supposed to eat sugary and salty foods."* *"That fried foods is bad for us because it has too much grease."*
		55.2% (n=21) Unhealthy foods should be eaten less often	*"I learned you can't drink too much soda because it has a lot of sugar."* *"I learned that eating junk food and unhealthy food can make you sick and don't feel like doing anything."* *"If you eat too much sugar you can get fat and you can barely move."* *"I you eat a lot of sugar you could get diabetes."*
	5.9% (n=5) of references were about physical activity	**50% (n=3)** Children should spend a certain amount of time doing physical activity every day	*"I learned that you should have at least sixty minutes of physical activity."* *"I learned how much minutes of physical."*
		50%(n= 3) Physical activity is good for you	*"I learned that you should exercise more than being lazy."* *"I learned that it is good to stay active to be healthy."*
	8.2% (n=7) of references were classified as "other"	**57.1% (n=4)** Recalled scenes from the assembly performance	*"The grandmom show [how] to cook."* *"The young lady won a [competition] about healthy food."* *"I learned about go food and bad food she did not want chicken she wanted good food."*
		14.3% (n=1) Recalled what certain terms meant	*"I learned what 'whoa' and 'go' stand for."*
		28.6%(n=2) recalled <u>incorrect</u> information from the assembly	*"Brown rice is unhealthy."* *"I learned that you have to play 30 or 40 minutes a day."*

Table B. Results from Student Post Survey Question 7A: *"What was something new that you learned from the assembly?"*

Assembly	Main themes (n=102 references)	Sub-themes	Response Examples
Jump with Jill **(N=85 Student Responses)**	**60.8% (n=62)** of references were about healthy eating	**92% (n=58)** Why they should eat more healthy foods and types of healthy foods	*"Vegetables are good for your body."* *"Fruits are good for your body."* *"I learned that whole wheat bread is good for you."* *"Fruits and vegetables give you lots of nutrients."* *"Vegetables are great for my hair, my skins, muscles, my eyes and my bones."* *"I learned that people can have fun with healthy foods."* *"…how to make healthy eating fun."* *"That milk gives you energy makes your bones big and strong."* *"I learned that vegetables give more energy than fruits or any other food."*
		3.2% (n=2) Portion of the plate that should be filled with fruits and vegetables	*"I learned that ¼ of your plate should be filled with fruit."* *"What I learn is your plate should have ¼ vegetables."*
		4.8% (n=3) Importance of Breakfast	*"That you are supposed to eat breakfast every day. It is the most important part of the day."* *"I learned always eat breakfast."*
	27.5% (n=28) of references were about unhealthy eating	**57.1% (n=16)** Why they should eat less unhealthy foods	*"Eating unhealthy food makes you lose energy."* *"I learned that stuff that is not good for your body makes you lose all your energy."* *"I learned that when you eat junk food it gives your body less energy."* *"I learned that junk food is not good for your body and you'll lose energy."* *"That if you eat candy or unhealthy or your body will be bad."* *"I learned some energy drinks are not healthy."*
		42.9% (n=12) Types of unhealthy foods to eat less of	
	5.9% (n=6) of references were about exercise	**16.7% (n=1)** How to exercise more	*"I learned how to exercise my body more."* *"I learned that it is important to exercise."* *"I learned that exercise could be dancing and I learned to help keep your body in good shape."* *"You have to exercise and not sit on the couch and watch TV."*
		66.7%(n=4) Exercise is important	
		16.7%(n=1) Types of exercise	
	2.9% (n=3) of references were about other things learned	**33% (n=1)** learned songs from the performance	*Song lyrics like "beat to our bodies" and "super power vegetables help my skin, my hair, my muscles, my eyes, my bones."*
		33%(n=1) learned how the body loses water	*"I learned that when you talk, sweat and workout you lose water."*
		33% (n=1) learned how to "stay healthy"	*"I learned to stay healthy."*
	2.9%(n=3) of references were about other things <u>not</u> learned	**66.7%(n=2)** did not learn anything new	*"I already knew all the stuff she said."*
		33.3%(n=1) of references were incorrect knowledge	*"I learned that cheese does not give you that much energy."*

Table C. Results from Post Survey Question 7A: ***"What was something new that you learned from the assembly?"***

Assembly	Main themes (n=120 references)	Sub-themes	Response Examples
Rapping About Prevention **(N=116 Student Responses)**	**32.5% (n=39)** of references were about exercise	**100% (n=41)** What exercise is and isn't, and how it affects our bodies	*"I learned that hula hooping is good for you."* *"Dancing is a part of exercise and exercise can be fun."* *"You should exercise more. You can exercise by just dancing."* *"I learned that dancing gives you exercise."* *"I learned that if you don't exercise your heart can weaken."* *"That you should exercise everyday for at least 1 hour a day."* *"We have to play for 60 minutes."* *"What I learned is that dancing helps out your heart and muscles."* *"I learned that people's hearts and muscles can get strong."*
	27.5% (n=33) of references were about why they should eat healthy	**100% (n=33)** Eating healthy is Important to our bodies	*"I learn that milk is good for your nails."* *"What I learned is that you have to eat healthy to stay strong."* *"I learned that if you eat healthy your brain is more active."* *"I learned that I should always eat fruits and vegetables and then I would be fit."* *"I learned that eating healthy gives your more energy."*
	19.2% (n=23) of references were about healthy food	**93.8% (n=18)** Fruits & vegetables are healthy foods **2.2% (n=5)** Importance of Breakfast	*"That the plate has to be filled with half vegetables."* *"I learned that you should have at least three healthy things on your plate."* *"Your plate should be half full of fruits and vegetables."* *"Fifty percent of your plate should be fruits and vegetables."* *"I learned that you have to eat a healthy breakfast every day."* *"Breakfast gives you 'brain power' and helps you stay focused for the day."* *"To eat a healthy breakfast every day."*
	8.3% (n=10) of references were about unhealthy foods	**100% (n=10)** Some foods are unhealthy and should be eaten less often	*"I learned that when you fry your chicken it gets unhealthy for you."* *"Don't eat sugary foods. Exercise a lot during the day."* *"What I learned was that I did not know steak was not healthy."* *"I learned that not every kind of cereal is healthy for you."* *"That Frosted Flakes, Cinnamon Crunch and Apple Jacks are not healthy because they have tons and tons of sugar that's what I learned."* *"Yes because I didn't know Gatorade had so much sugar in it."*
	6.7% (n=8) of references were about the link between eating healthy and exercising	**100% (n=8)** It's important to eat healthy and exercise	*"I learned that it's not just eating healthy that makes feel in the right shape."* *"I learned that you should always exercise and you have to eat a piece of fruit every day."* *"I learned that exercising and eating right helps me grow and become strong."* *"I learned to eat healthy and keep my body in shape."*
	5.8%(n=7) of references were classified as "other"	**42.9% (n=3)** didn't learn anything new from the assembly **28.6%(n=2)** references recalled <u>incorrect</u> information from the assembly **28.6%(n=2)** referenced other things learned	*"I answered no, it didn't teach me anything I didn't already know (but I like it)."* *"I learned that watching TV doesn't help. And you have to get up and exercise 20 minutes day."* *"I learned that eating healthy is a good way to exercise."* *"If one teammate leaves it affects the whole team."*

Appendix P

Table A. Teacher Survey Responses to *"Do you have any suggestions or comments to help improve the FoodPlay assembly program?"*

Assembly	Main Items	Key Themes	Response Examples
FoodPlay (N=43 Teacher Comments)	**40% (n=17)** Positive Comments	**100% (n=17)** Positive adjectives included: "great", "enjoyed", "informative/educational"	*"It's great!"* *"I think they are great. Love the music."* *"It's great as it is."*
	40% (n=17) Negative Comments	**59% (n=10)** Sound issues related to loud microphones and music	*"The background music was a little too loud to hear the actors."* *"The actors speak too fast. You can't always hear them with the music so loud. My students missed some of the important things."*
		18% (n=3) Actors spoke too fast	*"The performers were very high energy, but the music was so loud, it covered their voices and words often. Most students were excited by the music, but completely missed the message because the performers were speaking too fast"*
		23% (n=4) Performance too long for younger students (1st grade); Not appropriate for older students (6th grade)	*"Shorter time for first grade students."* *"I found that for 6th graders, the play was a little too young. The students also commented the same"*
	20% (n=9) Suggested Improvement Comments	**33% (n=3)** New show content	*"Our school sees this exact play every year. Perhaps you could create something a little different to do on alternate years."* *"Change the show each year. New play. Game show maybe…"*
		44% (n=4) More interaction & student involvement	*"It needed to be a little bit more interactive."* *"Audio needs to be appropriate, and it should be more interactive."*
		22% (n=2) More direct messaging	*"Less loud voices. Speak slowly. Kindergartners don't always 'get it'. Need repetition. Need obvious. Say it directly."* *"Make the message more direct, and increase student involvement."*

Table B. Teacher Survey Responses to *"Do you have any suggestions or comments to help improve the Jump with Jill assembly program?"*

Assembly	Main Items	Key Themes	Response Examples
Jump with Jill (N= 63 Teacher Comments	**75% (n=47)** Positive Comments	**85.1% (n=40)** Positive adjectives included: "great, love, excellent, wonderful"	*"It was wonderful!!!!!"* *"It was excellent!!!"* *"Great assembly. My students loved it."*
		4.3% (n=2) Age appropriate for younger students	*"It is good for kindergarten age students."* *"…the little kids always enjoy the presentation especially the music and funny dialogue."*
		4.3%(n=2) Students were engaged	*"Best nutrition assembly I've seen. 'Jill' had great management and crowd control and the students were extremely engaged."* *"The show was excellent! Even I was engaged."*
		6.4% (n=3) Used and enjoyed CD, songs	*"The children respond so well to the physical movement in the program when I play the CD they continued to move."* *"The songs are an excellent resource of information."* *"We loved the CD and the songs! The students continue to sing them during recess and they choose the CD during listening station."*
	10% (n=6) Negative Comments	**50% (n=3)** Too fast-paced for some students to follow	*"To slow down the pace…it was hard for the students to understand and keep up."*
		33.3% (n=2) Neglected special needs students	*"Please tell Jill to make a more concerted effort to include the special needs students present at the assembly."* *"While Jill was energetic with, she was very ignorant to quite a few teachers that spoke with her. She had a poor attitude when dealing with the teachers and she neglected to include the special needs students."*
		16.7% (n=1) Inappropriate for 4th and 5th grade	*"Assembly was good but a little immature for 4th and 5th graders."*
	15% (n=10) Suggested Improvement Comments	**60% (n=6)** New show content	*"… Alterations can be made to enhance performance i.e. change in songs."* *"Change it up a little. It was very similar to the assembly the previous year."* *"Please continue and add new program matter or content. In other words change it up from year to year!"*
		40% (n=4) Additional supplemental lessons and handouts	*"…If the handouts could be leveled by grade that would be great. Ours was a little difficult for kindergarten but we worked through it!"* *"Have handouts or worksheets that are related to or connected to the musical songs."*

Table C. Teacher Survey Responses to *"Do you have any suggestions or comments to help improve the Rapping about Prevention assembly program?"*

Assembly	Main Items	Key Themes	Response Examples
Rapping About Prevention (N= 40 Teacher Comments)	**60% (n=24)** Positive Comments	**75% (n=18)** Positive adjectives included: "enjoyed", "great", "excellent", "fun"	*"The students stated they really enjoyed the program."* *"It was awesome. My students loved it! Great message!"* *"They were excellent. Each year they get better."*
		12.5% (n=3) Students related to performers	*"In the past, my students described the nutrition assemblies as 'corny', 'nerdy people wearing capes', and 'boring'. However, this year, my students were able to relate to the presenters."* *"The students could relate to the music and dancing and in turn relate to the message."* *"The program was what the students need because they can relate to the performers therefore the message of health registered for the students."*
		12.5% (n=3) Students were engaged	*"The whole school got the message and was engaged."* *"I thought the assembly was fantastic, not only were the students engaged but all of the teachers were as well."*
	12.5% (n=5) Negative Comments	**60% (n=3)** Inappropriate slang, performer appearance, dance moves	*"I don't think the dancers should shake their butts."* *"Speakers/dancers shouldn't have tattoos all over their faces, necks and hands—sends wrong message."* *"The Rappers used slang and questionable vocabulary. My students were disturbed by the language and grammar…."*
		40% (n=2) Not appropriate for older students (Age not specified)	*"The program for younger students seemed more appropriate for the age group. The information provided to the older students was lost in all the noise and entertainment."*
	27.5% (n=11) Suggested Improvement Comments	**63.6% (n=7)** Changes to content such as more visuals, and more specific information about nutrition and health	*"Provide more visuals and allow more student engagement."* *"To explain how a poor diet can affect you. To explain the signs and symptoms of diabetes, high blood pressure, and hypertension."* *"I would like to see more specific content—more educational value to the program…I would like to see the program be 'meatier'…"* *"Same program as 2012, children remember the same routine, small changes to review the material would be more exciting."* *"….some students have seen it more than once."*
		36.4% (n=4) More outside learning, such as "meet and greet" with performers, use of technology in supplemental activities/lessons	*"A little more interaction in the classroom prior to the assembly."* *"Go from class to class after assembly to meet students on a personal level."*