

Designing & Implementing an Elementary School Vegetable Snack Program to Increase Children's Consumption

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Introduction

Background

Many American communities are lacking healthy options when it comes to children's nutrition. Poor nutrition in childhood can lead to obesity, which persists into adulthood and is linked to several chronic diseases including coronary heart disease, stroke, and diabetes (1). Thus, increasing children's fruit and vegetable consumption has become an important focus among practitioners, policymakers and researchers (2).

There is a developing literature examining a variety of methods to increase children's fruit and vegetable intake in school settings. These programs have generally shown modest short term positive effects limited to fruit and vegetable consumption at school (3). Despite program successes, vegetable intake among children continues to be significantly lower than recommended United States Department of Agriculture (USDA) guidelines (4).

This suggests that researchers and policymakers should work to develop strategies to specifically increase children's vegetable consumption. For example, the USDA Fresh Fruit and Vegetable Program (FFVP) allocates funding for selected schools in all fifty states to provide students with free fresh fruit and vegetable snacks outside of school lunch.

This study provides a brief review of key findings from our prior research evaluating the impact of the FFVP. We then highlight a variety of challenges and confounding issues that arise in conducting this type of research in partnership with schools and other researchers.

Based on these results and our experiences, we describe the planning process, study design, and research expectations for a new vegetable snack program evaluation in partnership with one Eau Claire area elementary school planned for 2016-17.

USDA FRESH FRUIT & VEGETABLE PROGRAM & PRIOR RESEARCH

Program History & Funding

- Pilot began in 2002
- Wisconsin added to pilot in 2006
- Program expanded nationwide in 2008
- Provides free fruit and vegetable snacks
- Outside school lunch program
- 3-4 days a week
- \$50-75 per student, per school year (5)
- United States FFVP Funding (6)
- 2009-10: \$65 million
- 2015-16: \$177 million
- Wisconsin FFVP Funding (7)
- 2009-10: \$1,314,593
- 2015-16: \$3,317,564

2008-09 FFVP Study

- 4 Western Wisconsin elementary schools
- 2 intervention (N=173) and 2 control (N=190)
- 4th and 5th grade students
- Pre-test/Post-test (self-report, DILQ)
- Measure change in fruit and vegetable intake
- Average daily fruit and vegetable intake (measured over 3 days)
- Fraction of students reporting average daily fruit and vegetable intake of ≤ 1.5 (Table 1)
- Program effect is limited
- Increased fruit/vegetable intake concentrated during morning snack period (free access)
- Fruits eaten more than vegetables

Survey	Intervention	Control
Pre-Test	0.670	0.497
Post-Test	0.316	0.525

2009-10 FFVP Study

- One Western Wisconsin school (N=68)
- 4th and 5th grade classrooms (2 classes in each grade)
- Free fruit and vegetable snacks served three days a week for afternoon snack
- Teacher observation of consumption (0, 1/4, 1/2, 3/4, 1)
- How many fruits and vegetables did students eat (Table 2)?
- Can students be incentivized to bring fruits and vegetables from home to eat for school snack (Tables 3 & 4)?
- Children eat served fruits and vegetables at high rate
- Children eat fruits more than vegetables
- Students can be incentivized to bring fruits and vegetables from home
- 1,019 fruit and vegetable items brought from home
- 877 fruits (86.1%) compared to 142 vegetables (13.9%)

	Fruit (66 Days)		Vegetable (29 Days)	
Variable	Mean	Std Dev	Mean	Std Dev
% Ate All	73.9%	10.7%	50.6%	14.9%
% Ate Half	10.5%	6.0%	10.2%	6.5%
% Tried	12.0%	7.6%	29.0%	12.2%
% Ate None	3.6%	3.3%	10.2%	6.7%

Item	# Times	% Fruit
Apple	298	34.0%
Orange	130	14.8%
Banana	107	12.2%
Grapes	59	6.7%
Tangerine	52	5.9%
Raisins	39	4.4%
Craisins	36	4.1%
Pear	21	2.4%
Mixed Fruit	20	2.3%
Strawberries	20	2.3%
Kiwi	17	1.9%
Watermelon	16	1.8%
Dried Apple	13	1.5%
Pineapple	9	1.0%
Applesauce	7	0.8%
Cantaloupe	6	0.7%
Peach	6	0.7%
Dried Pineapple	5	0.6%
Grapefruit	4	0.5%
Blueberries	3	0.3%
Dried Apricot	3	0.3%
Pomegranate	2	0.2%
Apricot	1	0.1%
Boysenberries	1	0.1%
Raspberries	1	0.1%
Rhubarb	1	0.1%

Item	# Times	% Vegetable
Carrots	94	66.2%
Cucumber	13	9.2%
Celery	8	5.6%
Broccoli	6	4.2%
Spinach	5	3.5%
Cauliflower	4	2.8%
Green Pepper	2	1.4%
Jicama	2	1.4%
Lettuce	2	1.4%
Peas	2	1.4%
Tomatoes	2	1.4%
Mixed Vegetables	1	0.7%
Radish	1	0.7%

RESEARCH PARTNERSHIPS & CHALLENGES

Washington State FFVP Evaluation

During the fall of 2015, a partnership was established with a professor in Washington State regarding a collaborative evaluation of the USDA FFVP in two elementary schools. The goal was to examine the impact of access, repeated exposure, encouragement and praise on the vegetable intake of students.

However, the following limitations were noted:

- Incorrect consumption data recording
- Failure to record data on planned days
- Teachers not performing encouragement praise
- Failure to serve snacks at planned times
- Food service serving different items than planned
- Long period between repeated exposures
- Communication delays

2016-17 ELEMENTARY SCHOOL VEGETABLE SNACK PROGRAM EVALUATION

2016-17 Wisconsin Vegetable Snack Program

Based on these challenges we decided to design and implement a vegetable snack program evaluation in partnership with an Eau Claire area elementary school.

Set-up

- Work closely with food service director, teachers and principal
- Everyone is a willing and enthusiastic participant
- Researchers control menu and timing of snacks
- Student researchers observe/record consumption data
- Research funds pay full program costs

Goals

- Increase vegetable consumption for elementary school snack
- Implement program in classrooms with highest teacher interest
- Provide children with free vegetable snacks
- Variety of delivery method conditions across classrooms
- Record consumption for repeated exposure of vegetables

- Three days a week for two months

Study Design

- Snacks prepared by food service staff
- Individual serving containers with children's lunch id#
- Student researchers have a list with student lunch id#
- Count vegetable not eaten and record intake
 - 0, 1/4, 1/2, 3/4, 1
- Aggregate classroom weight measure
 - Before serving and leftover
- Teacher provides snack with no encouragement/praise to try/taste/eat.
- Teacher actively encourages/praises to try/taste/eat
- Teacher adds extra activities related to eating vegetables
- Bring vegetable snacks from home
- 2 weeks, encourage/praise
- All intervention details determined with teacher input

Vegetable Snacks Served

- Mini carrots
- Cherry tomatoes
- Sliced peppers
- Eight times each

Research Expectations

- Highest consumption - Encouragement/Praise Plus condition
- Slightly lower consumption - Encouragement/Praise condition
- Significantly lower consumption - No Encouragement/Praise condition
- Higher consumption over time, especially for Encouragement/Praise and Encouragement/Praise Plus conditions
- Encouragement/Praise Plus students can be encouraged to bring vegetables from home to eat for school snack

Coordination and Planning

- Initial meeting went extremely well
- Food service director and principal excited
- Kindergarten, 1st grade, 2nd grade, 3rd grade
- 12 teachers, 3 classes each grade
- Approximately 25 students per class

Teacher Interest and Preferences

After being provided a complete description of the proposed vegetable snack program and different snack delivery conditions, teachers were surveyed to assess their interest in participating as well as their survey condition preference.

Figure 1

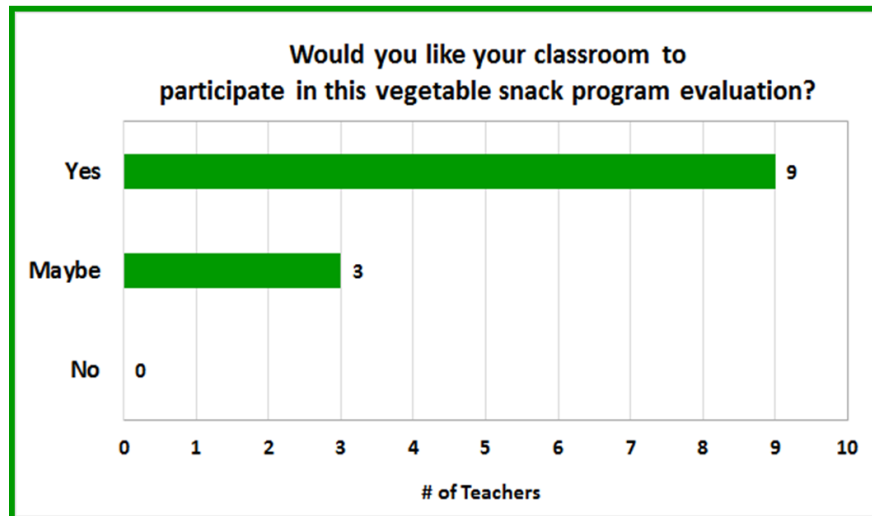
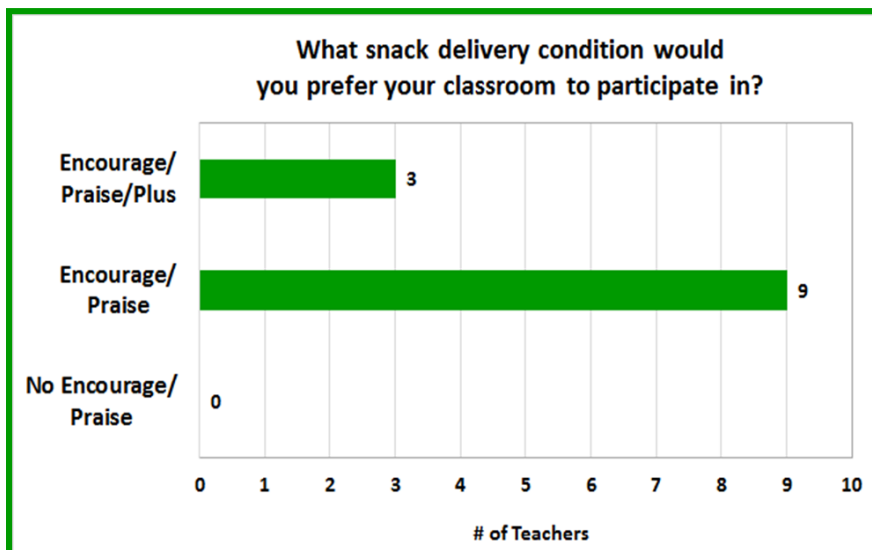


Figure 2



Conclusion & Discussion

This study provides motivation for increasing children's fruit and vegetable consumption as well as evidence of successful school-based programs designed to meet this goal through the USDA Fresh Fruit and Vegetable Program. Our past research shows that children will eat vegetables and especially fruits if they are served for free as snacks in school. However, these results also show that significantly more efforts need to be dedicated to increasing children's consumption of vegetables.

Our past experiences also show that designing and implementing such programs including research and evaluation components in partnership with schools and other researchers can be challenging as confounding issues arise.

Building on all of this, we present our current plan for working with one Eau Claire area elementary school to design and implement a successful evaluation of a vegetable snack program beginning in the fall of 2016. Two key components of our future partnership are significant advance planning and building a high level of interest and enthusiasm among the food service director, principal, and especially the teachers.

Additionally, by having student researchers perform the observation and recording of consumption data, and having research funds cover the entire monetary cost of the program, we have effectively reduced the school's cost of participation significantly.

Our hope is that this research project will provide valuable insights into practical applications that schools can use on their own as well as with other researchers to increase children's vegetable consumption. Our ultimate goal is to improve the eating habits and health and wellness of children both locally and nationally by informing the public discourse and influencing public policy to address this important issue.

Finally, this work serves as a model of excellence in student/faculty collaborative research and community partnership that should be recognized, celebrated, and shared with the entire University of Wisconsin-Eau Claire community and beyond.

