



Does Tasting Local Sweet Potatoes Increase the Likelihood of Selection by High School Students?

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ABSTRACT

Purpose/Objectives

Schools are offering more fruits and vegetables; yet consumption of fruits and vegetables among adolescents remains low. Many schools are implementing Farm-to-School programs to help generate excitement and increase selection of fruits and vegetables by students. The purpose of this research was to determine if a simple tasting with minimal marketing would increase selection of local sweet potatoes by high school students.

Methods

All students with access to the cafeteria were invited to taste the local sweet potatoes. Daily cafeteria production records were analyzed to compare selection of local sweet potatoes before, during, and after the tasting. Steamed carrots were used as a baseline to compare to the selection of sweet potatoes as they were the most comparable vegetable offered on the five week cycle menu. Counts and percents were reported on the servings of sweet potatoes taken vs offered at all three time points sweet potatoes were on the menu. Binomial tests of proportions were used to compare the sweet potato rates at the third time point to the overall carrot selection rate. Analysis was conducted using SAS v 9.4 with significance set at a p value of ≤ 0.05 .

Results

There was a significant difference in the proportion of sweet potatoes compared to carrots taken in week 1 ($p = .001$) and week 2 ($p = .002$) of tasting. However, after the tasting occurred, percentage of offered sweet potatoes taken (47%) nearly equaled the carrot servings taken (55%), and the difference was not significant.

Applications to School Nutrition Professionals

School nutrition professionals are given the task every school day to offer more fruits and vegetables that the students will actually choose for school lunch. It is a daunting task that can be frustrating. Many times vegetables are prepared and offered, but few are chosen. This research demonstrated that a simple tasting can significantly increase selection of vegetables in school lunch programs.

Keywords: farm; school; adolescents; vegetable; tasting

INTRODUCTION

Childhood obesity is at an all-time high, and much of the focus has been on the National School Lunch Program (NSLP). Research shows that the average student consumes an estimated 35% of daily calories at school; if the student eats both breakfast and lunch at school, it is estimated that closer to 47% of their daily caloric need are met at school (Gosliner, 2014). This creates an

opportunity for schools to help increase the selection/consumption of fruits and vegetables during school breakfast and lunch. The Healthy, Hunger-Free Kids Act of 2010 called for the largest makeover to school meals in 30 years. The NSLP now must offer more fruits, vegetables, whole grains, and lean proteins. Along with offering more healthy foods, school lunches must now be lower in sodium and offer fewer calories than previous guidelines. Even with schools offering more nutritious foods, it is estimated that only 5%-6% of adolescents meet the recommendations for fruit and vegetable intake, and more than half of the vegetables eaten are fried potatoes or tomato puree (Gosliner, 2014). According to the 2015 Dietary Guidelines for Americans (U.S. Department of Health and Human Services [USDHHS] & U.S. Department of Agriculture [USDA], 2016a), consumption of fruits and vegetables along with exercise and a healthy lifestyle can help maintain healthy weight. Knowing that fruit and vegetable consumption is so low among our adolescent population, many leaders in school food service are looking for answers on how to increase selection and consumption.

The Farm-to-School initiative is relatively new to the school lunch scene and is being examined as a possible way to increase selection of fruits and vegetables among school aged children. However, there has been little research on the effectiveness of product trials and sampling among high school students to increase selection of a local vegetable.

The school district for this study was in the development stage of their Farm-to-School efforts. The school district teamed with Saint Louis University to expand the Healthy Eating with Local Produce (H.E.L.P.) program (USDA, Office of Communications [OC], 2015f). Production records showed that when sweet potatoes were on the menu, very few servings were taken from the lunch line since students could choose the fruit offered that day and were not required to take the vegetable. This study was initiated to test whether something as simple as a tasting could increase selection of local sweet potatoes when offered on a school lunch menu.

METHODOLOGY

This descriptive study was conducted with students in a large urban school district. This study was determined to be exempt by Saint Louis University Institutional Review Board. There were 1,183 students at the selected high school. The vast majority of students (85.9%) were African American, and 7.7% were Caucasian (Missouri Department of Elementary and Secondary Education [DESE], 2015). The high school operates a 5 week cycle menu and participates in the Community Eligibility Provision (CEP) program through the Department of Elementary and Secondary Education (DESE). The CEP program allows school districts with high poverty rates the ability to offer all students in the school district breakfast and lunch at no cost. The urban school used in this study had a 64.2% free and reduced rate prior to participating in the CEP program (DESE, 2015). The participating high school was an offer vs. serve style program per school meal regulations. This means that students could choose a fruit or vegetable (or both) at lunch as part of the reimbursable meal.

The number of servings offered and the number of servings taken were obtained from production records for all weeks of the study. Prior to the tasting, local sweet potatoes were offered once on the lunch menu. In accordance with NSLP regulations, students are required to select at least one fruit or vegetable to make their meal reimbursable.

Two weeks later, the second time the sweet potatoes were served, the initial tasting took place. For the tasting, a table was set up at the entrance of the cafeteria. On this table was signage

promoting the tasting and samples. Staff that helped hand out samples encouraged students to try the local sweet potatoes as they passed the sampling table. Samples were provided in 2-ounce soufflé cups that were pre-portioned prior to the students entering the cafeteria. Students could taste the sweet potatoes as they entered the cafeteria or after they entered the line for lunch. All students who had access to the cafeteria were invited to taste the sweet potatoes. Two weeks later, sweet potatoes were offered again on the menu as a follow-up with no tasting provided and the number of servings taken versus offered was again recorded.

A week prior to each sweet potato day, steamed carrots were offered on the lunch menu. Steamed carrots were used as a baseline for comparison to the selection of sweet potatoes because they are both part of the red/orange vegetable category within the USDA's National School Lunch Program (NSLP) guidelines and are the most comparable vegetable offered. The number of servings of carrots taken from servings offered was obtained for each of the three weeks prior to the sweet potato offerings. These rates were averaged together and the result was used as a baseline for percent of red-orange vegetables taken.

Counts and percentages were reported on the servings of sweet potatoes taken vs offered at all three time points sweet potatoes were on the menu. Binomial tests of proportions were used to compare the sweet potato rates at the third time point to the overall carrot selection rate. Analysis was conducted in SAS v. 9.4 (Cary, NC) with significance set at a p value of ≤ 0.05 .

RESULTS

The urban school district participating in this study was a collaborator with Saint Louis University, Department of Nutrition and Dietetics' grant to implement a Farm-to-School program called Healthy Eating with Local Produce (H.E.L.P.) USDA-OC, 2015f). Through this program, high school students were hired to process local sweet potatoes into sweet potato coins to be used on the five week cycle menu that is used at all schools in the district (elementary, middle, and high). The goals of the program were to help increase selection/consumption of local produce by the students in the district, help strengthen local economy by increasing purchases of produce from local farmers, and to provide gainful employment to high school students.

The sweet potatoes used in this study were purchased from a farm located just 45 minutes from the school district. High school student employees went through a formal application and hiring process. The selected students were trained by Saint Louis University staff at a district kitchen where production took place. After enough servings were processed, the sweet potato coins were added to the menu as part of the five week cycle.

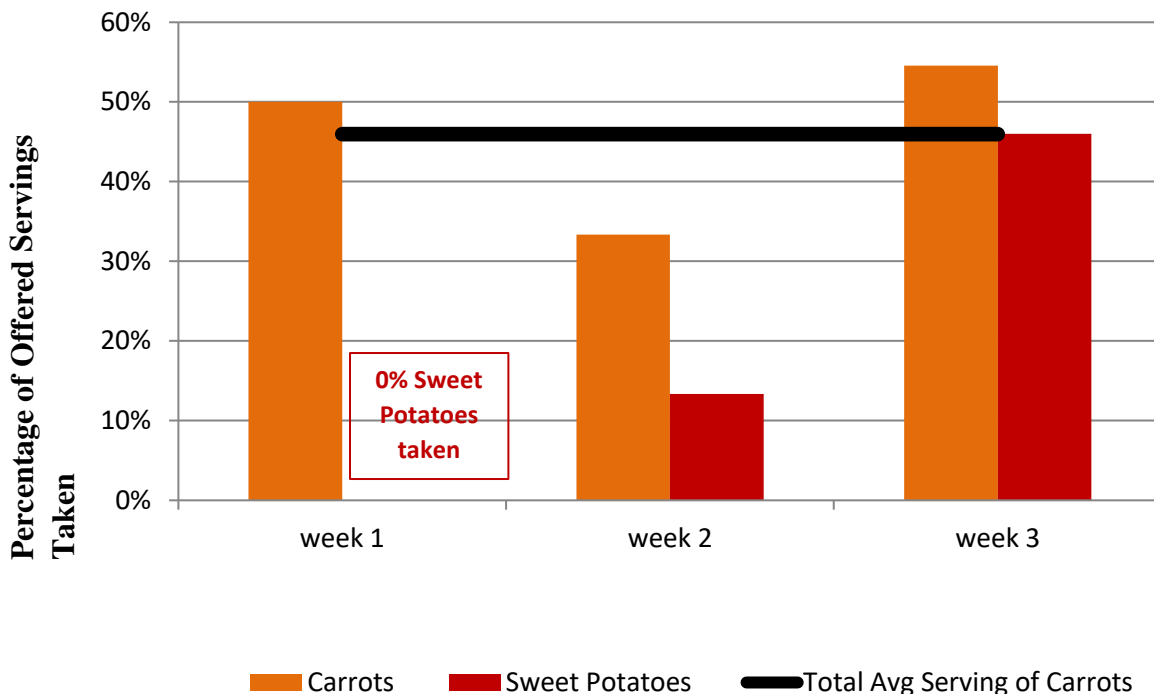
The present study explored the impact of tasting local sweet potatoes on the likelihood of selection by high school students in a large urban school district. Samples were offered to all students who had access to the cafeteria. There were 123, 2-ounce samples taken by students. The samples were set in a high traffic area where all students would have access to a sample. Minimal signage and marketing were used to promote the tasting. An offer versus serve program requires students, at a minimum, to take a full serving of a fruit or vegetable during lunch; however, they can choose to take both. The number of servings of sweet potatoes prepared by cafeteria staff was based on prior production records.

Table 1. Unsolicited Student Comments During Tasting of Sweet Potatoes.

Student	Student Comments
Student 1	“These sweet potatoes are awesome - have we really had these on the menu before?”
Student 2	“Hey, you really need to give these a try. They are actually pretty good” to another student leery about taking a sample.
Student 3	“I did not know sweet potatoes were so good for me.”
Student 4	“I did not know that these were coming from a local farm.”
Student 5	“I did not take a serving today because I already had a sample, I will be taking them the next time they are on the menu.”

Student comments were not solicited for this study; however, many students provided feedback about the samples. Please see Table 1 for student comments.

The first time sweet potatoes were offered on the menu, 36 servings were put on the service line, and 0 servings were taken. When steamed carrots were offered the following week, 36 servings were offered, and 12 servings were taken. The next time sweet potatoes were offered was the day the tasting occurred. This time, 30 servings were offered on the serving line, and 4 servings were taken. A week later when steamed carrots were offered again, 55 servings were offered, and 30 servings were taken. The following week (two weeks post tasting), sweet potatoes were offered on the menu. There were 50 servings of sweet potatoes offered on the serving line, and 24 servings were taken. The numbers of carrot and sweet potato servings taken were obtained from production records for the three respective dates.



*** $p \leq .001$

Figure 1. Comparison of Percentage of Servings of Carrots and Sweet Potatoes Selected by High School Students Before and After Tasting

A binomial test of proportions was used to compare the rate of sweet potato servings taken at the three time points to the average rate of steamed carrot servings taken. Steamed carrots were used as a baseline because students were familiar with the vegetable as it has historically been served by the school's lunch program. Another reason steamed carrots were chosen is because along with sweet potatoes, they are part of the red/orange vegetable sub group and met the same weekly requirement put forth by the NSLP (USDA, 2015e). At the end of the study (which was after the tasting occurred), results showed that 50%, 33%, 55%, and 50% of steamed carrot servings offered to students were taken in weeks one, two, three, and four respectively. The average percentage of offered servings taken for carrots was 55%. There was a statistical difference in the proportion of sweet potatoes compared to carrots taken in week 1 ($p=.001$) and week 2 ($p=.002$) of tasting. The percentage of offered sweet potato servings taken increased significantly from 0% in week one (before samples were offered) to 13% in week two (when samples were offered) and even further to 47% in week three (see Figure 1). By week three of the study (after the tasting occurred) the percentage of sweet potatoes taken nearly equaled the carrot servings taken (55%), and the difference was statistically non-significant.

DISCUSSION

Federal programs are increasing student exposure to fruits and vegetables, but expanded efforts are needed to get students to select and consume what is offered. Taste testing and the Farm-to-School initiative are being considered as a possible ways to increase consumption/selection of fruits and vegetables among school-aged children. In research conducted by Lakkakula et al. (2011) taste testing in an elementary setting showed a positive liking for targeted fruits and vegetables after an eight week period. This promising research, in an elementary setting, gave good cause to try sampling of a local vegetable in a high school setting to see if an increase in selection could be accomplished.

The Farm-to-School initiative has also shown promise to increase selection of locally grown fruits and vegetables by school age children. The National Farm-to-School Network (NFSN)(2015) is an information, advocacy and networking hub whose mission is to bring local food and agriculture into school systems. The NFSN states that Farm-to-School “empowers children and their families to make informed food choices while strengthening the local economy and contributing to communities”. Farm-to-school implementation can vary from location to location. According to NFSN, it includes at a minimum one of the following: “procurement, education, and school gardens”.

Taylor and Johnson (2013) reported that Farm-to-School programs may be especially effective at influencing dietary behavior because of the various settings and activities involved in a program that engage the students in many different ways (hands-on learning). Joshi, Azuma, and Feenstra (2008) showed that school lunch participation increased in schools that had farm to school programs. When school lunch participation increases, more revenue is generated for the school nutrition program, which can mean increased purchases of local produce.

CONCLUSIONS AND APPLICATION

This current descriptive study shows the positive impact a simple tasting can have on local vegetable selection at the high school level. As of 2010, 32% of American adolescents were obese or overweight (Ogden, 2015). According to the 2015-2020 Dietary Guidelines for Americans (USDHHS & USDA, 2016a), consumption of fruits and vegetables can help maintain

a healthy weight and lower risk for certain diseases. There is currently minimal research on methods that might increase total consumption of fruits and vegetables among the adolescent population in schools. The Farm-to-School program is a relatively new initiative with the goal of generating excitement around how fruits and vegetables are grown, why they are good for students, and what eating local means.

There are many more benefits of a Farm-to-School program in addition to increasing selection of locally grown produce (in this case, sweet potatoes). The Farm-to-School census data indicates that schools purchased nearly \$790 million in local food from farmers, ranchers, fishermen, food processors, and manufacturers in the 2013-2014 school year (USDA, 2015b) . This is a 105% increase over school year 2011-2012, when the first USDA Farm-to-School Census was conducted. According to Joshi and Beery (2007), direct sales from Farm-to-School programs have represented up to 5% of a farmer's income when that farmer sells to schools. Farmers state they make valuable connections with parents, teachers, and community members which can lead to more sales outside of the school (Joshi and Beery, 2007).

Application to School Nutrition Professionals

With the new school meal regulations in place, there is more demand on school nutrition professionals to accomplish more meal preparation in minimal time and on a stretched budget. There is also more focus on reducing food waste and making sure that students enjoy what is on the menu while offering what is required through the NSLP. The Farm-to-School Initiative can be a great way generate excitement around eating more fruits and vegetables. According to the USDA Farm-to-School Census, over the course of the 2013-14 school year, there was a 38% increase of community support for school meals, a 28% increase in the acceptance of the new school lunch regulations, a 21% decrease in school meal program costs, a 17% increase in participation in school meals, and an 18% reduction in food waste (USDA, 2015b.c.d).

For school nutrition professionals, a Farm-to-School program can mean a variety of things. Farm-to-School can mean purchasing local produce to be used on the school menu. This strengthens the local economy, provides a good price on produce which helps with an already tight budget, and provides an opportunity to teach students where their food comes from. Farm-to-School can also mean partnering with various individuals and students throughout the school to utilize produce that may be grown in a school garden.

School nutrition professionals need to be willing and ready to market their local produce, sample what is being offered, and increase awareness. This can be done through sampling what is being offered with students. Cafeteria staff can also increase awareness of what is on the menu by talking with students as they come through the line. This study demonstrates that simply exposing students to a local vegetable through a tasting in an urban school district increased selection. Future research could be conducted to see the impact of having a peer high school student, particularly one of those engaged in processing the vegetable, hand out the samples. According to Bruce et al. (2015), by early adolescence, youth are making an increasing number of their own food decisions and peers play an important role. With a student influencing peers during sampling, participation in sampling would increase. School nutrition professionals are busy, and fitting in a tasting on top of an already busy schedule is daunting. Using a high school student for the tasting could alleviate the staffing needed while adding positive peer pressure to try new and healthy options.

Implications for future research

The research presented in this article opens the door for future research. Since a positive increase in selection of local sweet potatoes resulted from a simple tasting, school nutrition professionals should consider how other marketing strategies might impact selection. Possible marketing strategies to be tested could be student-created public service messages during morning announcements. Testing could also be done on effectiveness of student driven tastings. Posters created by students could be hung throughout the school. Students could even invite the farmer who grew the sweet potatoes into the school for a question and answer period during lunch. Finally, analysis of cafeteria production records provides a simple mechanism to document changes (2 months, 6 months, possibly even a year post tasting) and sustainability of these strategies.

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