

Are Grocery Store Tours Capturing the Right Audience?

Characteristics of Students Who Volunteer to Receive a Grocery Store Tour

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Abstract

The goal of this research is to examine the demographics of students volunteering to receive a grocery store tour in order to assess if these students represent those most in need of the information. Dietetics students trained in giving grocery store tours through a Produce for Better Health grant provided store tours to college student volunteers, "tourists". Tourists provided demographic and health behavior data which was analyzed using descriptive statistics, ANOVA, t-tests, and chi-square. Twenty-three student trainees gave tours to 49 student tourists. Most tourists were female (77.8%), of healthy Body Mass Index (BMI) (64.9%), and reported being healthy eaters (47.3%). Results indicated that tourists who were not healthy eaters, did not cook daily, and were not likely to increase produce intake after the tour had higher BMI's. Few tourists were male, obese, or reported having less healthy eating habits. Future research should examine who is participating in store tours in order to optimize their impact on healthy eating and shopping habits by assuring recruitment of individuals most in need of the experience.

Keywords: college students, food preferences, nutrition, cooking, eating behavior, consumer

1. Introduction

With the exception of fruit intake among young children, fruit and vegetable intake is below recommended levels in all age and gender groups in the United States (United States Department of Agriculture & United States Department of Health and Human Services, 2015). Higher intakes of fruits and vegetables have been associated with lower Body Mass Index (BMI) (Azagba & Sharaf, 2012; te Velde, Twisk, & Brug, 2007; You & Choo, 2016) and energy intake, and can possibly facilitate weight loss, although not all research supports the effectiveness of this strategy (Kaiser et al., 2014; Mytton, Nnoaham, Eyles, Scarborough, & Ni Mhurchu, 2014). Public health objectives from Healthy People 2020, NWS 2.2, 14, 15, 15.1, and 15.2, address increasing the contribution of a variety of fruits and vegetables to the diets of all individuals over age 2 (United States Department of Health and Human Services, 2014). Additionally, the 2015 – 2020 Dietary Guidelines for Americans encourage changes in food environments that promote and increase access to healthy foods, including fruit and vegetables, and outreach programs designed to help consumers make healthier food choices (United States Department of Agriculture & United States Department of Health and Human Services, 2015).

One method of promoting healthy food purchases is grocery store tours. Store tours take place at the grocery store where tour participants' typically purchase food and involve a nutrition professional demonstrating how to identify and prepare healthy foods (Baic & Thompson, 2007). Grocery store tours are an important component of retail dietetics, a rapidly growing field, as 95% of grocery stores surveyed in 2015 by the Food Marketing Research Institute reported employing RDs at a corporate, regional, or local store site (Food Marketing Institute, 2015).

In response to the growing need for retail nutrition professionals and inadequate produce intake, The Produce for Better Health Foundation (PBH) partnered with retail dietitians to develop a grocery store tour training program for dietetics and nutrition students (Thompson, Silver, Pivonka, Gutschall, & McAnulty, 2015). The goal of this program is three-fold: increase dietetics and nutrition students' proficiency in giving produce-based grocery store tours, increase college student tourists exposure to various types of produce, and develop partnerships with grocers (Thompson et al., 2015). In an initial report of the grocery store tour training program effectiveness, Thompson et al (2015) found that 69% of the students receiving a store tour indicated they would definitely eat more fruits and vegetables, 50% had tasted a particular fruit or vegetable for the first time that day, and based on comments from post tour surveys, many were able to recall key messages presented on the tour.

The effectiveness of grocery store tours has only been examined in a few studies. The results of these studies have indicated some promise in regards to changes in knowledge (Reid, Molamphy, & O'Sullivan, 1999; Thompson et al., 2015), short term intake changes (Crawford & Kalina, 1993), and intention to increase variety of foods consumed especially produce (Milliron, Woolf, & Appelhans, 2012; Thompson et al., 2015), low fat dairy and whole grains (Crawford & Kalina, 1993). Interestingly, research has also indicated that while those participating in tours may purchase more fruit and vegetables, they do not decrease purchases or intake of foods high in total, saturated, and trans fats (Crawford & Kalina, 1993; Milliron et al., 2012). Studies examining the impact of grocery store tours encompass various populations from college students (Thompson et al., 2015) to those with medical conditions such as cardiovascular disease (Baic & Thompson, 2007). Some articles considered demographic variables, such as income, gender, race, BMI, and current dietary habits (Baic & Thompson, 2007), however, many only identify gender or race (Baic & Thompson, 2007; Reid et al., 1999; Thompson et al., 2015) or no demographic at all (Crawford & Kalina, 1993).

Demographic variables may have an impact on store tour participation and therefore, store tour effectiveness. The purpose of this study is to explore the demographic, as well as eating, cooking, and shopping characteristics of students volunteering to receive a grocery store tour ("tourists") from dietetics students trained as part of the PBH Foundation Grocery Store Tour Training Program. The intention of this study is to determine whether tourists are actually those most in need of the education, and the relationship between BMI and tourist characteristics. The theoretical basis of this research is founded in the Social Cognitive Theory. Other grocery store nutrition interventions are also designed using constructs of the Social Cognitive Theory (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008). As with other grocery store interventions, the purpose of the store tour is to educate tourists in their usual store environment with other shoppers in order to increase their confidence and ability to shop for healthy foods in the preferred shopping venue. The demographic variables considered could also act as confounding factors that may increase or decrease a tourists' ability or desire to learn new shopping behaviors.

2. Method

2.1 Background on the Training Program

This study was approved by the University's Institutional Review Board (HE16062). During the fall 2015 semester, students enrolled in Community Health and Nutrition Education Lab participated in the training program. Dietetics students who wished to participate and were not currently enrolled in the lab were invited as well. A total of 23 dietetics students were trained.

Two training sessions of three hours each were conducted. During the training sessions, Registered Dietitians (RDs) with extensive store tour experience taught dietetics student trainees about produce quality and pricing, and techniques for personalizing store tours for tourist groups. After the initial six hours of training, the student trainees were required to give two 1-hour store tours (each consisting of at least 1 tourist) to tourists recruited from university courses. The tours given by student trainees were supervised by the RDs who trained them.

2.2 Participant Selection

Volunteer student tourists were recruited from Nutrition Science, Wellness, and Family and Consumer Sciences Education courses. Nutrition Science and Wellness courses are large general education courses providing a recruiting base of 1000-1300 students from a variety of programs. Family and Consumer Sciences Education courses are small, consisting of students who are enrolled in a singular program. Students in Nutrition Science received 15 extra credit points for completing a store tour and writing a short paper on the experience. Students in the Wellness and Family and Consumer Sciences Education courses used the store tour as an alternative to meet required course objectives.

2.3 Tour Structure

Each student tourist scheduled a tour from a preset list of dates and times. In order to account for "no-shows", multiple tourists were assigned to tours. The goal was to teach at least 46 tourists (2 tourists for each dietetics student trained). Tourists were responsible for their transportation to one of two store sites. Once on-site, a student trainee provided a one-hour tour focusing on fresh, dried, canned, and frozen produce. Tourists were taught how to select, budget for, and incorporate produce into their diet. They were also provided with information on the health benefits of consuming produce. At the end of the tour, tourists and student trainees sampled a variety of fruits and vegetables together.

2.4 Data Collection Instruments

Prior to leaving the store, student trainees explained the research portion of the study to the tourists. Tourists were asked to complete two brief surveys, one that was developed and required by the grant funder and another short demographic survey developed by the researchers to collect information on BMI, age, major, living arrangements, and cooking habits. Tourists who did not wish to participate in the research portion of the study did not complete the demographic portion

of the survey. If tourists were willing to participate in the research study, they signed the informed consent and completed both surveys with the understanding that all survey data could be used for research. Surveys of those who did not wish to participate in the research were kept separate and were not used in data analysis.

Neither survey was pilot tested for this study. The survey required by PBH has been used in other store tour programs and previously published (Thompson et al., 2015). The second survey was designed to capture basic demographic data. Questions were selected from a survey developed for thesis research on cooking skills in college students (Kourajian, 2015).

2.5 Data Analysis

Descriptive statistics were used to classify tourists by gender, age, average BMI, BMI classification, major, living situation, number of servings of fruits and vegetables consumed daily, frequency of visits to the grocery store, and cooking frequency. Analysis of Variance (ANOVA) and 2-tailed independent samples t-tests were used to explore statistical differences in mean BMI by gender and various survey response categories. Chi-square tests were used to identify associations between gender and reported produce intake.

2.6 Limitations

There are several limitations to this study. This was a voluntary program and some student tourists were offered extra credit for participating. Therefore, the tours were likely to attract students not performing well in class or aiming for a higher grade, rather than those aiming to improve their health. Transportation may have limited participation for some tourists as the grocery stores were not within walking distance of campus. The sample is relatively homogeneous in many demographic variables. Students were mostly white, female, and in health related majors. This limits generalizability to any other group because students in health related majors may already have knowledge of and interest in healthy eating. Sample size may be another factor that influenced the results of this study. While 49 students is a relatively good number for participation, there were many survey questions with multiple response options. So many response categories only had a small number of tourists selecting them limiting the statistical significance of survey results. No follow-up data was gathered to determine if the tours did, in fact, promote any type of behavior change in the tourists.

3. Results

Twenty-three student trainees provided tours to 49 college student tourists. Forty-five of the 49 tourists (91.8%) agreed to participate in the research study, completing both surveys for data analysis. Demographic characteristics of tourists are listed in Table 1. Most tourists were 19 and 20 years of age (66.7%) with ages ranging from 18 to older than 24. Tourists were primarily female (77.8% or 35/45) and white (44/45 or 97.8%). The declared majors were Nursing (27/45), Exercise Science (7/45), Dietetics (6/45), or other (5/45) majors.

The average BMI of participants was $23.5 \pm 5.05 \text{ kg/m}^2$ ($n=37$). Almost 65% (24/37) of the tourists reported heights and weights indicative of a healthy BMI between 18.5 to 24.9 kg/m^2 (Centers for Disease Control and Prevention, 2015). Twenty-seven percent (10/37) were classified as overweight (BMI of 25 – 29.9 kg/m^2), 5.4% (2/37) were obese (BMI $>30 \text{ kg/m}^2$), and 2.7% (1/37) were underweight (BMI $<18.5 \text{ kg/m}^2$).

Over half (58%) of the tourists reported consuming only 1- 2 servings of produce a day. However, 73% of the tourists visited a grocery store 1- 2 times per week. Many tourists indicated that they did cook for themselves, and 60% indicated cooking 2 or more times per week.

Table 1. Demographic Characteristics of Student Tourists (n=45)

Demographic	n (%)
Gender	
Male	10 (22)
Female	35 (78)
Age (years)	
18	10 (22)
19	18 (40)
20	12 (27)
21	1 (2)
22	1 (2)
23	1 (2)
24	0
>24	2 (5)
Race	
White	44 (98)
African American	1 (2)
BMI (n = 37)	
Underweight	1 (3)
Healthy Weight	24 (65)
Overweight	10 (27)
Obese	2 (5)
Major	
Nursing	27 (60)
Exercise Science	7 (16)
Dietetics	6 (13)
Other	5 (11)
Living Arrangements	
Dorm	17 (38)
Campus apartment	1 (2)
Off campus alone in apartment	1 (2)
Off campus in apartment with others	23 (51)
At home with parents	5 (7)
Fruit/veg servings/day	
1	4 (9)
2	22 (49)
3-4	17 (38)
4-5	2 (4)
5+	0
Weekly visits to grocery store	
1	26 (58)
2	7 (15)
3-4	0
Other	12 (27)
Frequency of cooking for self	
Never	3 (7)
1 time/month	2 (4)
2-3 times/month	6 (13)
Weekly	7 (16)
2-4 times/week	9 (20)
4-6 times/week	11 (24)
Daily	7 (16)

Tables 2 and 3 compare survey responses with BMI of tourists. While none of the ANOVA (Table 2) or t-test (Table 3) results were significant for differences in BMI by survey response, there were notable trends. With regards to healthy eating, only two tourists reported they were not a healthy eater. The average BMI of these two tourists was 29.19 kg/m². This was much higher than that of those who indicated they may be or are a healthy eater (23.08 kg/m² and 23.46 kg/m² respectively). With regards to the number of times per week tourists cook, most response categories were associated with healthy BMIs. However, those who indicated cooking daily had an average BMI of 25.44 kg/m² (n = 6). Those who never cooked had the second highest BMI at 24.99 kg/m² (n=3). However, this is still within the healthy range.

Table 2. Comparison of differences in BMI by survey response

Question/Response (n)	Average BMI in kg/m ² (SD)	P-value
Daily serving of fruit and vegetables		
1 per day (4)		
2-3 per day (17)	20.4 (±13.97)	.64 (NS)
4-5 per day (15)	23.7 (±3.35)	
>5 per day (2)	24.0 (±2.80)	
	23.4 (±4.82)	
Cooking Frequency		
Never (3)	25.0 (±5.38)	.59 (NS)
Monthly (2)	21.4 (±0.14)	
2-3 times/month (4)	24.4 (±2.08)	
Weekly (5)	23.0 (±2.27)	
2-3 times/week (8)	20.5 (±8.87)	
4-6 times/week (10)	25.0 (±4.16)	
Daily (6)	25.4 (±2.04)	
Healthy Eater		
No (2)	29.2 (±2.83)	.26 (NS)
Maybe (18)	23.1 (±6.65)	
Yes (18)	23.5 (±2.58)	
Times per week grocery shopping		
1 (21)	24.0 (±2.71)	.27 (NS)
2-3 (7)	20.7 (±10.30)	
4-5 (0)	-----	
Other (10)	23.5 (±3.16)	

As shown in table 2, there were no significant differences in mean BMI by survey response option

*P < .05 considered significant

NS = not significant

Again, while not statistically significant, Table 3 also highlights some interesting trends. The average BMI between male and female tourists differed by almost 3 kg/m² [25.6 kg/m² for males (n=10) and 22.7 kg/m² for females (n = 28)]. When examining responses to whether the grocery store tour would impact fruit and vegetable intake, the BMI for those indicating “yes” (n = 29) was 22.98 kg/m² as compared to 25.01 kg/m² for those who indicated “maybe” (n =9). It is important to note that no one reported the grocery store tour would have no impact on produce consumption. There was no significant difference in average BMI between tourists tasting a fruit or vegetable for the first time (31/36 or 86.1% of tourists) and those who had already tasted all of the fruits and vegetables offered as samples.

Table 3. Independent samples t-test (2 – sided) of BMI by survey response

Question/ Response (n)	Average BMI in kg/m ² (SD)	P-value
Gender		
Male (10)	25.6 (±2.75)	.12 ⁺ (NS)
Female (28)	22.7 (±5.48)	
First time tasting one of the fruit/ vegetable samples		
No (5)	23.2 (±2.31)	.92 ⁺ (NS)
Yes (31)	23.3 (±5.41)	
Tour will make a difference in fruit and vegetable intake		
No(0)/Maybe (9)	25.0 (±3.90)	.30 ⁺ (NS)
Yes (29)	23.0 (±5.31)	

As seen in Table 3, there were no significant differences in mean BMI by survey response

⁺Equal variances assumed (Levine’s Test p > 0.05)

* P < 0.05 considered significant

Table 4 reports the results of chi-square analyses examining the association between gender and produce intake. As with the other results, no statistically significant associations were found. In order to examine whether male or female students were eating more produce prior to the store tour, produce intake was divided into two groups, those eating four or more servings of produce a day and those eating 3 or less servings per day. Three servings was chosen as the dividing point as it represents the median between the upper and lower ranges of intake. Male tourists were evenly distributed

between the two groups. Female tourists were split with 60% (21/35) eating ≤ 3 servings of produce per day and 40% (14/35) eating ≥ 4 servings a day. With regards to whether tourists tasted a type of produce for the first time during the taste test, 80% of male (8/10) and 84% of female tourists (27/32) reported they had tasted at least one fruit or vegetable for the first time.

Table 4. Chi-square results of produce intake by Gender

Dichotomous response	Gender		<i>P-value</i>	
	Male	Female	<i>2 - sided</i>	<i>1 - sided</i>
⁺ ≤ 3 servings per day	5	21	.720 (NS)	.416 (NS)
≥ 4 servings per day	5	14		
*Not first time tasting	2	5	1.00 (NS)	.539 (NS)
First time tasting	8	27		

As seen in Table 4, there were no significant differences by gender in the mean number of servings of produce per day and whether participants had tasted a fruit or vegetable for the first time.

⁺1 cell had an expected cell count of < 5 (4.22)

*1 cell had an expected cell count of < 5 (1.67)

* $P < 0.05$ considered significant

4. Discussion

Grocery store tours are commonly used to teach healthy eating and shopping habits to consumers. To be effective, store tour programs must attract a variety of individuals, especially those most at risk of poor eating and shopping habits. The results of this study illuminate interesting trends among the tourists participating in this program, and may indicate a need to examine these differences in future studies.

The program attracted more female than male tourists. A study in the United States designed to increase cooking frequency in college students found that four of 32 students attending a cooking demonstration were male (Levy & Auld, 2004). However, when the intervention included cooking equipment as an incentive and opportunities to cook, male participation increased to 12 (n=33) (Levy & Auld, 2004). The results of the U.S. college cooking study may support the need for male-targeted marketing. Male participation increased when the program focus shifted from demonstration to experiential learning (Levy & Auld, 2004). A heart healthy shopping program in the United Kingdom (UK) attracted equal numbers of men and women (Baic & Thompson, 2007). The researchers noted the novelty of this and attributed higher male participation to marketing strategies designed to attract men (Baic & Thompson, 2007). The researchers recommended marketing tours as “information gathering exercises” not shopping experiences. Programs may need to market tours as opportunities for “hands-on” experience with food selection and meal planning to attract male participants.

The low number of male tourists is concerning because the male tourists had the higher average BMI. When examining produce intake in male versus female tourists, chi-square analysis showed that, while not significant, a slightly larger proportion of men reported eating 3 or more servings of fruit and vegetables a day. This result seems counter intuitive since male tourists were more likely to be overweight; however, it could also indicate that male students who have higher BMIs are also eating more, and therefore consuming more fruits and vegetables. Another explanation may lie in the composition of the classes from which the male tourists were recruited. These classes were mostly wellness and nutrition classes, which tend to attract male students in Exercise Science majors or who participate in performance sports such as weight lifting and bodybuilding. These students may be more physically fit and conscious of their eating habits, and have a higher BMI related to increased muscle mass.

The daily intake of produce reported by male and female tourists does not illuminate the types of produce were consumed. Potatoes and tomatoes make up 39% of the vegetables consumed in the U.S. and lettuce and onions account for another 10% (United States Department of Agriculture & United States Department of Health and Human Services, 2015). Therefore, while produce consumption may have been higher among the men, it may have been very limited in variety and nutrient density. Future research should examine how much produce and what types of produce are consumed by male and female tourists before and after the tour.

The number of obese tourists in the study was very low. Only 37 of 45 tourists provided heights and weights, and of those, only 5.4% (2) were obese. The national obesity rate among 20 – 39 year olds was 30.3% in 2012 (Ogden, Carroll, Kit, & Flegal, 2014). The number of obese tourists is not congruent with the national average. It is possible that students not reporting a height and weight could have been obese, which would have increased the percentage of obese tourists. As most of the tourists were in health related majors, it is also possible that they were already practicing healthy eating habits. Regardless, as fruit and vegetable intake has been indicated as a component of obesity prevention and treatment

(Ledoux, Hingle, & Baranowski, 2011), participating in grocery store tours may be important for those who are obese. Additionally, tourists in this study who reported they were not healthy eaters ($n=2$) had a higher BMI than those selecting the options of “maybe” ($n=18$) or “yes” ($n=18$) (29.19 kg/m^2 vs. 23.08 kg/m^2 and 23.46 kg/m^2 , respectively). While there were only 2 tourists who stated they were not healthy eaters, their higher BMI may also indicate that overweight individuals feel they do not eat well and may benefit from the learning opportunities provided during a store tour.

A promising result of this program was that 86.1% of tourists tried a fruit or vegetable for the first time during the store tour. Tourists indicated the new foods they tried were chick peas (also called garbanzo beans), dried apricots, sun-dried tomatoes, edamame, mangos, and grapefruit. These are all nutrient dense foods that could make significant contributions to the diet. Trying a fruit or vegetable for the first time may be a powerful motivator for incorporating more foods into the diet, especially if a participant has food neophobia, the fear of unfamiliar foods. One of the goals of the grocery store program was to introduce students to a variety of produce and to encourage them to eat more produce. As 76.1% of the tourists indicated that the tour would influence their fruit and vegetable intake, it would seem the tour and taste tests had the desired effect.

It would be beneficial to know why people choose to participate in grocery store tours, and determine if store tours attract those who are interested in maintaining health, as opposed to improving it. Research has shown an inverse relationship between fruit and vegetable intake and BMI (Azagba & Sharaf, 2012; te Velde et al., 2007; You & Choo, 2016), so fruit and vegetable intake may be an important component in preventing obesity, not just treating it. As grocery store tours are general nutrition education strategies, weight maintenance and obesity prevention may be important objectives for these programs. Additionally, some research suggests that the protective effects of produce on obesity are more pronounced in women than in men (You & Choo, 2016). Therefore, women may benefit more from a store tour aimed at increasing produce intake. In this case, our program may have attracted exactly who would benefit most, healthy weight women interested in maintaining their weight.

5. Conclusion

Grocery store tours are opportunities to learn important shopping, cooking, and healthy eating skills. In order to maximize effectiveness, store tours must attract consumers in need of the information. This study of college student tourists found that a majority of tourists were female, healthy eaters with a healthy BMI. Participation was low among college students who were obese, unhealthy eaters and male. In order to reach a larger audience, store tours may need to make specific marketing efforts toward these groups. Men may be more likely to participate in tours marketed as experiential learning with incentives for participants. Taste tests were an important component of this tour as many student tourists indicated they tried a new fruit or vegetable during the taste test. Overall, 76% of college student tourists indicated the tour and taste test would influence their produce intake. Future research should expand on identifying who is participating in store tours, their health goals, how the tour met their goals, and how to increase participation in underrepresented groups.

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