

PRODUCE SALES COMPARISON DURING A SHELF  
TALKER ADVERTISING CAMPAIGN IN SAN LUIS  
OBISPO COUNTY GROCERY STORES

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CAMPAIGN IN SAN LUIS OBISPO COUNTY GROCERY STORES

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## ABSTRACT

This consumer study was conducted to assess how effective shelf talker advertisements with nutrition related health claims are at selling fresh produce. Background research was conducted to determine the appropriate displays and FDA defined label claims. The study posted visually appealing shelf talker advertisements next to their respective produce item and compared the recorded sales a week prior to the advertising campaign to the following week with advertisements. Two separate observation periods were conducted at Spencer's San Luis Obispo and Arroyo Grande locations after the first period in June 2011 produced a surprisingly small amount of statistically significant data. The study ended with eleven produce items' unit sales results with and without shelf talker advertisements from both Spencer's locations after two strong, but unsuccessful attempts to positively influence produce sales from a statistically significant standpoint.

The data for each location was entered into a Microsoft Excel spreadsheet to run paired t-tests for means. The results for each store communicated similar analysis to the basic sales data comparisons, which lead to rejecting the study's proposed hypothesis that sales would increase during the second week of the study with advertising. Despite unfavorable results, this study can be used as a guide for future studies assessing consumer responses to different types of FDA nutritional claims as well as a reference to how custom produce displays and product placement in grocery stores can influence consumer purchasing behaviors.

## TABLE OF CONTENTS

<b>Chapter</b>	<b>Page</b>
I. INTRODUCTION.....	5
Problem Statement.....	5
Hypothesis.....	6
Objectives.....	6
Justification.....	6
II. REVIEW OF LITERATURE.....	8
Point of Purchase Displays.....	8
Label Claims.....	8
Spencer’s Fresh Market.....	11
Scanner Data.....	12
ANOVA Analysis.....	12
III. METHODOLOGY.....	17
Procedures for Data Collection.....	17
Procedures for Data Analysis.....	19
Assumptions.....	23
Limitations.....	23
IV. DEVELOPMENT OF THE STUDY.....	24
Problems with Data Collection.....	24
Analysis.....	25
V. SUMMARY, CONCLUSIONS, and RECOMMENDATIONS.....	28
Summary.....	28
Conclusions.....	29
Recommendations.....	29
VI. References Cited.....	33
VII. Appendices.....	36

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1 Spencer's Market Sales Experiment Results - San Luis Obispo and Arroyo Grande.....	42
2 Bar Graph of San Luis Obispo Store Sales Results.....	43
3 Bar Graph of Arroyo Grande Store Sales Results.....	44
4 San Luis Obispo Location's Paired t-Test for Means Analysis.....	45
5 Arroyo Grande Location's Paired t-Test for Means Analysis.....	46

## CHAPTER 1

### INTRODUCTION

There is something to be said for the vast, but overwhelming fresh produce sections in United States grocery stores, especially in heavily agriculture based California. Nutritionally savvy consumers who are educated in nutrition and the endless health benefits of fruits and vegetables may see this as a blessing, but for many consumers they may be left overwhelmed, searching for something more convenient to eat. Grocery stores that specialize in fresh produce are focused on marketing the farming practices, origin of crop, and flavor characteristics of their produce, but seem to leave out the nutrition benefits of many of the most nutrient dense foods on the planet. By reviewing the nutrient claims the FDA allows on food labels as well as consumer receptiveness toward each claim, it can help shape an experiment focused on increasing grocery stores' fresh produce sales by properly displaying advertising promoting nutritional benefits on eleven produce items.

#### Problem Statement

Can educating consumers with graphically pleasing advertisement flyers emphasizing health content and function claims of eleven seasonally available fresh produce items increase two local, San Luis Obispo county, grocery store's sales of those items over a two week sales unit comparison?

## Hypothesis

Graphically pleasing shelf talker displays emphasizing health content and structure claims of eleven seasonally available fresh produce items will increase unit sales of those advertised items compared to the prior week without advertisements at two local San Luis Obispo county grocery stores. The alternative hypothesis is represented as:

$$\mathbf{H_A: D_{PA} < D_{WA}}$$

## Objectives

- 1) To track the unit sales of eleven seasonal fresh produce items before and after a weeklong advertising campaign.
- 2) To measure the statistical significance advertising health structure and function claims have on sales of eleven advertised seasonal produce items.
- 3) To measure the statistical significance of advertising health structure and function claims on eleven seasonal produce items in San Luis Obispo compared to Arroyo Grande Spencer's Market locations.
- 4) To recommend grocery store nutritional advertising strategies based on analysis results.

## Justification

With the constantly increasing United States obesity trends, a more health conscious lifestyle is gaining popularity. Numerous studies conducted on food consumers' responses toward health label claims in the 1990s and early 2000s may have less meaning as the average American consumer's health goals have shifted dramatically over the last five years (Kozup 2003). While many food marketers look to use health

claims to make general appeals to nutrition as disease prevention, consumers are increasing their knowledge of Nutrition Fact panels and becoming more concerned with exaggerated disease prevention health claims (Kozup 2003). As a result, this study will take an alternate approach of using point of purchase shelf talker displays to educate San Luis Obispo county shoppers at Spencer's Fresh Market's San Luis Obispo and Arroyo Grande locations on eleven produce items' nutritional content and their related bodily functions. By educating consumers who would like to be health conscious, but lack the nutritional knowledge to do so, Spencer's produce shoppers can gain nutritional insight from the shopping experience and feel confident in the functions of their healthy produce purchases. Statistically testing the significance of sales units of these eleven advertised produce items a week prior to the shelf talker advertising campaign and during the week of advertising, conclusions can be made as to the effectiveness of shelf talkers promoting health content and function claims.



## CHAPTER 2

### REVIEW OF LITERATURE

#### Point of Purchase Displays

In the retail shopping environment, there are a number of displays in which retailers use to advertise to consumers within their stores. These displays are referred to as point of purchase displays (POP) which can include displays, signs, more formal structures, and technological devices. For the purpose of this study, which focuses on grocery stores, typical POP displays are end of aisle displays, front of store displays, or shelf talkers next to their designated food item. This study will use shelf talker POP displays on their designated produce display to communicate notable nutritional content and their related health claims in a graphically appealing manner (Blattberg 1990). While POP displays have been experiencing enormous growth in the last decade, a study in 1982 noted no clear sales volume changes when promoting qualified health claims (Jeffrey 1982). Despite these dated results, the study concluded that awareness and in store education information should relate to stores with customers interested in health and nutrition (Jeffrey 1982). Since Jeffrey's study's completion and new demand preferences of the 21<sup>st</sup> century, consumers have accepted recent trends to become more health conscious and may now respond more positively to encouraging health content and health claims as shelf taker POP displays.

#### Label Claims

For all food manufacturers, marketing plays an essential role in increasing consumers' likelihood toward purchasing a particular product if the marketing appeals to that particular

consumer. Whether marketers do so through coupons, advertising, discount sales, or simply educating the consumer on the products benefits, there is a notable incentive to increase consumers' specific purchasing desires.

Labeling statements on a product's packaging can provide a method of advertising as well as educating consumers on the benefits of a product. Label advertising is much more prevalent in processed foods where the company has developed a product and has an invested interest in marketing the product to sell it to its fullest potential. This is still the case in a commodity product like fresh produce where the goal is to sell as much as the supply permits, but the lack of a unified company supporting and funding the marketing of a particular commodity creates a lack of advertising. Grocery stores engaging in the final retail sales of produce may also have a desire to promote products that lack advertising or high sales volumes.

The Nutrition Labeling and Education Act passed by the FDA in 1990 and the FDA Modernization Act in 1997 promoted a number of studies as to what effects food label information has on consumption patterns (Muth 2009). These acts required a Nutrition Facts label on all food products while allowing additional statements to be displayed on packages that emphasize nutrient content, health claims, organic labeling, or custom developed advertising phrases by the products manufacturer (Bond 2007). The FDA has approved a number of general qualified health claims which serve to promote a products' ability to reduce ones risk of certain disease (Summary 2011). They have also approved nutrient content claims that allow manufacturers to promote a products content of a particular nutrient (Food 2011). Lastly, the USDA has included structure and function claims that specifically reference the product's nutrient content and their benefit in the body (Food 2011).

For the most part all label claims look to promote benefits the average consumer would most likely be unaware of if the label was not present on the package. A study by Kim, Nayga, and Capps in 2000 highlights health claims as providing the greatest diet quality improvement compared to nutritional panels, nutrient claims, and lists of ingredients (Kim 2000). Several other studies have looked into educational demographics and consumers' use of nutritional labels to conclude that people with interest in a particular product category are the most likely to pursue the labeled health benefit (Muth 2009). A study by Roe, Levy, and Derby found that health and nutrient content claims gave consumers a more positive opinion of a product than products with information only on the Nutrition Facts label (Roe 2009). Essentially, the inclusion of labeled health and function claims on the front of packaging encouraged consumers to habitually favor front of package health claims instead of the Nutritional Facts panel when examining other products.

The referenced studies above can assist this particular study's methodology for collecting data with the properly appealing advertising signs. Given Roe, Levy, and Derby's more recent findings of nutrient content claims contributing a more positive opinion of these products compared to those displaying only a Nutritional Facts label, this study's shelf talker display advertisements will look to emphasize nutrient content and health function claims of eleven fresh produce items to gauge current nutritional advertising effectiveness toward San Luis Obispo County produce consumers. An updated look at the effectiveness of advertising nutrient content and health function claims will provide interesting insight as consumers continue to increase their nutritional facts panel knowledge and health concerns while becoming more weary of exaggerated health claims (Kozup 2003).

### Spencer's Fresh Market

Spencer's Fresh Market is a grocery store chain with five locations on California's Central Coast. The grocery chain was founded by John Spencer, a Cal Poly alum, and has become an involved member of the San Luis Obispo county and Santa Maria community. Spencer's prides itself on supplying a majority of local products, so much so that they have coined the slogan "Local, it's our culture." As a result, Spencer's has chosen to carry a number of Cal Poly food products, as well as constantly opening its doors for Cal Poly sponsorships and Agribusiness consumer research.

Spencer's community involvement and consistent support for Cal Poly made them the first choice for conducting a local advertising experiment. This provided a great fit as Bob Boyd, Produce Department Manager for Spencer's five locations, was quite interested in helping with a Cal Poly senior project as well as promoting the nutritional benefits of produce in his stores. Bob suggested conducting the experiment at the San Luis Obispo and Arroyo Grande locations as the two stores on average sell the most produce of the five locations. Mr. Boyd also noted that the San Luis Obispo store is the only Spencer's location whose produce department averages higher sales revenue than the meat department, possibly due to a greater number of health conscious shoppers in the area (Boyd 2011). The high amount of health conscious shoppers may be contributed to the year 2009 estimate of 65% of San Luis Obispo city's population over 25 years old having completed some amount of college or more which may have exposed the more health conscious to develop more educated, nutrient-rich eating habits (San Luis Obispo 2011). The potential for analysis looks promising with 2011 city populations of 44,948 in San Luis Obispo and 17,145 in Arroyo Grande ranking them the second and fourth most populated cities with Spencer's locations (San Luis Obispo 2011).

### Scanner Data

Retail scanners are a means for retailers to easily charge and merchandise inventory at a given retailer. By using a UPC scanner code located on a product or a tag attached to the product, each purchase is recorded in a computer data base where it can be used for a variety of reasons. Typically, retailers use the databases for inventory management, comparing product performance, or in this study's case; as experimental data assessing the sales performance of produce supplemented with shelf talker display advertisements. A survey in 1995 of retailers showed that about 38% were using scanner data to measure the effectiveness of in-store POP advertising on advertised product sales performance (P-O-P 1996). Spencer's Fresh Markets agreed to provide scanner recorded sales units for White Onions, Kale, Cauliflower, Blackberries, and Eggplants in both their San Luis Obispo and Arroyo Grande stores for a fourteen day period of June 13<sup>th</sup> to 26<sup>th</sup> to analyze the statistical significance of the mean sales unit over a period before and after a shelf talker advertisement is displayed on each of the produce items.

### ANOVA Analysis

ANOVA analysis is intended to statistically test a hypothesis on economic theory, describe an economic situation, or forecast uncertain economic activities. The first steps in establishing a scenario for economic analysis consist of specifying the relationship to analyze, collecting the necessary data for analysis, and running an ANOVA analysis to prove the amount of statistical significance of the hypothesized relationship. Many economic experiments do not use data obtained specifically for their experiment, so this data is called non-experimental data (De Veaux 2009). Non-experimental data includes times series data collected over specific time intervals, cross-sectionals collect data from a number of units over a period of time, and panel-

data covers a specific unit over an extended period of time (De Veaux 2009). The focus of this study is on non-experimental data in the time series form due to the established time period for data collection using data of unit sales which are not specifically collected for the experimental purposes, but regardless are useful in qualifying the advertising experiment.

Once the independent and dependent variables are defined, ANOVA analysis is used to explain the statistical significance of changes over time in the dependent variable in relation to the changes in the independent variable. For this study's purposes, the dependent variable is defined as a specific produce items sales data during the second week of the study, which should be influenced by shelf talker nutritional advertisements. Therefore the independent variable is defined as a specific produce item's sales during the first week of the study without influence of shelf talker advertisements, making it independent.

After the study's fourteen days are complete, the defined independent or Y variable is compared to dependent or X variable by running an ANOVA analysis to create statistical paired t-tests and independent t-tests. To test the statistical significance between produce item sales before and after shelf talker advertisements, a paired t-test is required because the two variables sets are tested under very similar conditions, so their data samples correlate without substantial variation (Anderson 2011). Testing the differences between the two stores requires an independent t-test because the two stores are independent locations and therefore have numerous unknown factors affecting the relationship between the two data sets (Anderson 2011). This test also becomes a two-tailed test instead of a one-tailed test for the paired t-test because two tailed tests can determine an increase, decrease, or change in the differences rather than a pre-established hypothesis of a proposed increase or decrease in the difference. The two tailed test is useful in this situation where the comparison of the two stores could produce results not

hypothesized specifically as an increase or a decrease in sales dollars of one of the locations (Anderson 2011).

The paired t-test will look to analyze the significance of the mean differences in the values of the sales units over week one of the experiment compared to week two. A null hypothesis must be defined to conclude if the difference between the means of sales units from week one versus two is zero, there exists no relationship between sales units with and without shelf talker advertisement displays. A t-statistic must be calculated and compared to the data's correct tabled t distribution to reject the null hypothesis based on whether or not the t-stat is greater than the tabled value (Anderson 2011). A p-value is calculated as a result of the t-statistic's conclusion to calculate the specific percentage probability that the defined null hypothesis is correct (Anderson 2011). To conclude statistical significance, most statisticians look for a p-value of below .05 (Anderson 2011). By concluding that the null hypothesis has only a five percent probability of being possible, the alternative hypothesis proves at a probability of 95 percent, that the mean differences between sales units was significantly higher with shelf talker advertisements during the second week of the experiment.

The second test will compare the mean sales units of the six produce items over the fourteen day period in a two tailed independent t-test at the San Luis Obispo store location compared to the Arroyo Grande location. A null hypothesis is still defined to conclude the difference between the means of sales units from the San Luis Obispo location versus Arroyo Grande is zero meaning the two location means are equal. If there is no difference between the mean sales at the two locations, no independent relationship exists between sales units at San Luis Obispo and Arroyo Grande locations. The two tailed tests requires a less specific alternate hypothesis stating the sales units means in San Luis Obispo are not equal to sales dollar means in

Arroyo Grande, so there could be an independent relationship between store locations (Anderson 2011). The null and alternative hypotheses for the two tailed independent t-test of Spencer's locations is represented as: **HO**:  $D_{SL} = D_{AG}$  and **HA**:  $D_{SL} \neq D_{AG}$

Once the hypotheses are clearly defined, the t-stat and p-values are calculated to reject the null hypothesis based on the mean differences in the two locations advertised produce sales. After the t-stat has rejected or failed to reject the null hypothesis, the statistical significance of the data can be concluded with a p-value of below .05 (Anderson 2011). By concluding that the null hypothesis has only a five percent or less probability of being correct, the alternative hypothesis proves at a 95 percent probability that the mean differences between sales dollars at the San Luis Obispo location was significantly higher or lower with shelf talker advertisements during the second week compared to Arroyo Grande's sales dollars.

A study by Reicks, Splett, and Fishman was successful in using ANOVA analysis with paired t-tests on grocery store mean sales dollars with and without POP advertisement displays. Reicks, Splett, and Fishman's study concluded their hypothesis that POP displays promoting organic products had an impact on consumer purchases, especially at more up-scale, health conscious stores (Reicks 1997). A Cal Poly Senior project completed by Jacqueline de Figueiredo in 2010 also uses ANOVA analysis but with independent t-tests to draw similar conclusions. In de Figueiredo's study, she compared the varying prices of five produce items at several farmers markets and grocery stores over eight weeks with a compiled mean of grocery stores versus farmer's markets price differences to conclude that farmers markets are cheaper overall (de Figueiredo 2010). Figueiredo's success in validating her hypothesis with independent t-tests can apply similarly to this study. Rather than gathering time series price data, this study will focus on Spencer's Markets unit sales as the time series data over two weeks. These



examples of reaching successfully hypothesized conclusions with ANOVA analysis in the form of paired and independent t-tests provides assurance when applying the same type of analysis toward this particular study's data collection.

## CHAPTER 3

### METHODOLOGY

#### Procedures for Data Collection

The procedures for data collection of this study involve collecting scanner sales unit data at Spencer's Fresh Market in the San Luis Obispo and Arroyo Grande locations in San Luis Obispo County, California. The scanner data will compile the location collected, date collected, and number of units sold of White Onions, Kale, Blackberries, Cauliflower, and Eggplants available during the summer from June 13<sup>th</sup> through June 26<sup>th</sup> 2011. These dates were chosen in coordination with Bob Boyd to avoid fluctuating demands from students leaving town for the summer as well as the 4<sup>th</sup> of July holiday. The experiment will not advertise the five produce items during the week of June 13<sup>th</sup>. On June 20<sup>th</sup>, the shelf talker advertisements are introduced as the dependent variable for the second week of data collection. This study will look to assess whether or not consumers respond positively toward nutritional education advertising by comparing the number of produce units sold when exposed to shelf talker displays versus the week prior with no exposure to advertisements.

Correspondence with the produce manager is essential for ensuring an effective, unbiased experimental study. With consultation of the produce manager, the advertised produce items should be carefully selected as to avoid an item being placed on a weekly sale or during a period of excessively high demand. Choosing products without an increasing demand will ensure the experiment is measuring the effect of the nutritional advertising campaign rather than biased

variables. Displaying advertisements in a noticeable manner will also help ensure the full effect of the display is being assessed through the data. It is very important to obtain the produce manager's approval to display the advertisements in a non obstructive, but visually noticeable area on the display, preferably at eye level. When possible, an advertisement holder should be used to incorporate the ad into the center of the display itself to draw the shopper's attention toward the information provided. Spencer's has approved a 7 inch by 11 inch size fliers to hang above displays and inside Spencer's advertisement holders on displays. By insuring the advertised material is noticeable as well as unbiased by other factors affecting consumer purchasing decisions, the study's experimental data is more focused on the advertisements affects.

To make a promotional display appealing and beneficial for the consumer, consulting an art or graphic designer for professional advice on visually pleasing colors and typography styles appealing toward a middle aged consumer shopping at Spencer's is useful. The advertisements must include large and clearly visible photos and advertised health content and function claims relevant to the promoted produce item. In choosing specific claim types to advertise nutritional benefits of produce items, the study will base promoting health claims on Roe, Levy, and Derby's findings mentioned in the Review of Literature. Roe, Levy, and Derby's recent findings of products advertised with nutrient content claims lead to a more positive consumer opinion of these products compared to those displaying only a Nutritional Facts label. Shelf talker advertisements will include one health content claim and two to three nutrient function claims to educate the consumer on the beneficial content and its related health function in the body. An example of shelf talker advertisement displays and health claims used for Spinach and Cherries are located in Appendix I and II.

From a nutritional analysis of the produce item's vitamin and mineral content according to their corresponding recommended daily value percentage, health claims emphasizing nutrients with significant daily percentages are constructed. Nutrition.self.com provides detailed nutritional content break downs and the related daily value percentage for thousands of prepared and unprepared foods useful for promoting Spinach and Cherries (Self Magazine). Next, a description is created based on the high valued nutrient's function in two to three quick and comprehensible health content and function claims. For cherries, the advertisement can state "Good source of Vitamin C and Fiber" as a health content claim. To back up the nutritional health content of cherries with educational insight, two additional points can include health function claims including "Promotes a strong and health immune system" and "Improves digestive function." These simple, but useful claims allow the consumer to quickly read through three claims; assess their desire toward obtaining the mentioned health function benefits; and make a quick, educated decision on buying cherries at that display or in the future.

#### Procedures for Data Analysis

The scanner data results will be inputted and analyzed in a Microsoft Excel spreadsheet. The first part of data analysis will create a bar graph with the data, visually displaying the general relationship between the advertised produce items before and during the health advertising campaign. Once the general relationship is laid out, an ANOVA analysis with a paired t-test will be run to identify statistically significant differences in the mean sales units of the six advertised produce items before and during the nutrition claim advertising campaign. After that relationship is analyzed, a secondary relationship will use a two tailed independent t-tests to analyze the advertising campaign's effectiveness in Spencer's San Luis Obispo location compared to their Arroyo Grande location.

The bar graph for visual relationship analysis can be quickly created in Excel with the properly formatted data. This is accomplished by laying out the data of each produce item for the seven days prior to nutrition promotion as a dependent variable, or the Y variable, and data collected during the seven days of nutrition promotion as the independent variable, or the X variable. After doing so, creating the graph should only require highlighting the two variable columns for each of the six produce items and selecting to insert a clustered bar graph from the main menu ribbon. The clustered bar graph from the data set should allow for a quick, visual analysis of the impact of the advertising campaign displayed by the second of the two bars.

The next step is to analyze the paired t-test relationship between each produce item's sales the week prior to shelf talker advertisement and during the week of advertising. To do so, the t-stat must be calculated to reject or fail to reject the null hypothesis. The t-statistic is calculated by dividing the standard deviation differences of produce sales dollars before and after advertising nutrient content by the square root of the count of sales units during the two week experiment. Once calculated, the mean difference in sales dollars with and without promotion is divided by the previous calculation to determine the t-stat (De Veaux 2009). The calculated t-stat is then compared to a t-stat distribution table to determine if the t-stat is greater than or equal to the tabled value. Tabled values are typically defined based on a 95 percentile confidence level and a degree of freedom (De Veaux 2009). Degrees of freedom are calculated by taking the number of sales units during the observation period and subtracting two to account for the dependent intercept Y and the second independent variable resulting from produce advertisements. If the determined t-stat is greater than or equal to the tabled value according to its related degree of freedom, then the null hypothesis can be rejected at a 95 percent confidence level.

To establish the paired t-tests specific statistical significance, the t-stat must be used to calculate the p-value's exact significance. The p-value is calculated by running a t-dist function in Excel which requires the absolute value of the t-stat followed by the number of degrees of freedom referenced in the t-stat value table and lastly the number one for the one tailed test the distribution is running. This Excel calculation will generate an accurate p-value to assess exactly what statistical significance the alternative hypothesis is approved by. After the p-value is determined, the null hypothesis is rejected when stating no difference between mean differences of Spencer's sales dollars on a specific produce item before advertising displays as well as during the shelf talker advertising campaign at a 95 percent confidence level. The alternative hypothesis stating an increase in sales dollar mean differences during the advertising campaign's second week of nutritional shelf talker advertisements therefore fails to be rejected at a 95 percent or higher confidence level.

Running the two tailed independent t-test analysis to test for significance between advertised sales dollars at Spencer's San Luis Obispo versus Arroyo Grande location will follow similar steps as the paired t-test with the exception of a few changes for completing a two tailed test. Similar to the paired t-test, the t-stat is the first statistic to calculate. The t-stat is calculated the same way as above except for using a less specific, 90 percent confidence percentile on the t-distribution value table because the two tailed test analyzes both tails of the distribution curve (De Veaux 2009). This can also be looked at as splitting the remaining unconfident percent of 10 in half as it covers the highest and lowest five percentiles on the 100 percentile distribution curve. If the calculated t-stat is greater than or equal to the selected t distribution chart value based on the correct degrees of freedom at a 90 percentile confidence interval, the null hypothesis stating equal mean differences between produce advertising sales at Spencer's San

Luis Obispo and Arroyo Grande locations is rejected. In other words, the analysis fails to reject the alternative hypothesis stating unequal mean differences in produce advertising sales at both tested Spencer's locations at the 90 percent confidence interval.

Calculating the specific confidence level of the p-value, requires the same process for the paired t-test stated above except for analyzing based on a two tailed test. This requires the same t-dist function command in Excel with the absolute value of the t-stat, the same degree of freedom referenced in the t distribution value table, but the last item requires a two for testing a two tailed distribution. The function outputs an accurate p-value for specifically evaluating up to what confidence level the alternate hypothesis is proven. A p-value of .02 will prove that at a 98 percent confidence interval, the San Luis Obispo location had higher mean sales dollars of the study's advertised produce items than the Arroyo Grande store or vice versa, depending on what the data forecasts.

By rejecting the null hypothesis and failing to reject the study's alternate hypothesis based on the t-statistics, the p-value allows the study to conclude on its proposed hypothesis with at least a 90 percent statistical confidence. Based on the study's final analysis of failing to reject the proposed alternative hypotheses for each produce item, a general assessment of the number of successfully proved hypotheses can lead to conclusions of whether or not the nutritional shelf talker advertising campaign increased Spencer's sales dollars of the advertised items. The statistical significance of the independent t-test between Spencer's San Luis Obispo and Arroyo Grande store locations can conclude which type of consumer demographics favor specific health content and function advertisements.

### Assumptions

The data collection in this study is presented assuming that seasonality and produce management decisions may require substitutions among selected produce items and possibly store locations. It is also wise to assume produce advertisement displays could negatively affect sales if consumers do not positively associate themselves with the nutritional information on the displays.

### Limitations

In order to conduct this study with a grocery store's sales data, they will require a confidentiality statement that the results will be used solely for this project and kept confidential from other parties.

While this study intends on promoting the nutritional claims in a beneficial manner to fresh produce consumers, the study's secondary focus on seasonally available produce could present an element of data set bias if one can conclude that promotion of seasonal products increased sales as much as promoting their nutritional benefits.



## CHAPTER 4

### DEVELOPMENT OF THE STUDY

#### Data Collection Problems

Data collection, especially for something speculative like sales results, can easily become troublesome due to many independent biases that may or may not have an influence on data collection results. Despite carefully laid out plans in the Procedures for Data Collection section, problems that were mentioned to avoid still occurred during the collection period. These problems consisted of improper assumptions in timing reasonable dates for conducting the study which caused Spencer's Markets stores to receive more customer traffic during the control week of June 13<sup>th</sup> compared to the week of June 20<sup>th</sup> with shelf talker advertisements. Another problem encountered was poor communication between Spencer's produce manager and his employees when displaying the shelf talkers in a professional and visually accessible manner. As a result of these issues, the collected data resulted in only three sales increases from displaying the shelf talkers out of ten total observations from the two locations.

Fortunately, the data collection was taken early enough in the development of the study that there was sufficient time for a second round of data collection. Bob Boyd at Spencer's approved Garlic, Russet Potatoes, Lemons, Avocados, Mangos, and Spinach to remain unadvertised for July 11<sup>th</sup> to July 17<sup>th</sup> and to run a new shelf talker advertising campaign at both Spencer's locations from July 18<sup>th</sup> to July 24<sup>th</sup>. These new observations focused on creating

slightly larger, more visually appealing produce images and text to attract more customers to the shelf talker produce displays. An extra effort was also put in by Bob, the produce manager, to ensure his employees accommodated displaying the shelf talker advertisements in the most non-obstructive, but visually recognizable possible. These accommodations required reorganizing current price tags or placing the shelf talker displays at a noticeable eye level in hopes that a more focused second round would communicate more promising results.

### Analysis

After the second round of data collection was completed, a general side by side comparison of both rounds was conducted to assess the quality of the data in proving the hypothesis stating shelf talker advertisements promoting eleven fresh produce item's nutritional structure and function claims increased unit sales compared to the previous week's sales without the advertisements. Also stated in the alternative hypothesis equation as  $H_A: D_{PA} < D_{WA}$ . The data collected is located as a chart in Table 1 or graphically as a bar graph in Tables 2 and 3 for their respective store locations. A basic assessment of the results communicated a sales increase of Kale at the San Luis Obispo location and an increase in Cauliflower and Kale at the Arroyo Grande location for ten total items tested in June. The second trial in July indicated sales increases in Mangos and Spinach at the San Luis Obispo location and increases in Garlic and Spinach at the Arroyo Grande location out of twelve total observations during the second round. Overall, the seven positive sales increases as a result of the shelf talker advertisements are not a significant increase based on the 22 total observations.

To evaluate statistical significance, the compiled data of eleven San Luis Obispo store produce sales observations and eleven Arroyo Grande observations were entered into Microsoft

Excel and under the data analysis tab, a paired t-test for two sample means was run separately for each location. The paired t-test analysis compiled the means of the eleven produce sales observation results collected the week before the produce advertisements were displayed at Spencer's compared to the mean sales units of the eleven items during the week featuring shelf talker advertisements. The paired t-test analysis then tests the means statistical significance by evaluating the t-statistic in comparison to its respective tabled t-critical figure.

Spencer's San Luis Obispo location's paired t-test analysis in Table 4 feature mean sales of about 78 units without shelf talker advertisements and 75 units with the advertisements. These figures correlate to a t-stat of -0.27 which is significantly lower than the respective t-critical of 1.81 resulting in a failure to reject the null hypothesis stating there is no difference between the mean unit sales during week one without advertisements compared to week two with the shelf talkers. Failing to reject the null hypothesis leads to a rejection of the alternative hypothesis defined as an increase in sales units during the week of shelf talker advertisement compared to the previous week without the ads. A more thorough examination of the results confirms the t-stat's conclusion with a one tailed p-value of .40 which is well above the standard statistically significant value of .05. These negative results from Spencer's San Luis Obispo store are the first confirmation to reject the study's hypothesis of sales increases compared to the previous weeks sales as a result of advertising produce's nutritional benefit with shelf talker displays.

The same paired t-test for sample means was run for the eleven observations for Spencer's Arroyo Grande location. The results available in Table 5 communicate a compiled mean of 175 units sold for the week prior to produce shelf talker advertisements and 149 units during the week of advertisement. Once further statistically analyzed, the compared means correlate to a t-stat of 1.32 which is still less than the corresponding tabled t-critical of 1.81

resulting in another failure to reject the null hypothesis stating no difference between mean unit sales during the first week without advertisement compared to the second week with shelf talker produce ads. Like the San Luis Obispo store's results, failing to reject the null hypothesis also rejects the studies proposed alternative hypothesis of an increase in sales units during the second week with advertisements. The one tailed p-value of .10 confirms rejecting the alternative hypothesis because a p-value of .05 would communicate statistical significance in the result tested at a 95 percent confidence level. It is now statistically acceptable to conclude that the study's proposed hypothesis can be rejected after analyzing and rejecting the alternative hypotheses in both of Spencer's tested locations.

With the conclusion of the paired t-test analysis and a lack of positive hypothesized statistical significance at both stores, a decision was made to withhold from running an independent t-test comparing the sales with shelf talker advertisements at the San Luis Obispo and Arroyo Grande locations. The decision was made because the hypothesis has already been disproved and an extra analysis comparison would not add valuable insight to the study's conclusion despite the objective and reasoning stated in the procedures for data analysis.

## CHAPTER 5

### SUMMARY, CONCLUSIONS, AND RECCOMENDATIONS

#### Summary

This consumer study was conducted primarily to assess how consumers respond to label based nutritional education with regards to fresh produce. Consumers are nutritionally educated with labels quite often in the grocery store aisles, but on a limited basis in the produce department where most of the true nutrition is located. As a result of this gap in grocery advertising, researchers for this study collaborated with Nutrition and Agribusiness professors at Cal Poly San Luis Obispo to create a unique way to properly advertise nutrition and health benefits to fresh produce consumers.

With the cooperation of Bob Boyd, the Produce manager at Spencer's Fresh Market, the idea was presented to post visually appealing shelf talker type advertisements next to their respective produce item and compare their recorded sales a week prior to the advertising campaign to the following week with advertisements. Two separate observation periods were conducted at Spencer's San Luis Obispo and Arroyo Grande locations after the first period in June 2011 produced a surprisingly small amount of statistically significant data from a potential bias in heavy store traffic during the first week without advertisements. The unfortunate results of the first round lead to a second round of observations with six new produce items, during July 2011, which also lead to similar insignificant results. As a result of time restraints during Cal

Poly's quarter system and two strong, but unsuccessful attempts to positively influence produce sales from a statistically significant standpoint, the study was ended with eleven produce items' unit sales results with and without shelf talker advertisements from both of the specified Spencer's locations.

Despite a basic side by side analysis of the sales units before and after the advertising campaign, the data for each location was entered into a Microsoft Excel spreadsheet and paired t-tests for means were run using the data analysis feature. The results for each store communicated similar analysis to the basic sales data comparisons, which lead to failing to reject the null hypothesis that produce sales before and after the nutritional benefit shelf talker campaign are equal. By failing to reject the null hypothesis in both locations, the alternative hypothesis is rejected because it is proving a sales increase during the second week of the study with advertising. Therefore, by rejecting the alternative hypothesis, the proposed hypothesis of this study is rejected and concluded as an incorrect hypothesis.

### Conclusions

Based on the results from Microsoft Excel's paired t-tests for means for both Spencer's locations, the study must reject its proposed hypothesis. While the result concludes that promoting nutritional benefit in a visually appealing manner beside fresh produce at Spencer's San Luis Obispo and Arroyo Grande locations does not effectively increase sales, it certainly provides insight for future attempts aimed to promote produce's nutritional benefit.

### Recommendations

While sales increases are the ultimate reassurance that an advertisement was successful, several unpredictable factors can play a role in positively or negatively affecting a consumers desire to purchase an item. While most of the advertised produce items were selected due to them not already being advertised in Spencer's weekly newspaper ad as well as seasonal availability, specifically selecting items with notably high levels of nutrition may have positively favored the advertisements. This noted case can also be applied oppositely, to the fact that a few of the produce items advertised at Spencer's during this study did not have very appealing nutritional content which was not ideal to advertise. For future studies, a focus on promoting exceptionally nutritious produce items could potentially increase sales and have more meaning for consumers looking to eat healthier. Increased consumers appeal could be also conveyed through use of a more shopper compatible form of FDA approved health claim.

This study took an educated risk in using health and function claims to promote produce nutritional benefit because of health trends in the last five years and health claim research indicating increased familiarity with nutritional facts and front of package labels. Research by Roe, Levy, and Derby; as referenced in the Label Claims section of the literature review; suggests a consumer familiarity with health structure claims, but not necessarily their health functions on the body. While this study took the initiative to back up health structure claims of the produce items with function claims in very comprehensible terms, consumers may not identify as well with how a vitamin or nutrient can contribute to healthy body processes. Examples of the produce items' shelf talker advertisements and structure and function claims used in this study are located in the Appendix. For future studies, a focus on strictly structure and FDA approved health claims may lead to more positive results. Rather than promoting the function of nutrients, basic structure claims for example "Good Source of Fiber" and FDA

approved health claims such as “Reduces risk of heart disease” might be more appealing to health conscious produce consumers. Another way to positively influence future studies is a heavier emphasis on product and advertisement placement.

During the first round of data collection, Mr. Boyd noted a custom designed wine barrel display for Cauliflower featuring a centrally displayed sign holder and shelf talker advertisement placed directly in the walkway as customers entered Arroyo Grande’s produce section. Noticeable product placement as well as professional presentation of the shelf talker advertisements contributed to Cauliflower having the most significant sales increase from the advertising study. Cauliflower sales increased from 49 units sold the first week to 117 during the week of the wine barrel display and nutritional benefit advertisement. Clearly, visually appealing product placements and organized advertising displays can draw grocery consumers to make impulse or educated purchase decisions. On the contrary, unprofessional displays and advertisement placement on the shelves may also negatively affect sales results.

Several observations at both participating Spencer’s locations during the advertising weeks of the study noted possible negative influences due to unprofessional Spencer’s Markets produce displays. Spencer’s Fresh Markets had on display many moldy packages of Blackberries in their San Luis Obispo location which puts into question the advertisements appeal. Despite the advertised nutritional benefit, the product’s quality is questionable. This type of careless quality control can also discredit Spencer’s reputation of calling themselves a fresh market. Regardless of the store’s quality issues, their produce sections were also very limited on space for displaying 7 inch by 11 inch nutritional advertisements. Observations at both locations also noted many of the shelf talkers were displayed too high for most eyes to notice, questionably adhered above price tags as if it were about to fall off, placed in the back of the display underneath the chilled



produce section where it was difficult to notice, and forced into locations where at least one of the function claims was covered by another price tag. While many produce sections are constrained for space, if Spencer's conveyed a more dedicated commitment to promoting produce nutritional benefit and increasing related sales, future studies could potentially produce more significant results.

Despite the results, during the study's completion, demand to promote nutritional benefit in several grocery stores' produce sections has increased in San Luis Obispo County. Before the study's development, New Frontier's, a local health and natural food store advertised the beneficial nutrients of seasonal citrus in an obscurely placed and lengthy description display. Within the last six months, Ralphs Supermarket in San Luis Obispo has introduced a nutritional fact type label highlighting significant levels of nutrients on a weight and daily value percentage scale. Within the last four months, Albertson's in San Luis Obispo has incorporated a produce department nutritional advertising campaign called "NutritonIQ" complete with newspaper advertisements promoting the new program as well as color coded health and function claims similar to this study's. Also within the last four months, Scolari's grocery store in San Luis Obispo has introduced a store wide nutritional rating campaign called nuVal where most food sold is ranked between one and 100 based on its perceived nutritional content. All of these recent advertising trends in the last year strongly support the logic behind advertising nutritional content of nutrient rich produce items. The increasing trend to nutritionally advertise produce is promising for the future study of consumer accepted methods for using FDA approved health claims to promote produce's nutritional content.

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Appendix

Appendix I: Cherries Example Advertisement



# Cherries

**Good source of Vitamin C  
and Fiber**

**Promotes a strong and  
healthy immune system**

**Improves digestive function**



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Appendix II: Spinach Example Advertisement

# Spinach



◆ **Excellent source of  
many vitamins and  
antioxidants**

◆ **Promotes healthy  
skin and hair**

◆ **Encourages new bone  
growth**

# Blackberries



- Excellent source of Vitamin E, Fiber, and Manganese
- Encourages regular digestion
- Helps maintain a healthy heart

# Cauliflower

- Valuable source of Vitamin K and Folate
- Promotes a balanced digestive system
- Encourages new cell growth



Appendix V: Kale Advertisement



# Kale

- Excellent source of Vitamin A, Vitamin B-6, and Vitamin K
- Promotes healthy skin and encourages bone growth
- Helps strengthen the immune system

Appendix VI: Eggplant Advertisement

# Eggplant

- Great source of Vitamin K and Thiamin
- Aids in healthy digestion
- Promotes and strengthens new bone growth



# White Onions



- **Good source of Vitamin C, Potassium and Folate**
- **Promotes a strong immune system**
- **Helps cells grow and function properly**

# Avocados



- **Outstanding source of Vitamin K and Folate**
- **Helps proper cell growth and function**
- **Promotes strengthening weak bones**



# Garlic

- Good source of Vitamin B-6 and Manganese



- Helps maintain blood sugar levels
- Encourages strong and healthy bones

# Lemons

- Excellent source of Vitamin K and Fiber
- Maintains healthy digestion
- Strengthens the blood supply and weak bones





# Mangos



- Great source of Vitamin A and B-6
- Promotes healthy skin and bones
- Encourages new cell growth



# Potatoes

- Excellent source of Vitamin C and B-6
- Promotes a strong immune system
- Maintains new cell growth



# Spinach

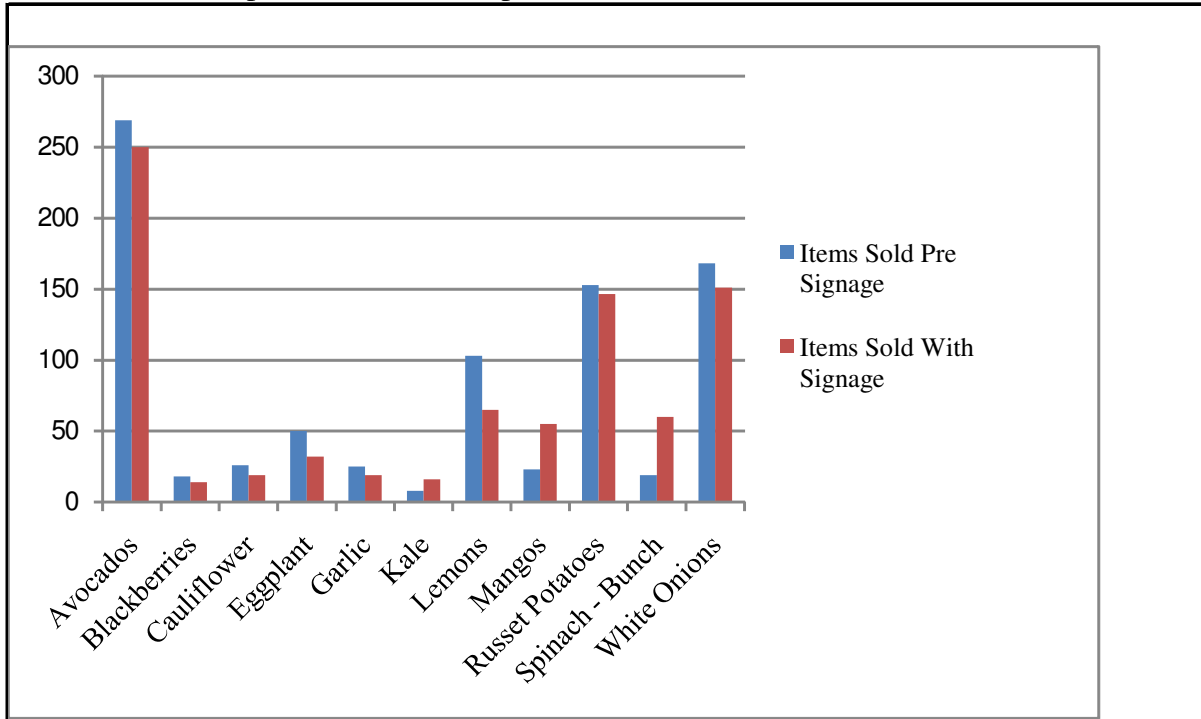


- Excellent source of many vitamins and antioxidants
  - Promotes healthy skin and hair
  - Encourages new bone growth

Table 1. Spencer's Market Sales Experiment Results - San Luis Obispo and Arroyo Grande

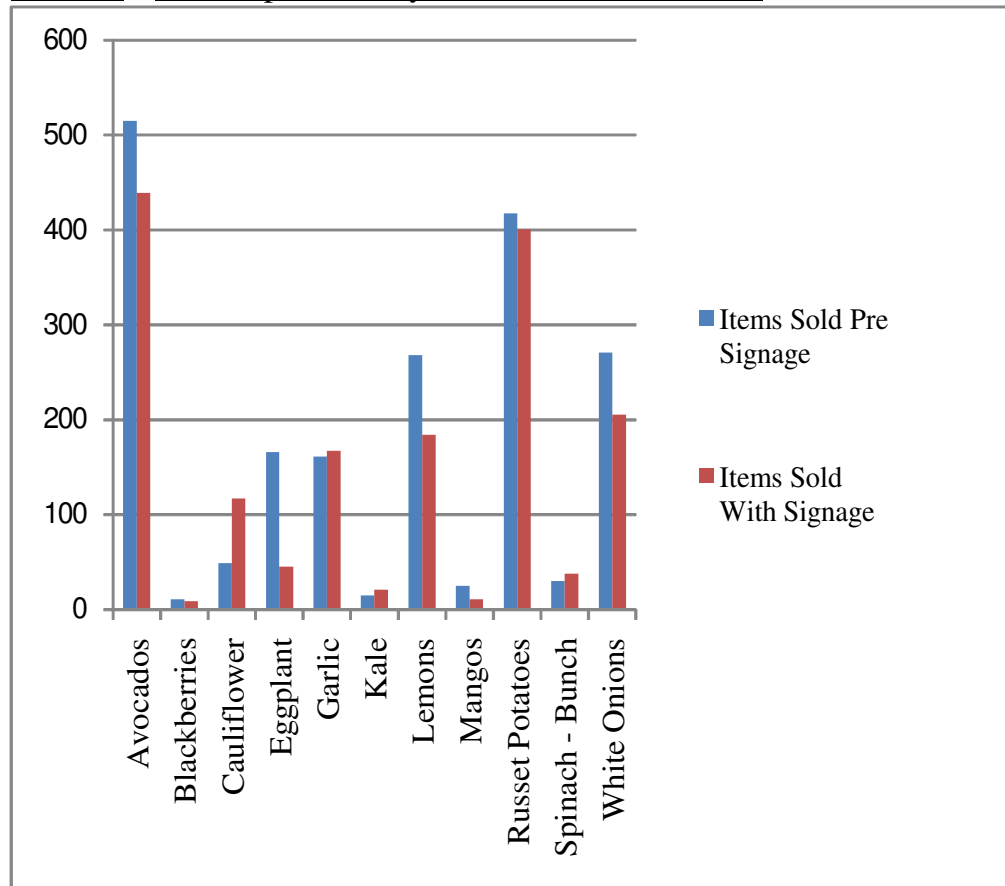
<b>San Luis Obispo</b>		
<b>Produce Item</b>	<b>Items Sold Pre Signage</b>	<b>Items Sold With Signage</b>
Avocados	269	250
Blackberries	18	14
Cauliflower	26	19
Eggplant	50	32
Garlic	25	19
Kale	8	16
Lemons	103	65
Mangos	23	55
Russet Potatoes	153	147
Spinach - Bunch	19	60
White Onions	168	151
<b>Arroyo Grande</b>		
<b>Produce Item</b>	<b>Items Sold Pre Signage</b>	<b>Items Sold With Signage</b>
Avocados	515	439
Blackberries	11	9
Cauliflower	49	117
Eggplant	166	45
Garlic	161	167
Kale	15	21
Lemons	268	184
Mangos	25	11
Russet Potatoes	418	401
Spinach - Bunch	30	38
White Onions	271	206
<b>Note:</b>	<b><u>Sales increases with signage of the following items by location</u></b>	
	<u>San Luis Obispo</u>	<u>Arroyo Grande</u>
	Kale	Cauliflower
	Mangos	Garlic
	Spinach	Kale
		Spinach

Table 2. Bar Graph of San Luis Obispo Store Sales Results



Note: Sales increases with signage of the following items  
 Kale  
 Mangos  
 Spinach

**Table 3. Bar Graph of Arroyo Grande's Sales Results**



**Note: Sales increases with signage of the following items**

- Cauliflower
- Garlic
- Kale
- Spinach

Table 4. San Luis Obispo Location's Paired t-Test for Means Analysis

t-Test: Paired Two Sample for Means		
	<i>Items Sold Pre Signage</i>	<i>Items Sold With Signage</i>
Mean	78.37334219	75.23146989
Variance	7217.95017	5759.939787
Observations	11	11
Pearson Correlation	0.965840261	
Hypothesized Mean Difference	5	
df	10	
t Stat	-0.269560254	
P(T<=t) one-tail	0.396489569	
t Critical one-tail	1.812461102	
P(T<=t) two-tail	0.792979137	
t Critical two-tail	2.228138842	
<b>Note:</b>	<b><u>Analysis areas of significance to the study</u></b>	
	Mean comparisons Pre and With Signage	
	t Stat < t Critical one-tail	
	P one-tail > .05	

Table 5. Arroyo Grande Location's Paired t-Test for Means Analysis

t-Test: Paired Two Sample for Means		
	<i>Items Sold Pre Signage</i>	<i>Items Sold With Signage</i>
Mean	175.3232782	148.8357438
Variance	30450.86305	23137.23137
Observations	11	11
Pearson Correlation	0.954297788	
Hypothesized Mean Diff	5	
df	10	
t Stat	1.317124846	
P(T<=t) one-tail	0.10858932	
t Critical one-tail	1.812461102	
P(T<=t) two-tail	0.21717864	
t Critical two-tail	2.228138842	
<u>Note:</u>	<b>Analysis areas of significance to the study</b>	
	Mean comparisons Pre and With Signage	
	t Stat < t Critical one-tail	
	P one-tail > .05	