

FRESH SQUEEZED ORANGE JUICE BY THE GLASS

By

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To God and my family

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The purpose of this study is to determine consumers' willingness to pay (WTP) for fresh squeezed orange juice. Also, this study was done to observe consumers' taste preferences for three types of orange juice (fresh squeezed, from-concentrate, and not-from-concentrate orange juice) and factors that influence consumers' decision to purchase those juices. To collect the data, a survey was conducted on a total of 200 participants evenly divided between Tampa and Orlando using a mall intercept strategy. A taste test and a conjoint analysis were instruments used in the survey. Results have shown that it is important to use a taste test to observe consumers' willingness to pay. Also, using a conjoint analysis allows us to determine which attributes are more influential on the willingness to pay. Both attributes-price and types of orange juice-influence the decision to purchase orange juice. This study is limited to Florida interpretation only. In fact, the findings obtained can be useful to the Florida orange juice markets.

CHAPTER 1 INTRODUCTION

Consumption of Fruit Juices (1970-2008)

“More than half of all Americans eat some type of fruit or drink fruit juice nearly every day” (USDA, 2010). The consumption of citrus juices such as orange, grapefruit, lemon and lime juices are consumed at higher per capita levels than non-citrus juices (apple, grape, pineapple, cranberry, and prune juices). Statistics from the USDA (2010) indicate that from 1970 to 2008, the average consumption per capita of citrus juices was 5.4 gallons compared to 2.2 gallons for non-citrus juices. However, as shown in figure 1-1, the consumption of non-citrus juices increased by almost 190% over the past 38 years, while the consumption of citrus juices dropped by 15% over the same period. The increase in the consumption of non-citrus juices consists largely of apple and grape juices.

The trend in the consumption of citrus juices is highly influenced by the consumption of orange juice. Per capita consumption of orange juice increased from 3.7 gallons in 1970 to 4.7 gallons in 1975 (Figure 1-2). The late 1970s and 1980s were periods of relative stability, with per capita consumption averaging 4.6 gallons. The per capita consumption of orange juice in 1990 was 36% less than that of the previous year. The consumption of orange juice experienced a comeback during the late 1990s, with an average per capita of 4.7 gallons. However, per capita consumption has continuously decreased by 43% from 5.8 gallons in 1998 to 3.3 gallons in 2008. Although there have been more downward trends than upward trends in its consumption, orange juice remains the number one juice consumed by Americans (USDA, 2010).

The second most consumed juice in the U.S is apple juice, with an average per capita consumption of 1.4 gallons over the past 38 years. The per capita consumption of apple juice increased by 320% from 0.5 gallons in 1970 to 2.1 gallons in 2008 (Figure 1-2). In fact, the late 1970s and 1980s were periods of tremendous growth in the per capita consumption of apple juice, which increased from 0.5 to 1.5 gallons. Then, per capita consumption stayed steady between 1.5 gallons and 2.1 gallons from 1984 to 2008.

Per capita consumption of grapefruit juice has consistently been lower compared with those of orange and apple juices. Consumption decreased 46% between 1970 and 2008, an average of 0.6 gallons over that period (Figure 1-2). Per capita consumption in the late 1970s and 1990s experienced ups and downs, with an average of 0.6 gallons and a peak of 0.9 gallons in 1990. From 2000 to 2008 per capita consumption of grapefruit juice continuously decreased by 40% (from 0.5 to 0.3 gallons).

Although grape juice is the least consumed juice among the four juices been considered in the study, its consumption rose by 100% from 0.2 gallons in 1970 to 0.4 gallons in 2008, with an average of 0.3 gallons per capita consumption (Figure1-2).

Orange Juice Demand

Citrus fruits are believed to have originated in the ancient orient. The first writings about citron, a large lemon-like fruit, were attributed to Confucius, a Chinese philosopher who died in 479 BC. The fruit was brought to Europe and the Mediterranean area by Arab traders (Florida Citrus, 1974). In the United States, citrus cultivation began in Florida in the early 1800s and later spread to Texas, Arizona, and California. It is believed that Ponce de Leon brought citrus to Florida in 1513 while he was searching for the fountain of youth. The earliest groves were grown near St.

Augustine and Tampa (Florida Citrus, 1974). For centuries, oranges, the most popular fruit among citrus fruits, were consumed as a fresh fruit, not storable for long period of time or easily shipped to a long distance unless they are in dried forms. “Fresh orange juice was perishable once produced and had a very limited shelf life” (NYBOT, 2004).

In the late 1930s, the orange fruit production surpassed the demand for fresh fruits leading to the emergence of an overproduction of oranges. Since the fresh orange juice has a limited shelf life, three scientists, MacDowell, Moore, and Adkins, developed a process to produce frozen concentrate orange juice (FCOJ), which can be stored for later consumption (Florida’s Golden Fruit, 1977). As a result of this invention, consumers quickly demonstrated a clear preference for FCOJ taste and convenience, substituting FCOJ for fresh oranges.

The last decade has seen a large swing in consumer demand from frozen concentrate orange juice toward refrigerated orange juice, especially not from concentrate juice. The 1990 season was the first year in which chilled orange juice outsold frozen concentrate, and the gap has consistently widened since that time. For instance, the production of chilled orange juice in the 2007/2008 season was 552,263,000 gallons, while the production of frozen concentrate orange was 135,196,000 gallons in the same season (USDA, 2009).

Currently, the three major types of orange juice purchased in the United States are frozen concentrated orange juice (FCOJ), not from concentrate (NFC) orange juice, and refrigerated orange juice from concentrate (RECON) (Davis, 2008). Not from concentrate (NFC) juice is flash-heated to pasteurize immediately after the fruit is squeezed. NFC is never concentrated. Refrigerated from concentrate (RECON) is

manufactured as a frozen concentrate, and then reconstituted by adding back the amount of water originally removed. RECON is sold as a ready to drink product. Frozen concentrate (FCOJ) is a freshly squeezed juice that has been concentrated and frozen. Consumers reconstitute the juice by adding back the amount of water originally removed.

Prices of Orange Juice

Retail orange juice prices vary according to many factors such as the form or type of juice (FCOJ, NFC and RECON), the brand and private label, the season, the region of production, the average household income in the market area, etc. (Pollack , 2010). For instance, prices of orange juices averaged \$5.09 a gallon at the end of October 2009 compared with \$4.45 per gallon a year earlier (Pollack, 2010). The price of NFC, which is the most consumed form of orange juice, averaged \$6.8 a gallon in the season 2007-2008 (Pollack, 2010). However, in 2008/09 season, the price of NFC decreased to \$ 6.66 per gallon.

Nutritional Benefits of Orange Juice and Vitamin C Content

There are different juices which are believed to offer health benefits to the body. Many studies, such as a research on “Beverages in Nutrition and Health” by Wilson and Temple (2004), show that orange juice may help lower both cholesterol levels and blood pressure levels, which are two very common problems among middle aged men and women. Orange juice is thought to be very high in antioxidants thus it may help prevent various forms of cancer, including breast cancer and prostate cancer (Wilson and Temple, 2004). The fruit is also renowned for its folic acid content, an important nutrient for pregnant woman to help prevent birth defects (Pollack, 2003). Orange juice contains a high percentage of Vitamin C, which is helpful in boosting the immune system. So,

orange juice lessens the odds of catching various illnesses, such as colds and the flu (Wilson and Temple, 2004).

Each type of orange juice has a different level of vitamin C and antioxidant. The vitamin C content of orange juice can be compared using food composition tables (Table 1-1). Published ORAC (Oxygen Radical Absorbance Capacity) values illustrate the antioxidant benefit of orange juice. Fresh orange juice (8 fl oz or 248 ml) is a concentrated source of vitamin C, containing 50% more vitamin C than a single orange of 131 gram without peel (Wilson and Temple, 2004). Similarly, the antioxidant capacity of fresh orange juice is higher than that of a single orange. Orange juice processing (pasteurization and storage), however, reduces its vitamin C content. An 8 fluid ounce bottle of frozen reconstituted juice has higher vitamin C content than the same amount of chilled juice in plastic jugs. Juice chilled in plastic jugs (8 fl oz) has more vitamin C content than a chilled juice in cartons of the same size (Wilson and Temple, 2004).

Objectives

This study seeks to:

- Identify the past consumption patterns of consumers.
- Determine taste preferences for the three types of orange juice: fresh squeezed, from concentrate and not from concentrate orange juices.
- Find out the consumers' willingness to pay for a type of orange juice, particularly fresh squeezed orange juice.
- Identify which of the two attributes (price and types of juice) influence the decision to purchase an orange juice product.
- Identify if demographic background affects the decision to purchase.
- Determine if seeing a machine squeeze oranges to produce fresh juice immediately prior to consumption impacts consumers' willingness to pay.

Hypotheses

The following are the study's hypotheses:

- Participants that saw the juicing process will like fresh squeezed juice more than participants who did not see the juicing process.
- Price will have a negative effect on the participants' decision to purchase the orange juices.
- The higher the income the higher the decision to purchase the orange juice.
- The higher the education levels the higher the decision to purchase the orange juice.

Thesis Outline

Chapter 2 discusses relevant researches about the demand for orange juice particularly the impact of price and demographics on the demand for orange juice.

Chapter 2 also gives a review of research that has been conducted using sensory test to determine the consumer's taste preference for orange juice. Finally, Chapter 2 brings up research conducted on the demand for orange juice using conjoint analysis.

Chapter 3 begins with a definition of the sensory analysis, followed by the discussion of the survey methodology and the data collected.

Chapter 4 discusses conjoint analysis and random utility theory. Logit model and model specification for this study are conferred as well in Chapter 4.

Chapter 5 discusses the analysis of the results obtained from the logit model test and the price premiums that participants are willing to pay for orange juice.

Finally, Chapter 6 draws the summary of this study, the marketing message behind it, further research that can be conducted on orange juice particularly fresh squeezed juice and the study limitation.

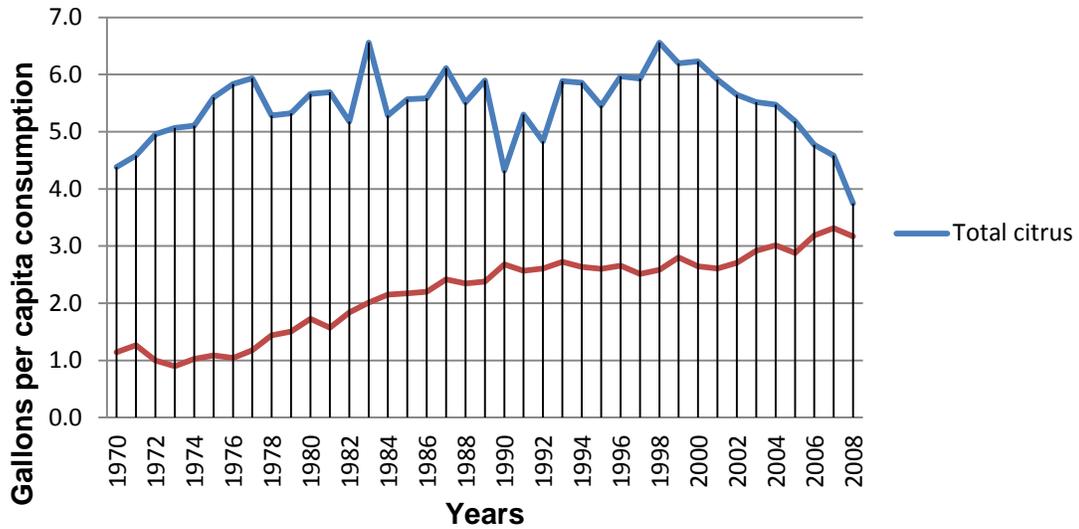


Figure 1-1. Per capita consumption of citrus and non citrus juices. USDA/ Economic Research, 2010.

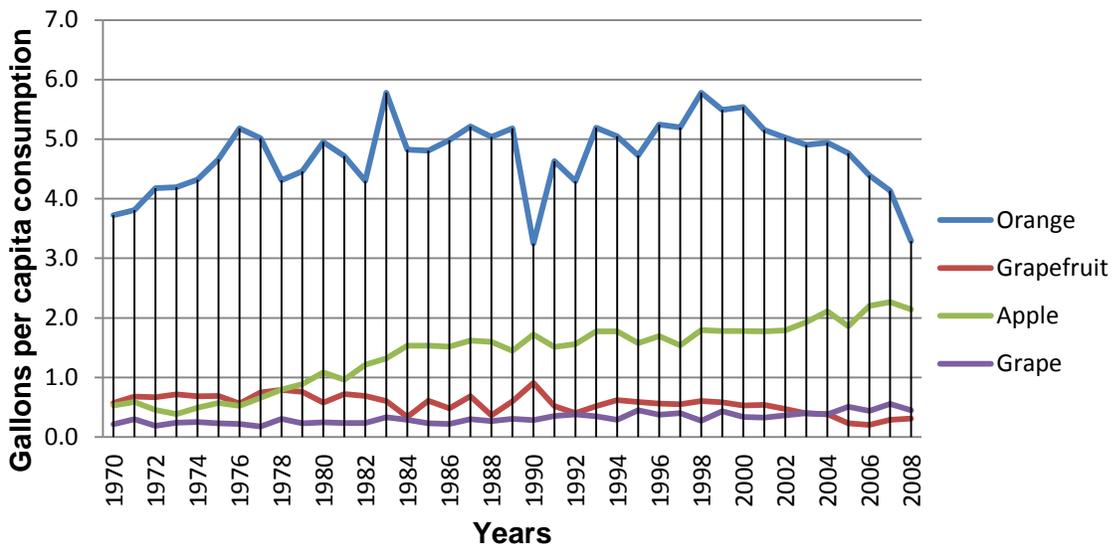


Figure 1-2. Per capita consumption of the four major juices consumed in the United States (orange, grapefruit, apple, and grape). USDA/ Economic Research, 2010.

Table 1-1. Ascorbic acid content and ORAC (oxygen radical absorbance capacity) score of oranges and several varieties of orange juice

Oranges and varieties of orange juice	Ascorbic acid	ORAC score
Orange,navel,131 g without peel	80	983
Orange juice,fresh,8fl oz	124	1637
Reconstituted from frozen concentrate,8fl oz	97	—
Chilled, packaged in plastic, 8 fl oz	86	720
Chilled, packaged in carton, 8 fl oz	44	—

CHAPTER 2 LITERATURE REVIEW

Demand for orange juice. Orange juice has been the most popular juice consumed by Americans for many decades. Because orange juice is highly consumed, much research has been conducted on the consumer's demand for the product. Indeed, one area of focus has been identifying factors that impact the demand for orange juice.

Davis et al. (2008) examined the effect of demographics on the demand for orange juice. In this study, a regression analysis was conducted using weekly data over a two-year period. Explanatory variables such as orange juice price, price of substitute products, and demographics were used to estimate total orange juice gallons sold. Results indicated that income and price of substitutes had a positive effect on the demand for orange juice. Davis et al. calculated income elasticity for orange juice of 0.17 and a cross-price elasticity of 0.85. However, orange juice price had a negative effect on orange juice gallons sold, with a coefficient of -0.99. Besides income, other demographic variables were also found to be significant. The cities with the highest percentage of Black and Hispanic populations had a lower demand for orange juice. Demand for orange juice decreased by 0.58% and 0.32% for each percent increase in the percentage of the population that was Black or Hispanic, respectively. The opposite was true for the cities with a large percentage of Asians. For each percent increase in the Asian population in a city, the demand for orange juice increased by 0.40%.

Love et al. (2006) investigated the impact of disposable per capita income, price and purchase habits on the purchase for orange juice in the Southern region. The data used for their study was in the form of scanner data. The data was collected for orange juice purchases in the Southern region on a four-week basis from October 1995 through

December 2004. These purchase estimates represent volume sales in all ACNielsen retail outlets in the Southern region, including U.S grocery store chains, Wal-Mart stores (excluding Sam's Club), and mass merchandisers and drug stores. Love et al. found that the relationship between purchases of orange juice and price was negative and significant, with a coefficient of -0.02. This indicated that the expected inverse relationship between price and demand existed. Also, Love et al. contrary to Davis et al. found that the relationship between purchases of orange juice and disposable per capita income was insignificant. Therefore, per capita discretionary income had no effect on per capita purchases of orange juice in the Southern region. Finally, they found that the relationship between purchases in the current time period and purchases from the previous time period, a measurement of habit persistence, was positive and significant, with a coefficient of 0.845. This result indicated that purchases of orange juice were based on habit.

In addition to ethnicity and income, Blisard (2003) found other demographics that impact the demand for fruits and juices. This study found that people above the age of 74 spent the most money on cereal, bakery goods, and fruits. He also established that households with children age nine or under spend more money on fruit and fruit juices than households with older children.

Chern, Kaneko and Tarakcioglu (2003) used experimental auctions to elicit the willingness to pay for a new orange juice produced with the PEF (Pulsed Electric Field) processing technology. "The PEF process is a nonthermal process used to inactivate enzymes and microorganisms in liquid food" (Chern, Kaneko and Tarakcioglu, 2003).

This process was built up in 1960 by a German scientist mostly “to minimize the loss and degradation of food quality attributes” that can be caused by a thermal processing.

The experimental auction was designed for participants to bid on four alternative products: unprocessed fresh juice, PEF juice, not from concentrate juice, and from concentrate juice. One important feature of the experiment was that the products for auction were all real products and the attributes of the PEF orange juice were either visible or detectable with tasting. One of the research objectives was to investigate whether or not product tasting would alter the WTP (willingness to pay) estimation. There were six trials conducted with the first three trials being conducted prior to product tasting and the other three after tasting. Chern, Kaneko and Tarakcioglu (2003) found that the bid prices for unprocessed and PEF juice were consistently higher than the prices for the not from concentrate and the from concentrate orange juices. Furthermore, the bid prices were higher for PEF than unprocessed orange juice for the first three trials prior to product tasting. However, the mean bid price for the PEF juice declined substantially after the product tasting, from \$2.71 to \$2.25, a 17% drop in the willingness to pay for this new orange juice. Some participants said that they did not like the taste of PEF juice, but many others said that it tasted like fresh juice. Also, after tasting, the bid price for unprocessed fresh juice increased from \$2.65 to \$2.72. As for the not from concentrate and from concentrate juice, the bid prices did not change much after product tasting. The results of the overall mean bid prices from all six trials indicated that consumers are willing to pay \$0.53 more for the PEF orange juice than for from concentrate and not from concentrate orange juices. The sample mean of the individual premium for the PEF orange juice with respect to its freshness suggested that

the new product is likely to be competitive in the marketplace since the cost of PEF processing should be lower than the mean premium once the PEF technology is adopted on a commercial basis. In summary, Chern, Kaneko and Tarakcioglu found in their study that product tasting truly impacted the consumer's willingness to pay.

Lee, Brown and Seale (1992) used a conditional demand system for fresh fruits and juices to investigate on the demand relationships among fresh fruit and juices in Canada. This strategy was useful as it restricted the number of estimated parameters and provided more precise parameter estimates when the restrictions can be accepted. First, a differential approach to the consumer's allocation decisions was discussed using the Rotterdam model. Then, weak separability and strong separability concepts were used to derive consumer demand restrictions to test for separability among fresh fruits and juices. Results obtained from the Rotterdam model (with strong separability imposed) indicated that if Canadian consumers were to allocate larger portions of their budgets to the consumption of fresh fruits and juices, expenditure shares on oranges, apples, orange juice, and apple juice would increase, with apple juice benefiting the most. Furthermore, the results indicated that the own price elasticities for apples and for apple juice are smaller than unity. Hence, an increase in price through supply management (either by restricting production, imports, or both) would increase revenue to the Canadian apple industry. The study results also indicated that oranges and grapefruits were substitutes for apples. Therefore, an increase in the price of fresh apples would increase the consumption of citrus such as oranges and grapefruits, thus increasing citrus imports.

Thomas (2009) conducted research using conjoint analysis to investigate consumer's purchase decisions for organic and conventional orange juice and carrots. In this study, consumers were first presented with products to taste (either organic and conventional baby carrots or organic and conventional orange juice). The goal of the research was to test if there was a taste difference or explicit preference for an organic product versus a conventional produced product (Thomas, 2009). Following the taste test, consumers answered a set of questions designed to conduct the conjoint analysis. The conjoint analysis had two attributes: price and type of products. For each question, the participant had to select between three choices: a conventional product, an organic product, or neither.

Results indicated that price and production methods both significantly influenced willingness to pay for orange juice. The price variable was negative, indicating that as price increased, likelihood to purchase the product decreased. The variable representing production method was positive, indicating that if the product was organic, the consumer would be more willing to purchase the juice. Interaction variables between the rating from the taste test and price and production method were both significant. In the case of price and the organic attribute ratings, findings showed that as the ratings of the attributes increased and price was kept constant, the respondent was more likely to purchase the orange juice. Race, ethnicity, and income were also significantly related to willingness to purchase organic products, with Whites and Hispanics less likely to purchase the organic juice and those with incomes over \$30,000 more likely to purchase organic juice. Interaction variables between price and age, race, and income were also significant. Respondents older than thirty years, White respondents, and

those with income less than \$30,000 were more likely to purchase if the price was kept constant.

The earlier research conducted on the demand for orange juice give insights into some factors, among many others, that impact this demand. For instance, Davis et al. and Love et al. found that price had a negative effect on the demand for orange juice. In addition, Davis et al. and Blisard proved in their studies that demographics background (e.g. income, ethnicity, age, and household size) are influential on the demand for orange juice. However, Love et al. contrary to Davis et al. found that income had no effect on the purchase for orange juice. Hence, this current study investigates further the effect of demographics on the decision to purchase the orange juice product. Furthermore, Chern, Kaneko and Tarakcioglu discovered that using a taste test was important to elicit the consumer's willingness to pay. In this current research, a taste test survey was also conducted to see the impact of product tasting on the decision to purchase. Finally, the literature discussed the use of conjoint analysis to investigate which attributes are influential on the decision to purchase. Thomas found that price and production methods both significantly influenced willingness to pay for orange juice. This current study uses a conjoint analysis as well to determine if different attributes such as price and types of products impact on the purchase for orange juice.

CHAPTER 3 DATA

This chapter opens with the definition of sensory analysis and its relevance to this study. Then, the chapter gives an overview of the survey methodology. Finally, the data collected is presented and summarized.

Definition of Sensory Analysis

The use of sensory evaluation has developed quickly in the second half of the 20th century. Product developers, food scientists, and managers use sensory evaluation to get informed about the sensory characteristics of their products. Sensory evaluation is composed of a set of techniques for precise measurement of human responses to foods and reduces the possibility of biasing effects of brand identity and other information effects on consumer perception (Lawless and Heymann, 1997). “Sensory evaluation has been defined as a scientific method used to evoke, measure, analyze and interpret those responses to products as perceived through the senses of sight, smell, touch, taste and hearing” (Lawless and Heymann, 1997). It is important in a sensory evaluation that the test method be appropriate to answer the questions being asked about the product in the test. Therefore, three types of sensory testing are mainly used, each with a different objective and using participants of different characteristics. The discrimination test, considered as an “analytic test” is the simplest test, which objective is to find out if there is a difference between two types of products. The second class of sensory test is the descriptive test also considered as an “analytic test”. This test is aimed to identify how products differ in specific sensory characteristics. The third class of sensory test is used to quantify the degree of liking or disliking of a product, called hedonic or affective test (Lawless and Heymann, 1997).

This current study uses sensory test to assess the participants' taste preference for the orange juice products, and also untrained participants are screened for product use. Therefore, the affective test (hedonic test) is the test method used for this study.

Survey Methodology

To determine willingness to pay for fresh squeezed orange juice, a survey was conducted June 2009. A total of 200 participants, evenly divided between Tampa and Orlando, Florida were surveyed using a mall intercept strategy. The survey consisted of questions regarding their consumption habits, a sensory evaluation of three juices, questions related to willingness to pay, and demographics.

The three juices used for the sensory analysis included fresh squeezed juice (FS), not from concentrate orange juice (NFC) and from concentrate (FC) orange juice. For the Fresh squeezed orange juice, there were two approaches used. Half of the participants tasted freshly squeezed juice after watching the oranges be squeezed by a machine while the other half tasted fresh juice without seeing the squeezing process. Each participant evaluated each juice on overall appearance, overall flavor, texture, aroma, sweetness, color, acidity and amount of pulp.

Following the sensory evaluation, a series of questions gathering willingness to pay were asked. Each participant selected which of four options they would choose in ten choice scenarios. Each scenario presented information on price and type of orange juice, with fresh squeezed, not-from-concentrate, and from-concentrate as three options, and no juice as the fourth option. Finally, demographic data was collected from each participant.

Data

Past consumption habits. Participants were asked if they have consumed any of five different types of orange juice (fresh squeezed, not from concentrate, from concentrate branded juice, from concentrate private label juice, and other) in the past four weeks (Figure 3-1). About seventy three percent (72.5%) of participants consumed not from concentrate (NFC) followed by 42.5% who consumed fresh squeezed juice (FS) and 34.5% who consumed from concentrate branded. Also, 21% of participants consumed from concentrate juice from the store and another 21% consumed other type of orange juice.

Furthermore, participants were asked which type of orange juice they consume most often. A little more than half of participants (56%) indicated they consume NFC most often. Nineteen percent of participants consume fresh squeezed juice most often, followed by 14% who consume from concentrate branded juice, and 4% who consume concentrate juice from the store (Figure 3-2).

Also, participants were questioned about the number of glasses they drink in an average week. Half of participants reported drinking 3 to 6 glasses of orange juice. A little more than a quarter (29%) of participants drink 7 or more glasses, while 17% of participants drink 1 to 2 glasses. Very few participants (4.5%) drink less than one glass per week (Table 3-1).

Participants were asked where they have purchased orange juice in the last six months. The majority of participants (149) have purchased orange juice at the grocery store (Figure 3-3) in the last six months. The second most common place to purchase orange juice is a large merchandise store (such as Wal-Mart or Costco), followed by restaurants, and convenience stores.

Sensory Test Results

The sensory results are divided into two parts: first, the attributes ratings of the juices on their overall appearance, aroma, overall flavor, texture, color, sweetness, aroma, and pulp including the panelists' likelihood; second, the overall rank order of the juices.

Attributes Ratings of Orange Juices

For the taste test survey, each respondent tasted three types of orange juice: fresh squeezed juice where the juicing process was observed (FSM) or fresh squeezed juice where the process was not observed (FS), from concentrate juice (FC) and not from concentrate juice (NFC). Participants rated each juice on overall appearance, aroma, overall flavor and texture using a 9-point scale with 1 being dislike extremely, 9 being like extremely (5 was neutral).

The four attributes (overall appearance, aroma, overall flavor, and texture) for the juices were rated between 5 and 7 on average which represented neutral to like moderately. For the overall appearance attribute, fresh squeezed juice where the juicing process (FSM) was observed was rated 6.52, while fresh squeezed juice where the process was not observed (FS) was rated 5.98. From concentrate (FC) and not from concentrate juices (NFC) were rated 6.45 and 6.31 respectively. (Figure 3-4). With regards to the aroma, FSM and FS were rated 6.91 and 6.72 respectively. Then, FC was rated 6.17, while NFC was rated 6.04. (Figure 3-4). The overall flavors for FSM and FS were rated 7.1 and 6.48 respectively. NFC was rated 6.11 for its overall flavor and FC was rated 5.86. (Figure 3-4). Relative to their texture, FSM and FS were rated 6.76 and 6.43 respectively. NFC and FC were rated 6.26 and 6.11 respectively (Figure 3-4).

Furthermore, participants rated the attributes color, sweetness, acidity and amount of pulp on a 5-point scale. For the 5-point scale, the value 3 was used to represent “just right”, with values of 4 and 5 being too much of an attribute (i.e. too sweet or too dark) and 1 and 2 being too little of an attribute (i.e. not acidic enough or not enough pulp). The meaning of the scales for each attribute is given in Table 3-2.

On average, based on the attribute color, FSM was rated 3.24, followed by a score of 3.45 for FS. NFC was rated 2.75, while FC was rated 2.65. (Figure 3-5). Also, the three juices were rated on their sweetness. FSM was rated 3.04, FS was rated 3.1, NFC was rated 2.76 and FC was rated 2.69. (Figure 3-5). Furthermore, with regards to the acidity, FSM was rated 3, while FS was rated 3.07. NFC and FC were rated 2.69 and 2.76 respectively. (Figure 3-5). For their amount of pulp, FSM and FS were rated 3.05 and 3.21 respectively, while NFC and FC were rated 2.93 and 3.59 respectively (Figure 3-5).

Finally, participants rated the three juices on their likelihood to purchase the juices at one of their favorite restaurants on a 6-point scale (with 1 being extremely likely, 2 being very likely, 3 being somewhat likely, 4 being not very likely, 5 being not at all likely, and 6 being don't like). Participants rated 2.47 and 2.87 for their likelihood to purchase FSM and FS respectively. They also rated 3.01 and 3.15 for their likelihood to purchase NFC and FC.

Overall Rank Order of the Orange Juices

Participants were asked to rank the three types of orange juice tasted. Of the 100 participants that saw the juicing process, most (52%) preferred the fresh squeezed juice, 18.75% liked second not from concentrate juice (NFC) and 23.25% liked least from concentrate juice (FC). For those that did not observe the juicing process, fresh

squeezed was still preferred, but by less participants (46%). Then, NFC was second liked by 18.75% of participants and FC was the least liked by 23.25% of participants.

Demographic Profile

Of the 200 respondents that participated in the survey, 52% were men and 48% were female (Table 3-3). Also, 37% of respondents were 30 years old or under, with 13.5% of respondents between the ages of 18 and 20 years (Figure 3-6). More than half of respondents (63%) were older than 30 years.

Additionally, the highest level of education for 72 participants was a high school degree or equivalent, while 15 participants went to grade or high school but did not finish (Figure 3-7). Forty-two participants had some type of college diploma or degree.

Thirty percent of participants (29.5%) were employed full time (Figure 3-8). Also, 18% of them were employed part time, 15% were currently unemployed, 14.5% were self-employed or homemaker and 12% were retired. There were very few students (5.5% of respondents). Again, 5.5% of respondents did not response or had other choice than the ones proposed.

Less than half participants (93 participants) had 2 or fewer people in their households, with 51 of them that have 2 persons in their households. In addition, 81 participants had 3 or 4 persons in their households, and only 26 participants had 5 to 12 persons in their households (Figure 3-9).

Additionally, the majority of respondents were single (41.5% of respondents), followed by married couples (32% of respondents) and divorced persons (13% of respondents). Other marital status recorded included domestic partnership, widowed and separated, as well as people with no response, with all of them accounting for 13.5% of respondents (Figure 3-10).

Most participants (117 participants) earn \$49,999 or less at work, with many (87 participants) earning \$30,000 to \$49,999. A significant number of respondents, 24 respondents, did not respond to the question (Figure 3-11).

Finally, over two third of the participants (138 participants) were Whites/ Caucasians followed by Black/African-Americans that accounted for 15.5% of the participants. The minority of participants was Hispanic/ Latinos with 23 participants and Asians with 2 participants (Figure 3-12).

Summary of Willingness-to-Pay Questions

Results of the choice scenarios. Ten scenarios, including two attributes (price and type of orange juice), were presented to the participants. In each scenario, there were four alternatives to choose from: option 1 is fresh squeezed juice (FS), option 2 is not from concentrate (NFC), option 3 is from concentrate juice (FC) and option 4 is no purchase. Participant's responses to the choice of orange juice product based on prices are shown in Table 3-4. The majority of participants choose to purchase fresh squeezed juice (FS) in scenarios F, I and J where the price of fresh squeezed juice is \$3.49, \$2.49 and \$2.49 respectively. Fresh squeezed juice was the second choice of the panelists when it costs \$4.49 in scenario C. In scenario G, while majority of the panelists (44.5%) chose not to purchase any of the products, 41.5% of participants preferred to purchase FS at a cost \$3.49. Additionally, in scenarios B, E and H, most of the participants chose to purchase NFC at the price of \$2.49. FC was the first choice for the majority of panelists at a price of \$1.99 in scenario A. A significant percentage of respondents: 61%, 42% and 44.5% chose not to purchase any product in scenarios C, D and G respectively.

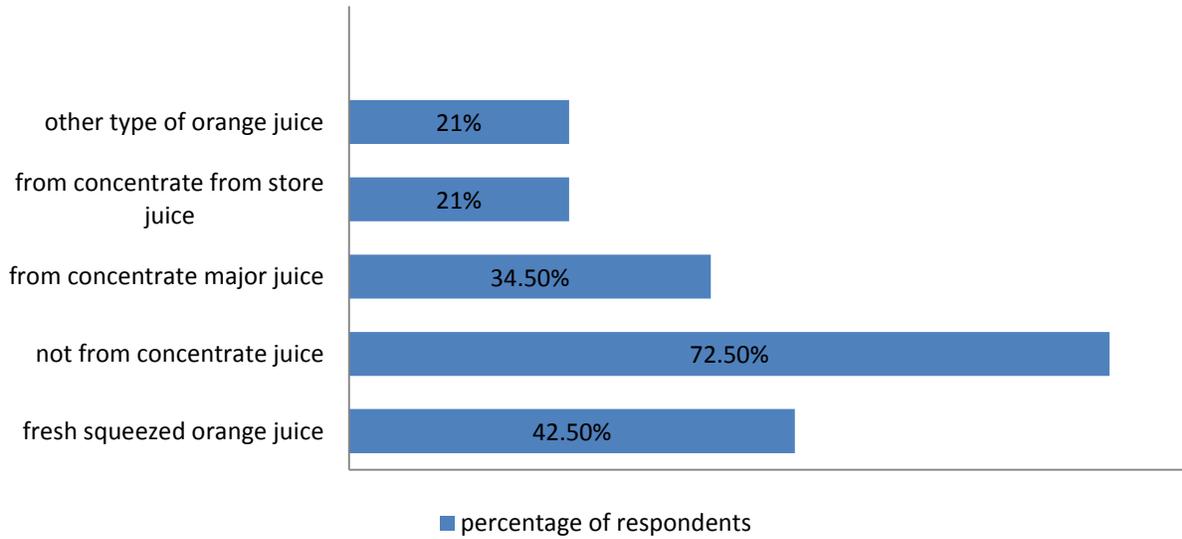


Figure 3-1. Percentage of respondents that consumed a type of orange juice the last four weeks

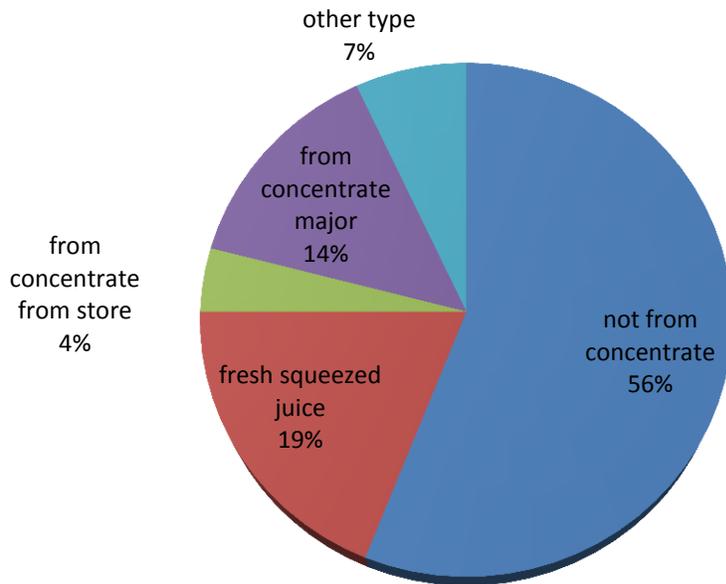


Figure 3-2. Orange juices consumed most often the last six months

Table 3-1. Number of glasses of orange juice consumed per week

	Frequency	Percent
7 or more glasses per week	58	29.0
3 to 6 glasses per week	99	49.5
1 to 2 glasses per week	34	17.0
Less than one glass	9	4.5
Total	200	100.0

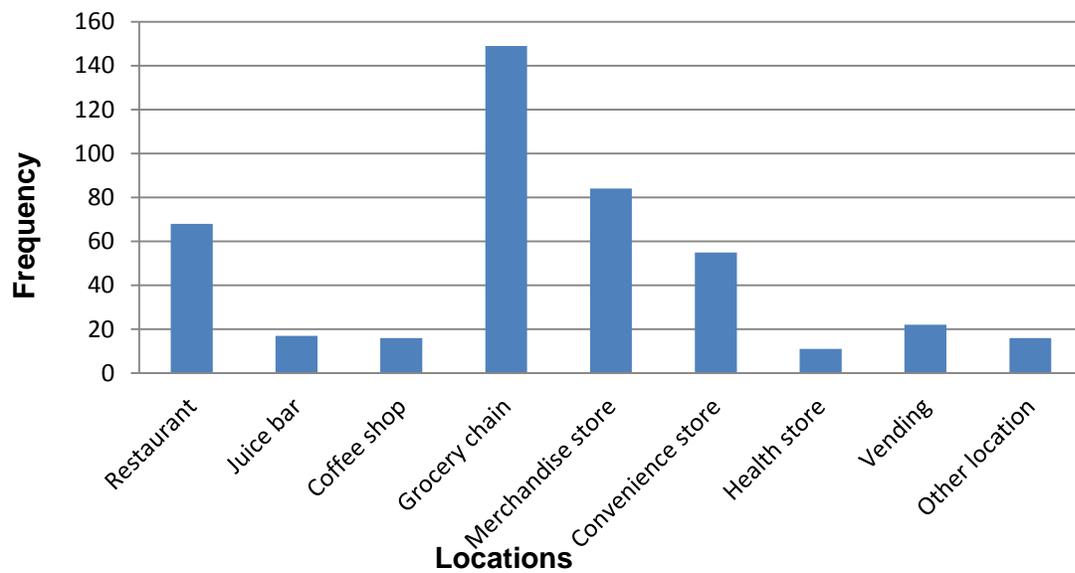


Figure 3-3. Locations where orange juices were purchased

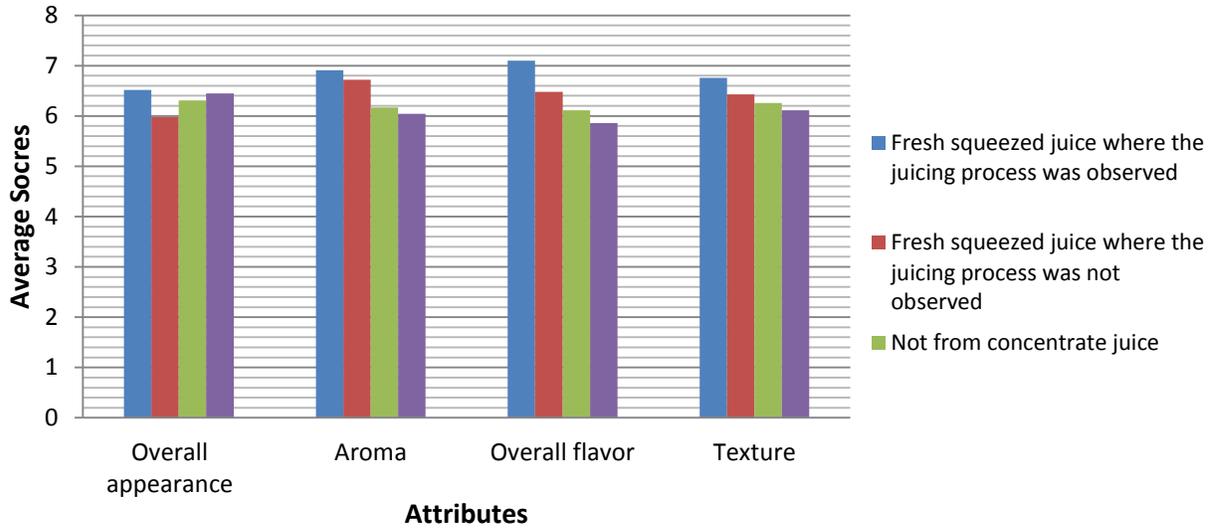


Figure 3-4. Average ratings of the attributes overall appearance, aroma, overall flavor, and texture

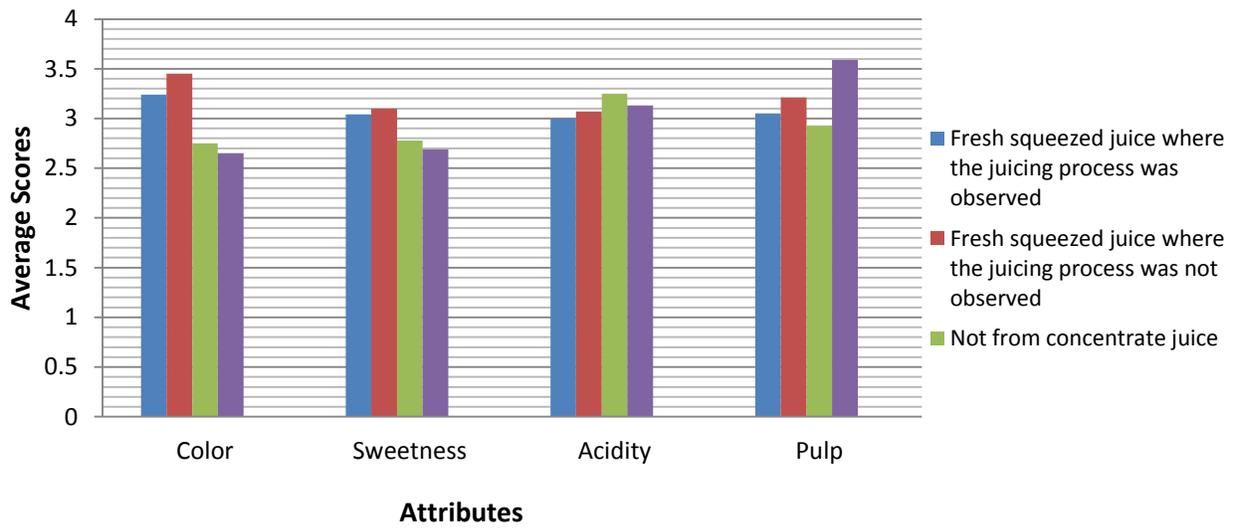


Figure 3-5. Average ratings of the attributes color, sweetness, acidity, and amount of pulp

Table 3-2. Scales of the attributes –color, sweetness, acidity, and amount of pulp

	1	2	3	4	5
Color	Much too pale	A little too pale	Just Right	A little too dark	Much too dark
Sweetness	Not at all sweet enough	A little not sweet enough	Just Right	A little too sweet	Much too sweet
Acidity	Not at all sour enough	A little not sour enough	Just Right	A little too sour	Much too sour
Amount of pulp	Much too much pulp	A little too much pulp	Just Right	A little not enough pulp	Much too little pulp

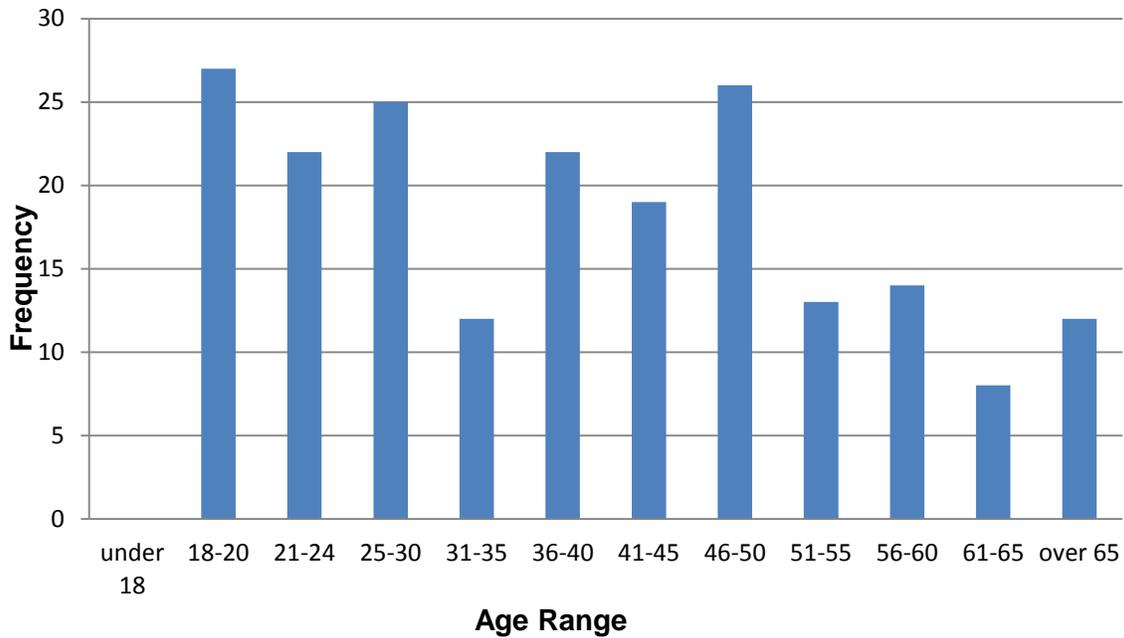


Figure 3-6. Age range of respondents

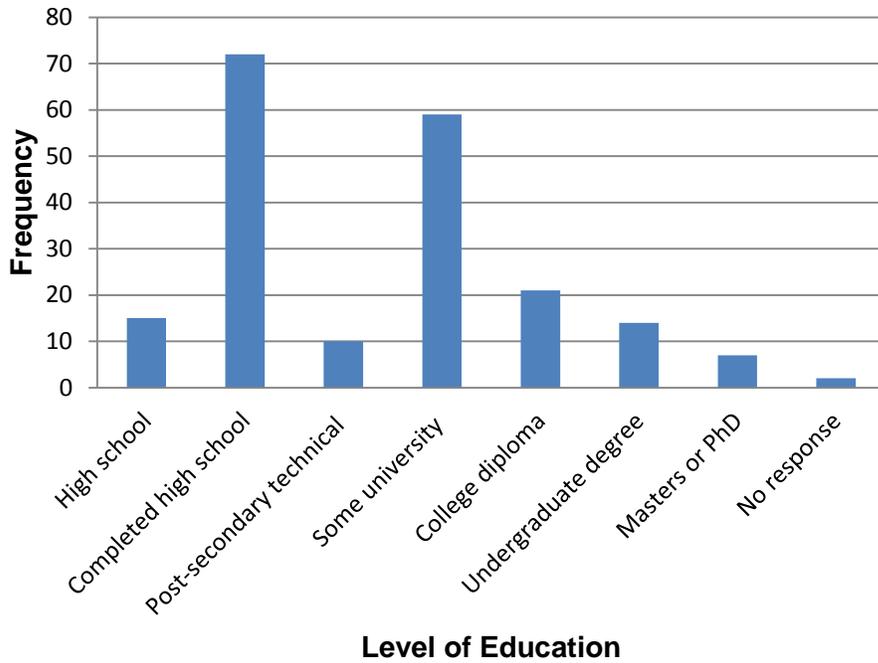


Figure 3-7. Level of education of respondents

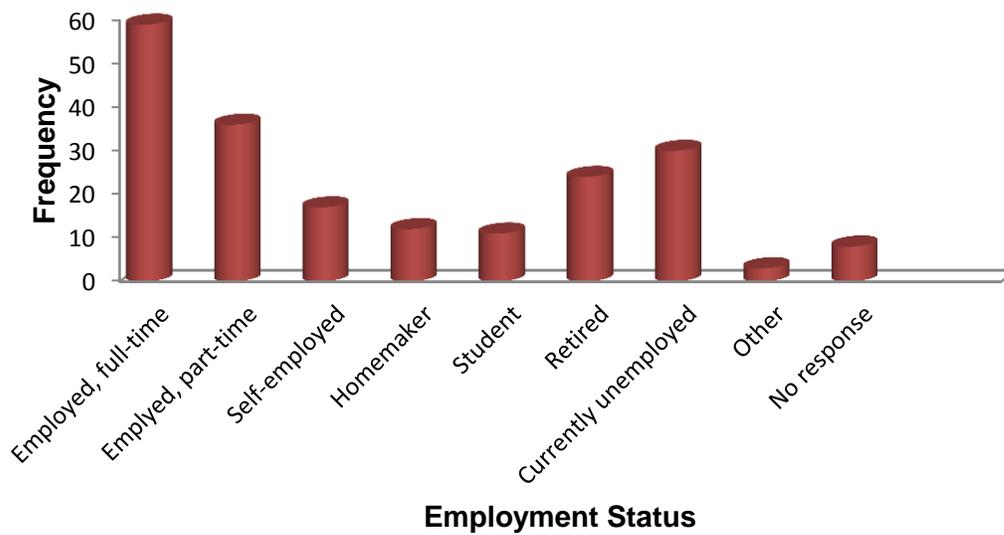


Figure 3-8. Employment status of respondents

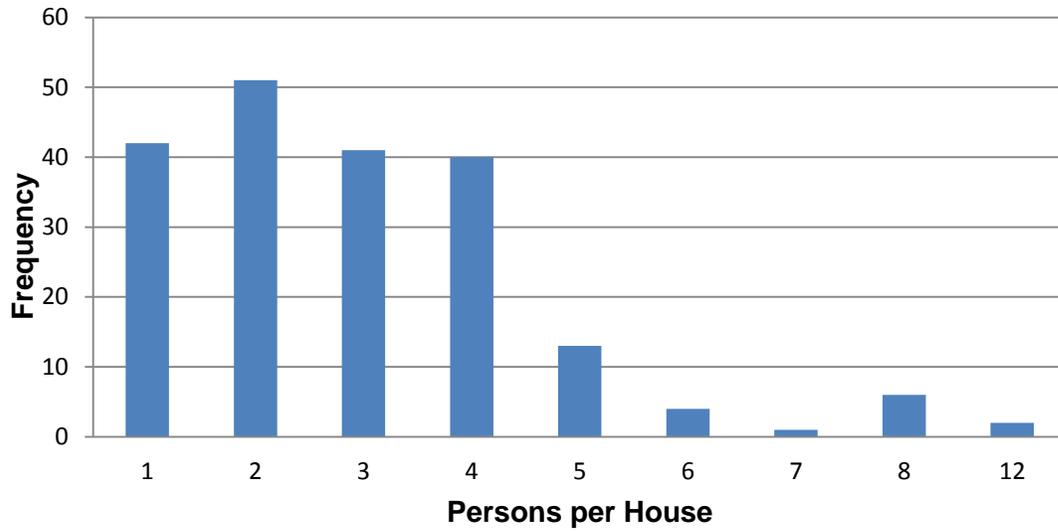


Figure 3-9. Household size of respondents

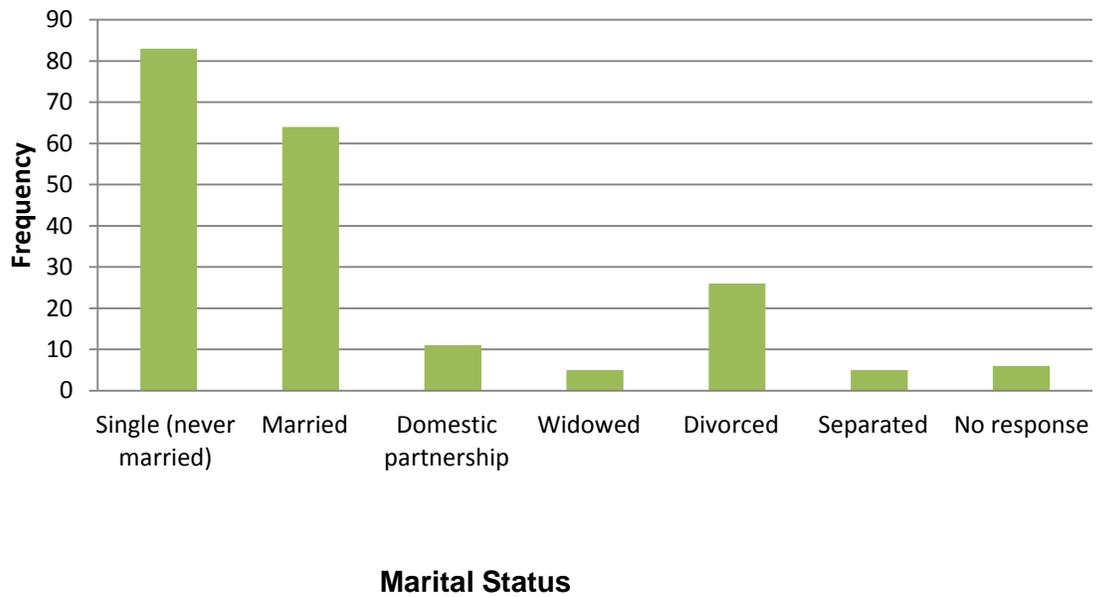


Figure 3-10. Marital status of respondents

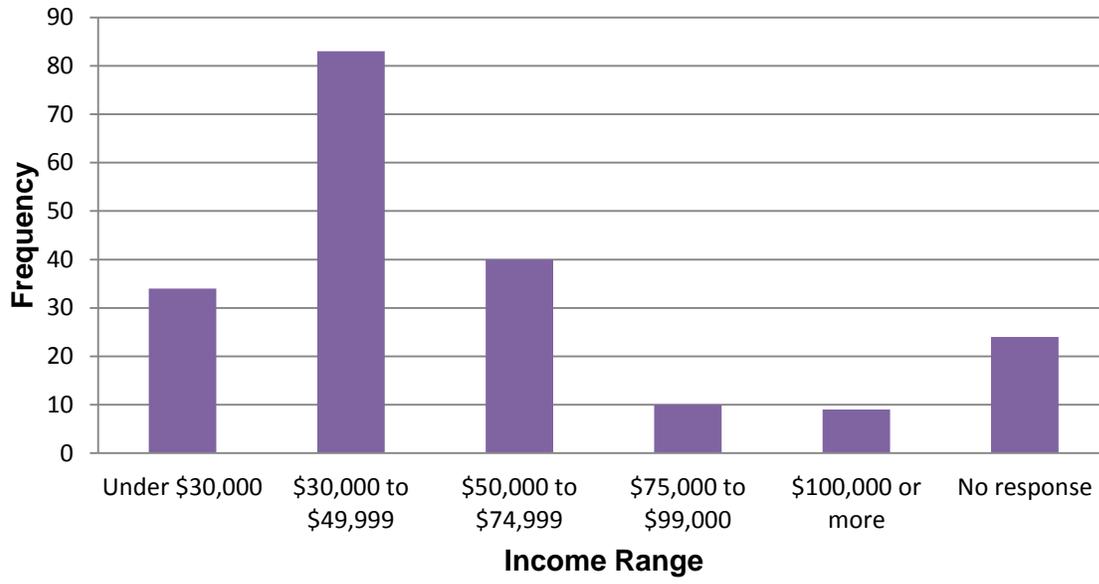


Figure 3-11. Income range of respondents

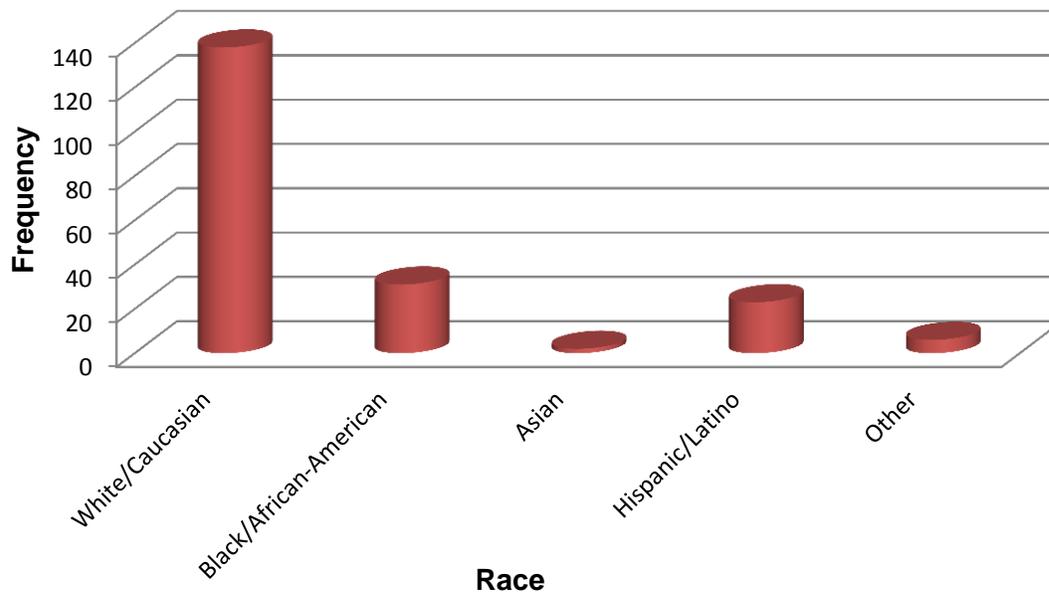


Figure 3-12. Race of respondents

Table 3-3. Results from the choice scenarios

Scenario	Fresh Squeezed	Fresh chilled, Not From Concentrate	From Concentrate	None
A	\$5.49	\$3.49	\$1.99	\$0
Choice percent	8%	18%	37%	36.5%
B	\$5.49	\$2.49	\$1.99	\$0
Choice percent	7.5%	41%	29%	22.5%
C	\$4.49	\$4.49	\$3.49	\$0
Choice percent	17%	7.5%	14.5%	61%
D	\$4.49	\$3.49	\$2.49	\$0
Choice percent	12%	19%	27%	42%
E	\$4.49	\$2.49	\$1.99	\$0
Choice percent	10%	43.5%	28.5%	18%
F	\$3.49	\$4.49	\$1.99	\$0
Choice percent	33.5%	4.5%	31%	31%
G	\$3.49	\$3.49	\$3.49	\$0
Choice percent	41.5%	9%	5%	44.5%
H	\$3.49	\$2.49	\$2.49	\$0
Choice percent	19.5%	37.5%	16%	27%
I	\$2.49	\$4.49	\$2.49	\$0
Choice percent	64.5%	5.5%	10%	20%
J	\$2.49	\$3.49	\$1.99	\$0
Choice percent	55.5%	8.0%	24%	12.5%

CHAPTER 4 THEORETICAL MODEL

Conjoint Analysis

Conjoint analysis is a statistical technique used mainly to measure the price effects in market research (Gustafsson, Herrmann and Huber, 2001p 47). Price is used by consumers “as a signal of quality as well as a monetary constraint in brand choice” (Gustafsson, Herrmann and Huber, 2001p 47). Hence, price has two roles: an informational role when it is used as a signal and an allocative role when it is used as a monetary constraint.

Furthermore, the purpose of using conjoint analysis is to find out which attributes, including price, given a number of product alternatives, have the greatest impact on the consumer’s choice or decision making (Gustafsson, Herrmann and Huber, 2001p 47). Conjoint measurement has been the most used method for measuring customers’ preference over the past two decades.

Random Utility Theory (RUT)

“Almost all conjoint analysis techniques can be viewed as a special case of the more general RUT paradigm” (Gustafsson, Herrmann and Huber, 2001 p167). Indeed, the term conjoint analysis should be restructured with more specific terms such as “random utility choice modeling” to help understand and model human decision- making and choice (Gustafsson, Herrmann and Huber, 2001 p167). Researchers, scientists or analysts use primarily RUT to have insights into consumer preferences. Randomness develops because analysts (or researchers or scientists) cannot directly detect the consumer’s true perception of attractiveness of each option. Rather, they can “indirectly observe indicators of true attractiveness by designing elicitation procedures (preference

elicitation procedures)” using random utility theory (Gustafsson, Herrmann and Huber, 2001p311). Even with that, not all the factors that influence consumer’s choice can be explained.

Random utility theory states that “utility (or attractiveness) of product or service options” can be broken up into “systematic (observed) and random (unobserved) components”:

$$U_i = V_i + \varepsilon_i, \quad (4-1)$$

where “ U_i is a latent measure of the attractiveness of option i , V_i is an observable, systematic or explainable component of the attractiveness of option i , ε_i is a random or unexplainable component of option i ” (Gustafsson, Herrmann and Huber, 2001p 311).

Additionally, the consumer is supposed to choose the alternative that gives him the highest utility or satisfaction. Therefore, the probability that alternative a is chosen by decision-maker j within choice set C is

$$P_C^j(a) = P[U_a^j = \max_{m \in C} U_m^j] \quad (4-2)$$

In this study, we use RUT to observe how the respondent makes his decision to purchase and which attributes impact the most his choice and decision. Two attributes are considered to impact the respondent’s decision to purchase: price and types of orange juice. In this situation, the respondent faces four options: choose to purchase any of the three types of orange juice or choose not to purchase at all.

Logit Model

“The logit model belongs to the class of probability models that determine discrete probabilities over a limited number of possible outcomes” (Cramer, 2003). Logit analysis differs from an ordinary linear regression by its dependent variable, which is not a

continuous variable but “a state which may hold or may not hold” (Cramer, 2003). The logit model can be distinguished in two models: ordered model, when the outcomes of the model can be ranked and non-ordered model, when the outcomes cannot be ranked. In this research, the model used is a non-ordered model with the dependent variable taking four choices (decide to purchase fresh squeezed juice, not-from-concentrate, from concentrate or not to purchase any juice).

Model Specification

The logit model in this study contains thirty (30) independent variables, including three basic variables: price, fresh squeezed (FS) and from concentrate juice (FC). These basic variables show the effects of price and the types of product on the consumer’s decision to purchase a product. Fresh squeezed and from concentrate orange juices are dummy variables. There are other dummy variables such as gender, race, age, education, employment, household size, income and “see a machine process the juice”. The dependent variable U represents the decision to purchase either fresh squeezed juice (A), from concentrate juice (B), not from concentrate (C) or not to purchase any juice (D).

The logit model equation is:

$$\begin{aligned}
 U(A, B, C) = & \beta_1 * price + \beta_2 * fs + \beta_3 * fc + \beta_4 * genprice + \beta_5 * genfs + \beta_6 * genfc + \\
 & \beta_7 * ageprice + \beta_8 * agefs + \beta_9 * agefc + \beta_{10} * educprice + \beta_{11} * educfs + \beta_{12} * educfc + \\
 & \beta_{13} * emprice + \beta_{14} * emfs + \beta_{15} * emfc + \beta_{16} * hsprice + \beta_{17} * hsfs + \beta_{18} * hsfc + \\
 & \beta_{19} * incprice + \beta_{20} * incfs + \beta_{21} * incfc + \beta_{22} * raceprice + \beta_{23} * racefs + \beta_{24} * racefc + \\
 & \beta_{26} * fsovfprice + \beta_{27} * nfcovfprice + \beta_{28} * fcovfprice + \beta_{29} * See_Mprice + \beta_{30} * See_Mfs \\
 & + \beta_{31} * See_Mfc
 \end{aligned}
 \tag{4-3}$$

$$\begin{aligned}
U(D) = & \beta_0 + \beta_1 * \text{price} + \beta_2 * \text{fs} + \beta_3 * \text{fc} + \beta_4 * \text{genprice} + \beta_5 * \text{genfs} + \beta_6 * \text{genfc} + \\
& \beta_7 * \text{ageprice} + \beta_8 * \text{agefs} + \beta_9 * \text{agefc} + \beta_{10} * \text{educprice} + \beta_{11} * \text{educfs} + \beta_{12} * \text{educfc} + \\
& \beta_{13} * \text{emprice} + \beta_{14} * \text{emfs} + \beta_{15} * \text{emfc} + \beta_{16} * \text{hsprice} + \beta_{17} * \text{hsfs} + \beta_{18} * \text{hsfc} + \\
& \beta_{19} * \text{incprice} + \beta_{20} * \text{incfs} + \beta_{21} * \text{incfc} + \beta_{22} * \text{raceprice} + \beta_{23} * \text{racefs} + \beta_{24} * \text{racefc} + \\
& \beta_{26} * \text{fsovfprice} + \beta_{27} * \text{nfcovfprice} + \beta_{28} * \text{fcovfprice} + \beta_{29} * \text{See_Mprice} + \beta_{30} * \text{See_Mfs} \\
& + \beta_{31} * \text{See_Mfc}
\end{aligned} \tag{4-4}$$

The variables in the logit model are explained in Table 4-1. The dummy variables are also explained in the same table. Demographic variables are built in the model to interact with the basic variables (price, FS and FC). Those interaction variables allow observing the effect of demographics on the decision to purchase when holding the basic variables constant. The ratings of the overall flavor attribute for fresh squeezed, not from concentrate and from concentrate interact each with price to give the variables FSovfprice, NFCovfprice and FCovfprice respectively. Those variables were included because there was a significant difference in the ratings of the overall flavor attribute for the three juices. Furthermore, a variable “See_M” was created to interact with the basic variables to help investigate the effect of viewing the squeezing process on the consumer’s decision to purchase.

Table 4-1. Definition of the variables

Variable	Definition
Price	Price of product
FS	If product is fresh squeezed (equals 1) or not from concentrate orange juice (equals 0)
FC	If product is from concentrate (equals 1) or not from concentrate orange juice (equals 0)
	The following are interaction variables of:
Genprice	Gender(1 if female and 0 if male) times price
Genfs	Gender times if product is FS
Genfc	Gender times if product is FC
Ageprice	Age (1 if less than 30 and 0 otherwise) times price
Agefs	Age times if product is FS
Agefc	Age times if product is FC
Educprice	Education (1 if college or university degree and 0 otherwise) times price
Educfs	Education times if product is FS
Educfc	Education times if product is FC
Emprice	Employment(1 if employed full time and 0 otherwise) times price
Emfs	Employment times if product is FS
Emfc	Employment times if product is FC
Hsprice	Household (1 if one or two persons and 0 otherwise) times price
Hsfs	Household times if product is FS
Hsfc	Household times if product is FC
Incprice	Income (1 if less than \$49,999 and 0 otherwise) times price
Incfs	Income times if product is FS
Infc	Income times if product is FC
Raceprice	Race (1 if white and 0 otherwise) times price
Racefs	Race times if product is FS
Racefc	Race times if product is FC
FSovfprice	Rating of the overall flavor attribute for FS times price
NFCovfprice	Rating of the overall flavor attribute for NFC times price
FCovfprice	Rating of the overall flavor attribute for FC times price
See_Mprice	If participants watch the squeezing process (equals 1) or don't watch (equals 0) times price
See_Mfs	If participants watch or don't watch the squeezing process times FS
See_Mfc	If participants watch or don't watch the squeezing process times FC

CHAPTER 5 EMPIRICAL MODEL

Introduction

This chapter interprets the results obtained from the test of the logit model by analyzing the model. The logit model includes data from the sensory test, questions on willingness-to-pay (WTP) and demographic profile. The results obtained inform us about the factors that influence the purchase of orange juice, and also the price premium that the consumer is willing to pay for fresh squeezed juice above the WTP for not from concentrate (NFC).

Analysis of the Model

A logit model composed of variables obtained from the taste test attributes and the conjoint analysis was used to predict the probability of choosing to purchase a type of orange juice. The results of the logit model are shown in table 5-1. The coefficients of the variables obtained in the results of the test indicate whether the variables have a positive or negative effect on the decision to purchase (the dependent variable). Only variables that are significant at 90% and 95% confidence level were considered. A positive coefficient of a significant variable means a positive effect on the decision to purchase and a negative coefficient means negative effect on the decision to purchase.

The variables price, types of product (fresh squeezed and from concentrate), and the ratings of the overall flavor attribute for FS and NFC times price (FSovfprice and NFCovfprice) are significant at 95% confidence level. Fresh squeezed (FS) variable and FSovfprice have positive coefficients of 1.119 and 0.015 respectively. This is interpreted as consumers are more willing to purchase if the product is fresh squeezed juice than if it is not from concentrate juice. Also, as the rating of the overall flavor attribute for FS

increases, consumers are more willing to purchase when price is kept constant. Price, FC and NFCovfprice variables have negative coefficients of -1.191, -1.303 and -0.014 respectively. Consequently, as the price of orange juice increases the consumers are less likely to purchase a type of orange juice. Furthermore, consumers are less willing to purchase if the product is from concentrate orange juice than if it is not from concentrate juice. As the rating of the overall flavor attribute for NFC increases, consumers are less willing to purchase.

The interactions between the variable “See-M” and the basic variables are statistically insignificant, suggesting it did not matter whether or not the consumers watched the juice squeezing process.

Five interaction variables of demographics and basic variables (emfc, raceprice, educfc, emprice, and hsf) are significant at 95% and 90% confidence level. Emfc and raceprice have positive coefficients of 0.093 and 0.033 respectively. Hence, a person employed full time is more likely to purchase if the product is a from concentrate juice than a person not employed full time (part-time, self-employed, student, homemaker, currently unemployed and retired). As price is held constant, a White is more willing to purchase a type of juice than a non-White (Asian, Black or Hispanic). However; educfc, emprice, and hsf have negative coefficients of -0.115, -0.023 and -0.063 respectively. A highly educated consumer (completed college or university) is less willing to purchase if the product is a from concentrate juice than a less educated consumer (completed grade, high or post-secondary technical school). A consumer employed full-time is less likely to purchase a product than a part-time, self-employed, student or homemaker consumer when price is kept constant. A person with a household size of one or two

persons is less willing to purchase if the product is a from concentrate juice than a person with a household size of more than two persons.

Willingness To Pay (WTP) for Fresh Squeezed Orange Juice

The equation of the WTP for fresh squeezed orange juice is:

$$\text{WTP} = - (\beta_2\text{fs} + \beta_5\text{genfs} + \beta_8\text{agefs} + \beta_{11}\text{educfs} + \beta_{14}\text{emfs} + \beta_{17}\text{hsfs} + \beta_{20}\text{incfs} + \beta_{23}\text{racefs} + \beta_{29}\text{see_mfs}) / (\beta_1\text{price} + \beta_4\text{genprice} + \beta_7\text{ageprice} + \beta_{10}\text{educprice} + \beta_{13}\text{emprice} + \beta_{16}\text{hsprice} + \beta_{19}\text{incprice} + \beta_{22}\text{raceprice} + \beta_{28}\text{see_mprice}) \quad (5-1)$$

The base demographic characteristics (BC) for the dummy variables are: male; other race such as Black, Asian and Hispanic; age 30 or more; completed grade, high or PS (post-secondary) technical school; not employed full time (part-time, self-employed, student and homemaker); household size of more than two persons; and income greater than \$49,999.

The price premium that a consumer is willing to pay for fresh squeezed product is shown in Table 5-2. That price premium was computed using the WTP's equation (5-1) and the variables in the logit model (4-3).

A woman with the base characteristics is willing to pay a price premium of \$0.99 above the price of NFC for fresh squeezed orange juice. However, a woman with different characteristics than the base characteristics (a woman that is non-White, is 30 years or older, has completed grade, high or PS school, is not employed full time, has a household size of more than two persons and earns more than \$49,999) is likely to pay \$0.04 more than the price premium the woman with base characteristics will pay, or a premium of \$1.03 for FS.

A man with the base characteristics is willing to pay a price premium of \$0.94, which equals to \$0.05 less than the price premium a woman with the same characteristics will pay for FS above the price of NFC.

Holding the other variables constant except race allows us to determine the effect of race on a male consumer's WTP. A White male is likely to pay a price premium of \$1.00 for FS while a Black, Hispanic or Asian male will pay \$0.94.

As all variables are kept fixed but education indicates that a consumer who completed college or university is likely to pay a price premium of \$0.97 for FS while a consumer who completed only grade, high or PS technical school is willing to pay \$0.94.

Also, a full time employed consumer is willing to pay a price premium of \$0.92 while a part-time, self-employed, student or homemaker consumer will pay \$0.94 as all the variables are held fixed except employment.

To observe the effect of age on the WTP for fresh juice when the consumer is a female, all variables are kept constant except age and gender. A female 30 years old or more is willing to pay the same price premium (\$0.99) as a female younger than 30 years.

A consumer who lives with one or two persons is willing to pay a price premium of \$0.89 when all variables are held constant but household size. He will pay \$0.05 less than the price premium a consumer with more than two persons in the house will pay.

Everything is kept constant except income to see the impact of income on consumers' WTP. A consumer with an income greater than \$49,999 is willing to pay

\$0.93 as price premium while a consumer with an income lower than \$49,999 will pay \$0.94.

Table 5-1. Results of the logit model with * and ** indicating that the variable is significant at 95% and 90% confidence level respectively based on the P-value

Variable	Coefficient	Standard Error	b/St.Er.	P[Z >z]
Price*	-1.191	0.169	-7.031	0.000
FS*	1.119	0.534	2.097	0.036
FC*	-1.303	0.442	-2.949	0.003
Genprice	0.049	0.040	1.211	0.226
Genfs	0.012	0.155	0.081	0.936
Genfc	0.073	0.128	0.572	0.568
Ageprice	0.002	0.001	1.163	0.245
Agefs	-0.006	0.005	-1.055	0.292
Agefc	0.005	0.004	1.155	0.248
Educprice	-0.005	0.013	-0.394	0.693
Educfs	0.046	0.049	0.939	0.348
Educfc*	-0.115	0.041	-2.794	0.005
Emprice*	-0.023	0.008	-2.728	0.006
Emfs	-0.007	0.032	-0.226	0.821
Emfc*	0.093	0.026	3.607	0.000
Hsprice	-0.001	0.011	-0.107	0.914
Hsfs	-0.062	0.045	-1.364	0.173
Hsfc**	-0.063	0.037	-1.694	0.090
Incprice	-0.020	0.014	-1.439	0.150
Incfs	0.006	0.053	0.113	0.910
Incfc	0.031	0.042	0.752	0.452
Raceprice**	0.033	0.019	1.766	0.078
Racefs	0.036	0.070	0.522	0.602
Racefc	0.059	0.057	1.040	0.299
FSovfprice*	0.015	0.007	2.200	0.028
NFCovfprice*	-0.014	0.007	-1.895	0.058
FCovfprice	-0.004	0.007	-0.636	0.525
See_Mprice	-0.001	0.041	-0.016	0.988
See_Mfs	0.042	0.157	0.270	0.787
See_Mfc	0.027	0.130	0.211	0.833
Intercept*	-3.193	0.169	-18.921	0.000

Table 5-2. Price premium for fresh squeezed juice based on different demographic characteristics.

Demographic characteristics	Price premium		Price premium	Difference of price premiums
A woman with the base characteristics (BC)	\$0.99	A woman with different characteristics	\$1.03	-\$0.04
A male with the BC	\$0.94	A woman with the BC	\$0.99	-\$0.05
A White male	\$1.00	A non-White male	\$0.94	\$0.06
A more educated person	\$0.97	A less educated person	\$0.94	\$0.03
A person employed full time	\$0.92	A person not employed full time	\$0.94	-\$0.02
A female, less than 30 years old	\$0.99	A female, 30 years or older	\$0.99	\$0
A person with a household size of 2 persons or less	\$0.89	A person with a household size of more than 2 persons	\$0.94	-\$0.05
A person with an income of \$49,999 or lower	\$0.93	A person with an income greater than \$49,999	\$0.94	-\$0.01

CHAPTER 6 CONCLUSION

Summary

A sensory test and a conjoint analysis survey were conducted to assess the consumer's taste preference and willingness to pay for the three types of orange juice (fresh squeezed, not from concentrate and from concentrate). On the overall taste preference, fresh squeezed juice was preferred best. Fifty two percent of the participants that saw the juicing process preferred fresh squeezed juice and 46% of those that did not observe the juicing process still preferred the fresh juice. Not from concentrate juice was the next preferred juice and from concentrate was liked least by both groups of participants.

Furthermore, a conjoint analysis was used to determine the factors that influence the consumers' decision to purchase the orange juice product. The results indicate consumers are more likely to purchase fresh squeezed juice than not from concentrate juice, and they are less likely to purchase from concentrate juice than not from concentrate juice. The overall flavor rating for FS has a positive impact on the consumers' decision to purchase while price and the overall flavor rating for NFC negatively influence the decision to purchase. Some demographic interaction variables also impact the decision to purchase. The interactions between employment and FC, race and price positively influence the willingness to pay, while the interactions between education and FC, employment and price, and household size and FC have negative effects. Watching the oranges be squeezed by a machine has no impact on the decision to purchase.

Furthermore, price premiums were calculated. Whatever their demographic characteristics, consumers are willing to pay more for fresh squeezed juice above the WTP for not from concentrate juice. However, some consumers are willing to pay more price premium than others. The highest price premium they will pay is \$1.03 and the lowest price premium is \$0.89. Women are willing to pay a higher price premium than men for fresh squeezed juice, consumers with higher education, white consumers, consumers with household sizes greater than two, and consumers with higher incomes were also willing to pay higher prices. Age has no effect on the WTP for fresh squeezed juice. Consumers employed full time are less likely to pay a high price premium than persons not employed full time.

Hypotheses Summary

The following are the hypotheses tested in this research. The first hypothesis stated that participants that saw the juicing process would like fresh squeezed juice (FS) more than participants who did not see the juicing process. We reject this hypothesis because results from the logit model showed that watching the oranges be squeezed by a machine had no impact on the willingness to pay.

We fail to reject the hypothesis that stated the price would have a negative effect on the consumer's decision. We also fail to reject the hypothesis which stated that the higher the income the higher the decision to purchase the orange juice. Finally, we fail to reject the hypothesis that stated that the higher the education level the higher the decision to purchase.

Marketing Message

This study is limited to Florida interpretation only. In fact, the findings obtained can be useful to the Florida orange juice markets. This research has shown that it is

important to use a taste test to observe consumers' willingness to pay. Also, using a conjoint analysis allows us to determine which attributes are more influential on the willingness to pay. Both attributes-price and types of orange juice- influence the decision to purchase orange juice.

Consumers are willing to pay a price premium for fresh squeezed juice above the price of NFC (at least \$0.89); therefore it is necessary to find out the cost of production of fresh squeezed juice. In case the cost of production and distribution is lower than the mean price premium for FS, then fresh squeezed juice can be a competitive product in the orange juice market. In this situation, resources can be spent on market development to attract more consumers. In case the opposite happens (cost is higher than price premium) then it will not be a good idea to develop the market for fresh squeezed juice. There is no need to implement the squeezing process of oranges into the market places in Florida since watching the machine squeeze oranges has no impact on the willingness to pay.

Further Research

The consumption of orange juice has been decreasing since 1998, and research has shown that the drop in the consumption of orange is partially due to the low-carbohydrate diet trends (Love, 2005). In 1972 and 1992, Dr. Robert Atkins published a book detailing the benefits and guidelines for a low-carbohydrate lifestyle. These diet trends reduce the consumption of fresh fruit and fruit juices by diet adherents and even normal consumers. Love (2005) also found that diet media coverage has a negative and significant effect upon purchases of orange juice in both the United States and within the Southern region. Further research can be done on how advertising and media coverage on the health benefits of orange juice can affect the demand for orange juice.

Additionally, further research can be conducted on how fresh squeezed juice can be supplied throughout the year, since the production of oranges is seasonal and fresh squeezed juice is not storable for a long period of time.

Study Limitations

The main limitation of this study was the fact that fresh squeezed juice was presented into two different forms: fresh juice (FSM) where half of the 200 panelists saw the machine squeezed the juice and fresh juice (FS) where the other half did not see the squeezing process. However, not from concentrate and from concentrate juices were presented in the same form to the 200 panelists. This brought up some confusion when reporting the taste test statistics and when running the logit model.

APPENDIX A
PURCHASE AND USAGE, TASTE TEST SURVEY

DRAFT – June 4

**INTERVIEWER: ENTER YOUR NAME AND INTERVIEWER NUMBER INTO
THE COMPUTER**

NAME: _____

INTERVIEWER #: _____ **(OPEN ENDED)**

INTERVIEWER CHECKS YOUR MARKET LOCATION:

ORLANDO– Altamonte Mall

JACKSONVILLE – Avenues Mall

OR: ALTANTA – Mall of Georgia

INTRODUCTION

INTERVIEWER READ:

Thank you for agreeing to participate in our taste test and survey today. I am going to ask you to enter your responses to the questions I have for you today on a computer. In a few minutes you are going to taste some orange juice samples and I will ask you to enter your responses to some questions about the products you will taste. Before we begin, I'd like to ask you a few questions about your orange juice purchasing and consumption habits.

SECTION A. PURCHASE AND USAGE

In this survey, we are interested in your shopping and consumption habits for orange juice.

A1a. Which of the following types of orange juice have you consumed the past 4 weeks? (*Please select all that apply*)

A1b. And which one type of orange juice do consume most often? (*Please select one response only*) [SHOW ONLY THOSE SELECTED AT A1a]

Fresh squeezed orange juice (from a home juicer, restaurant or elsewhere)

Fresh chilled brands, not from concentrate orange juice, typically bought in the refrigerated section of your store (e.g. Tropicana Pure Premium, Florida's Natural, Simply Orange)

From-concentrate brands of orange juice in gallon or half gallon containers

From concentrate store brands in gallon or half gallon containers

Other types (including frozen concentrate, single serving or blended (e.g. Sunny Delight)

A2. In an average week how many glasses of orange juice do you drink? (*Please select one response only*)

7 or more glasses per week

3 to 6 glasses per week

1 to 2 glasses per week

Less than one glass per week

A3. At which of the following locations have you consumed orange juice in the past 6 months? (*Please select all that apply*)

Home

Restaurant

Fresh juice bar

Coffee shop

Major Chain grocery store

Large merchandise store (such as Wal-Mart, COSTCO)

Convenience stores (like small corner stores, 7-Eleven and gas station
convenience stores)

Natural, health or organic food stores

Vending machines

Other locations

A4. How often do you drink orange juice somewhere else other than at home?

(Please select one response)

Once a day or more often

Once a week or more often

Once every two or three weeks

Once a month/every four weeks

Once every 2 to 3 months

Once every 4 to 6 months

Once or twice a year

Less than once a year

A5. Typically, of 10 glasses of orange juice that you drink, how many of these
are....? Please enter a number for each type of orange juice. MUST TOTAL 10. Enter 0
IF YOU HAVE NOT CONSUMED ANY OF THIS TYPE OF JUICE.

Type of Juice Consumed	Number of Glasses
Fresh squeezed orange juice	
Fresh chilled brands, not from concentrate orange juice	
From-concentrate brands of orange juice	
From concentrate store brands	
Other types of orange juice	
TOTAL	10

SECTION B . TASTE TEST SECTION

INTERVIEWER READ:

I am now going to ask you to try three different orange juice samples. I will present the samples to you one at a time, ask you to rate the sample on several attributes and in between tasting each one I'll have you eat a cracker and then drink some water to cleanse your palate before tasting the next sample.

INTERVIEWER: HAVE RESPONDENT LOOK AT SAMPLE AND SMELL EACH ONE BEFORE TASTING. RESPONDENTS WILL EVALUATE EACH SAMPLE FOR APPEARANCE, AROMA AND COLOR BEFORE TASTING, THEN TASTE EACH SAMPLE AND CONTINUE EVALUATING OTHER ATTRIBUTES. PROVIDE SAMPLE NUMBER FOR RESPONDENT TO SELECT CODE. ROTATE ORDER OF PRESENTING SAMPLES.

[PROGRAMMER: SET UP A SEPARATE SCREEN AND REPEAT FOR EACH SAMPLE NUMBER. THERE WILL BE A TOTAL OF THREE SAMPLES SERVED PER

RESPONDENT BUT FOUR SAMPLE CODES. REPEAT BLOCK OF Q's B1 to B9 FOR EACH SAMPLE]

SAMPLE NUMBERS: (TO BE PROVIDED BY FDOC)

XXX - (Fresh Squeezed, See Machine Squeezing)

XXX - (Fresh Squeezed, Don't see Machine Squeezing)

XXX – Fresh chilled

XXX – From concentrate

BEFORE TASTING this sample please look at the juice and rate it for its overall appearance and color.

B1. OVERALL APPEARANCE (Select one)

<input type="checkbox"/>								
Dislike extremely	Dislike very much	Dislike moderately	Dislike slightly	Neither like or dislike	Like slightly	Like moderately	Like very much	Like extremely

B2. COLOR OF JUICE

<input type="checkbox"/>				
Much too pale	A little too pale	Just Right	A little too dark	Much too dark

B3. AROMA (Select one)

<input type="checkbox"/>								
Dislike extremely	Dislike very much	Dislike moderately	Dislike slightly	Neither like or dislike	Like slightly	Like Moderately	Like very much	Like extremely

PLEASE TASTE THE JUICE THEN CONTINUE RATING

B4. OVERALL FLAVOR (Select one)

<input type="checkbox"/>								
Dislike extremely	Dislike very much	Dislike moderately	Dislike slightly	Neither like or dislike	Like slightly	Like moderately	Like very much	Like extremely

B5. MOUTHFEEL/TEXTURE (Select one) FDOC: ARE THERE PARTICULAR MOUTHFEEL ATTRIBUTES YOU WANT HERE SUCH AS SMOOTHNESS/VISCOSITY??

<input type="checkbox"/>								
Dislike extremely	Dislike very much	Dislike moderately	Dislike slightly	Neither like or dislike	Like slightly	Like moderately	Like very much	Like extremely

B6. SWEETNESS

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all sweet enough	A little not sweet enough	Just Right	A little too sweet	Much too sweet

B7. ACIDITY

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all sweet enough	A little not sweet enough	Just Right	A little too sweet	Much too sweet

B8. AMOUNT OF PULP

<input type="checkbox"/>				
Much too much pulp	A little too much pulp	Just Right	A little not enough pulp	Much too little pulp

B9. If this juice were available today, how likely are you to buy it? FDOC: Do you want to elaborate here and ask “available by the glass” or “available in one of your favorite restaurants’??

Extremely likely

Very likely

Somewhat likely

Not very likely

Not at all likely

DK

B10. Overall, taking everything into consideration, please rank order which juice you liked best, second best and least.

[PROGRAMMER: INSERT ACTUAL NUMBER OF SAMPLES TRIED] FDOC: Do

you want to rank order or simply get an overall preference and reason why??

	Liked Best	Liked Second Best	Liked Least
Sample # 1			
Sample # 2			
Sample # 3			

OR Optional: Overall, taking everything into consideration, which of the three samples would you say you liked the best?

Sample #1

Sample # 2

Sample # 3

No preference

SECTION C . PRICING & PURCHASE OPTIONS

OPTION 1: VAN WESTENDORP

Thinking about **fresh-squeezed orange juice that you purchase by the glass...**

C1. At what price would you consider a 10 ounce glass of fresh squeezed orange juice to be getting expensive, but you would still consider buying it?

_____ **[INSERT TEXT BOX]**

C2. At what price would you consider a 10 ounce glass of fresh squeezed orange juice to be getting too expensive and you would not consider buying it?

_____ **[INSERT TEXT BOX]**

C3. At what price would you consider a 10 ounce glass of fresh squeezed orange juice to be getting inexpensive, and you would not consider it to be a bargain?

_____ **[INSERT TEXT BOX]**

C4. At what price would you consider a 10 ounce glass of fresh squeezed orange juice to be so inexpensive that you would doubt its quality and would not consider buying it?

_____ **[INSERT TEXT BOX]**

C5. At **[INSERT EXPENSIVE PRICE FROM QC1]** how likely are you to purchase a fresh squeezed 10 ounce glass of orange juice in the next six months?

Extremely likely

Very likely

Somewhat likely

Not very likely

Not at all likely

DK

C6. At **[INSERT THE BARGAIN PRICE FROM QC3]** how likely are you to purchase a fresh squeezed 10 ounce glass of orange juice in the next six months?

Extremely likely

Very likely

Somewhat likely

Not very likely

Not at all likely

DK

NOTE TO FDOC: THE ADVANTAGE OF THIS APPROACH IS THAT IT DOES NOT RESTRICT THE RANGE – RESPONDENTS CAN ENTER WHATEVER THEY

WISH AND THE RESULTS INDICATE THE PRICE THAT WILL STIMULATE
MAXIMUM VOLUME.

APPENDIX B
CONJOINT ANALYSIS SURVEY AND DEMOGRAPHICS

PLEASE READ CAREFULLY

In the next part of the survey, **imagine that you are planning to purchase a glass of orange juice at your favorite restaurant**, and you have to make a choice between different options available to you.

On the following screens you will be presented with a number of different options to choose from.

- Please choose **ONLY ONE** option on **EACH** screen
- Assume that the options on EACH screen are **the only ones available**
- **DO NOT** compare options on different screens

When deciding on options, consider only the features that are important to you in your purchase decision. For example, if price is not a consideration then you might wish to ignore the price in deciding which product to choose. If you do not care about the type of juice, then ignore the juice type. On the other hand, if several features are important to you, then consider all of them when making your choice.

In the purchase choices you will see on the following screens there are some terms you may encounter. **PLEASE READ THE FOLLOWING GLOSSARY OF TERMS BEFORE PROCEEDING.**

[NOTE: INSERT PAGE BREAK]

GLOSSARY OF TERMS: FDOC TO CONFIRM AND EDIT DEFINITIONS AS NECESSARY AS THEY APPLY TO ORANGE JUICE TYPES

Fresh Squeezed: The juice is freshly squeezed from fresh oranges just before serving at the location where you are buying it

Fresh chilled, not from concentrate: Fresh orange juice that has been previously prepared and refrigerated to keep it fresh

From concentrate: The juice has been constituted from concentrate

[INSERT PAGE BREAK]

CHECK ONLY ONE CHOICE ON EACH SCREEN

Now suppose you are ordering a 10 ounce glass of juice at a restaurant. The following choices are the **ONLY ONES AVAILABLE** to you. **[INSERT CHOICE SCENARIOS. ROTATE ORDER]**

A.

Features	Option 1	Option 2	Option 3
			
Type of ORANGE JUICE	Fresh Squeezed	Fresh chilled, not from concentrate	From concentrate
SIZE	10 oz. glass	10 oz. glass	10 oz. glass
PRICE	\$5.49	\$3.49	\$1.99
PURCHASE	<input type="checkbox"/> Option 1 <input type="checkbox"/> Option 2 <input type="checkbox"/> Option 3 <input type="checkbox"/> No purchase		

[PROGRAMMER: ALL SCENARIOS APPEAR AS ABOVE FORMAT BUT PRICES CHANGE FOR OTHER OPTIONS B THROUGH J AS FOLLOWS]

	Fresh Squeezed	Fresh chilled, Not From Concentrate	From Concentrate
B	\$5.49	\$2.49	\$1.99
C	\$4.49	\$4.49	\$3.49
D	\$4.49	\$3.49	\$2.49
E	\$4.49	\$2.49	\$1.99
F	\$3.49	\$4.49	\$1.99
G	\$3.49	\$3.49	\$3.49
H	\$3.49	\$2.49	\$2.49
I	\$2.49	\$4.49	\$2.49
J	\$2.49	\$3.49	\$1.99

NOTE TO FDOC: THIS APPROACH OBVIOUSLY SETS PRICES WITHIN A RANGE OF \$1.99 to \$5.49. THE RESULTS WILL MODEL WITHIN THIS PRICE RANGE. I DO NOT RECOMMEND ASKING TWO DIFFERENT PRICING QUESTIONS IN THE SAME SURVEY.

SECTION D: DEMOGRAPHICS

We just have a few questions so that we can classify your responses with those of others.

D1. What is your marital status? (Select one)

Single (never married)

Married

Domestic partnership

Widowed

Divorced

Separated

No response

D2. What is your year of birth?

[INSERT DROP DOWN]

Range = 1900 - 1989, No response

D3. What is the highest level of education you have achieved? (Select one only)

Grade school or some high school

Completed high school

Post-secondary technical school

Some university or college

Completed college diploma

Completed university undergraduate degree

Completed post-graduate degree (Masters or Ph.D.)

No response

D4. Which of the following best describes your current employment status?

(Select one only)

Employed, full-time

Employed, part-time

Self-employed

Homemaker

Student

Retired

Currently unemployed

Other

No response

D5. Including yourself, how many people live in your household?

[INSERT DROP DOWN] (Select one only)

1

2

3

4

5

6

7

8

9

10

11 or more

No response

IF 2 OR MORE CONTINUE, OTHERS SKIP TO D7

D6. Do you have any children living in your household that fall into these age categories? **(Select all that apply)**

Under age 2

2 to 5 years

6 to 12 years

13 to 18 years

No children in household

No response

D7. Which of the following broad categories best represents your total household income before taxes? **(Select one)**

Under \$30,000

\$30,000 to \$49,999

\$50,000 to \$74,999

\$75,000 to \$99,000

\$100,000 or more

No response

D8. Which of the following describes your racial background? **(Select one)**

White/Caucasian

Black/African-American

Asian

Hispanic/Latino

Other

D9. Gender (Select one)

Male

Female

D10. May I please have your name and 10-digit phone number? This information will be used for verification purposes only. A supervisor may call you back in a few days to confirm that you participated in this study.

[RECORD RESPONDENT FIRST AND LAST NAME AND PHONE NUMBER]

FIRST NAME _____

LAST NAME _____

PHONE NUMBER - RECORD AS (###)###-#### _____

[PROGRAMMER, THIS INFO IS NOT REQUIRED TO CONTINUE]

D11. And finally, what is your zip code?

RECORD RESPONDENT ZIP CODE _____

[PROGRAMMER, THIS INFO IS NOT REQUIRED TO COUNT AS A COMPLETE]

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BIOGRAPHICAL SKETCH

Lucie Kadjo was born in Ghana and raised in Ivory Coast. She attended the University Hassan I of Settat in Morocco in 2002 where she received her Bachelor of Science degree in economics in 2006, with a minor in enterprise management. Lucie started, in August 2008, her Master of Science program in food and resource economics at the University of Florida and specialized in trade and policy.