

CONSUMER PREFERENCES FOR WATERMELONS: A CONJOINT ANALYSIS

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CONSUMER PREFERENCES FOR WATERMELONS: A CONJOINT ANALYSIS

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CONSUMER PREFERENCES FOR WATERMELONS: A CONJOINT ANALYSIS

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Callie Bryan Evans, daughter of William Gary and Jeannie (Saunders) Bryan, was born March 5, 1980, in Dothan, Alabama. She graduated from Enterprise High School in Enterprise, Alabama as Valedictorian in 1998. After receiving her Associates Degree from Enterprise State Junior College, she entered Auburn University in the fall of 2000. She graduated cum laude with a Bachelor of Science degree in Agricultural Communications in May 2002. In August of 2002, she entered the Auburn University Graduate School in order to obtain a master's degree in Agricultural Economics. She married Wesley Evans on October 28, 2006.

THESIS ABSTRACT

CONSUMER PREFERENCES FOR WATERMELONS: A CONJOINT ANALYSIS

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(A.A., Enterprise State Junior College, 2000)

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Almost 5,000 years after the first recorded watermelon harvest, people are still harvesting and eating watermelons today. However, different people prefer different attributes of the fruit. The main purpose of this study was to identify the influence certain consumer preferences have on watermelon purchasing behavior. The specific attributes examined in this study were flesh-color, seed content, form, lycopene content and price.

Consumer preference surveys were administered in several Alabama grocery stores in 2004. Respondents were asked to complete 19 demographic and purchasing questions as well as rate 16 pictorial representations of the watermelon products depicting various combinations of watermelon attributes.

The total sample's distribution of preferred levels revealed that approximately 84 percent of the respondents preferred a red-fleshed watermelon, while 16 percent preferred a yellow-fleshed one. Looking at the total sample's relative importance figures, flesh-color was the most important attribute with 30 percent of the consumer's buying intention being influenced by this trait. The other attributes in order of decreasing relative importance were form, price, seed content and lycopene sticker possession.

A cluster analysis was then applied to identify consumer segments that were within the total sample. Three clusters were revealed – the “Seeing Red” group, the “Catch-all” group and the “Traditionalists.” The “Seeing Red” group placed 54 percent of their buying intention on the flesh-color attribute, and specifically the red-fleshed varieties of watermelon. The “Catch-All” group could possibly be a viable consumer segment, or a sort of catch-all group where respondents that didn't fit into the other two clusters fell. If a real group, they placed almost equal relative importance on the price, seed content, flesh-color and form attributes. Specifically this group prefers \$5, seedless, red, sliced or sectioned watermelons. The third cluster identified was the “Traditionalists.” This group preferred a whole, red, seeded watermelon.

Evaluating the preferences of the total sample and each of the clusters identified in this study could provide beneficial marketing information to retailers and all the way back through the production lines eventually providing consumer preference information to the watermelon growers. The entire watermelon industry could profit simply by knowing what their consumers prefer.

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I. INTRODUCTION

The goal of any business is to satisfy the needs of its customers, and the watermelon business is no different. With Americans spending approximately \$1.5 billion on watermelon each year (Maynard 2001), it's not surprising that all those involved in the sale of watermelons – from growers to brokers to retailers – want to know specifically what pleases their customers. The old marketing motto was to “sell what you have,” but recently increasing consumer demand has caused the adage to transform to “have what sells” (Maynard 2001). To keep up with the ever-changing demand of watermelons, growers and retailers must supply a product that has the group of attributes most preferred by their customers. However, the main problem is that those in the watermelon industry do not specifically know who their customers are, where to find these customers nor what attributes they prefer in a watermelon. This study aims to address these questions because knowing what the consumer wants and providing them with that product could benefit all parties involved. Most importantly, consumers would be satisfied. Knowing their customers' preferences, growers and retailers could go back to “selling what they have,” because they only “have what sells.”

Objectives of Study

In 2005 Americans consumed on average 13.8 pounds of watermelon per capita (Geisler 2007), and the highest consumption for more than 50 years occurred in 1996, with approximately 17 pounds of watermelon being eaten per person that year (Maynard 2001). Although these statistics prove that watermelons are an integral part of American diets and have been for several years, there has been a limited amount of research that addresses the consumer preferences for watermelon. The specific objectives of this study are to use a conjoint analysis to evaluate and determine consumer preferences for certain watermelon attributes. The attributes outlined in this study are flesh color, price, seed content, form and lycopene sticker possession. Secondly, this study will implement a cluster analysis to determine if watermelon consumers who were surveyed prefer watermelons for specific attributes or combinations of attributes. A final objective of this study is to utilize a multinomial logit to show a correlation between several demographic and purchasing questions and the different preferences of the respondents.

The results of this study will allow watermelon producers to better understand consumers' perception of the most desirable watermelon product and therefore allow them to supply exactly what consumers demand. The results will also benefit retailers by revealing the identifying characteristics of the typical consumer of certain watermelon products. This will allow the retailers to stock the products their shoppers most desire. Additionally, the results from this study will aid processors, brokers and others who market watermelons by uncovering the best form or cut of watermelon to market to certain consumer segments and assist them in the overall promotion of all types of watermelon.

Background

History

The first recorded watermelon harvest took place in Egypt almost 5,000 years ago. Hieroglyphics drawn on walls in caves and tombs record the Egyptians' initial harvest of watermelons. Some historians believe that traders then brought the watermelon from Egypt to Italy and Greece with intentions of selling the seeds. The watermelon was introduced in China around the 10th century and in the rest of Europe by the 13th century. African slaves, however, brought watermelons across the Atlantic Ocean into the United States (National Watermelon Promotion Board 1999a).

Other historians have a totally different view of the watermelon's history. Some believe that watermelons were, in fact, not brought over from foreign lands, but were native to America. The Indians in the Mississippi Valley were said to be growing watermelons when the French came to explore America (National Watermelon Promotion Board 1999a).

Taxonomy

The watermelon is botanically a fruit. It is kin to cucumbers, pumpkins, squash and gourds - all of which belong to the family Cucurbitaceae. *Citrullus lanatus* is the specific scientific name for the watermelon (National Watermelon Promotion Board 2006a).

Production

Growing watermelons takes the right combination of water, weather and care. Watermelons are grown in rows that are about eight to twelve feet apart. Approximately 60 days after planting, the watermelon fruits nearest the root, called the "crown set," are

produced. Within the following 30 days these first watermelons can be harvested, and other melons farther down the vine, which ripen after the crown set, can be harvested later. Because the watermelon is rather fragile, they are handpicked in the fields and then hand-packed in cartons, bins and trucks to be shipped (National Watermelon Promotion Board 1999b).

Watermelons are grown in more than 96 countries worldwide and are produced in 44 states in the U.S. (National Watermelon Promotion Board 2003d). The United States presently ranks fourth in production behind China, Turkey and Iran (United Nations 2004). In 2004, the U.S. produced approximately 3,682 million pounds of watermelon. As of 2005, Alabama was ranked fifteenth in national production with 20.3 million pounds produced, while Florida, Texas, Georgia and California top the list for production year after year (National Watermelon Promotion Board 2008) (see Tables 1 and 2).

Problems with Watermelon Production

Watermelons are susceptible to several kinds of insect infestations. Aphids, cabbage loopers, cucumber beetles, cutworms, leafhoppers, thrips, leafminers and spider mites are all known to infest watermelon crops. However, all can easily be treated with pesticides or by biological means. Organisms such as lady beetles and lacewings, as well as foods like bran and molasses, can be used as alternate tools to manage pests (Sanders 2001).

Several diseases also threaten watermelon crops. Alternaria leaf blight, anthracnose, bacterial rind necrosis, bacterial wilt, gummy stem blight, downy mildew, cercospora leaf spot, Fusarium wilt, powdery mildew, Pythium, Southern blight and verticillium wilt are common diseases in watermelon crops. Disease problems, like

insect problems, are controllable. Natural management of diseases in watermelons can be as simple as crop rotation or planting the seeds in raised beds. Fixed copper and sulfur products can also be applied for more non-traditional methods of control (Sanders 2001).

Watermelons can also be plagued by a variety of viruses. Pathogens that cause viruses include: watermelon mosaic virus-2, tobacco ringspot virus, papaya ringspot virus, squash mosaic virus, cucumber mosaic virus and zucchini yellow mosaic virus. Possibly the best way to manage viruses is to avoid conditions that promote infection and multiplication of viruses. However, controlling weeds near the watermelon crop can decrease the number of hosts that may transmit a virus to the watermelons and using nematicides and fumigants may help lessen the presence of any nematode transmitted viruses (Maynard 2001).

Weed control is also essential in successfully producing watermelons. Annual and perennial grasses along with broadleaf weeds commonly emerge throughout the watermelon growing season. Applying Alanap or Curbit to the soil surface after planting the watermelon crop will help control weed invasion (Sanders 2001).

The National Watermelon Promotion Board (NWPB) continually conducts research to help producers be more successful with their watermelon crops. Discovering disease-resistant varieties of watermelon and urging farmers to implement “Melcast”, a weather-condition disease forecasting system, are just a few of the methods the NWPB is researching to ease environmental concerns (National Watermelon Promotion Board 2003d).

Varieties

Throughout the world, more than 1,200 varieties of watermelons are produced, with between 200 and 300 varieties grown in the United States (National Watermelon Promotion Board 2003d). There are four basic groups of varieties of watermelons: Picnic, Ice-Box, Seedless, and Yellow-Flesh. The Picnic type's melons are oblong, have dark green rind (with or without stripes), weigh 20-25 pounds, and have red flesh (National Watermelon Promotion Board 2003b). This group includes varieties named Sangria, Fiesta, and Regency. Included in the Ice-Box group are varieties such as Sugar Baby, Petite Sweet, and Yellow Doll (National Watermelon Promotion Board 1999b). These melons are round, weigh 5-15 pounds, can have either red or yellow flesh, and can have dark or light green rind (National Watermelon Promotion Board 2003b). Varieties such as Crimson Trio, Farmers Wonderful, and Honey Heart are seedless type of watermelons (National Watermelon Promotion Board 1999b). Seedless watermelons weigh 10-25 pounds, are oval to round in shape, have a light green rind with dark green stripes, and can have either red or yellow flesh. The melons in the "yellow-flesh" variety have yellow to bright orange flesh, are oblong to long in shape, weigh 10-30 pounds, and have light green rind with blotchy stripes (National Watermelon Promotion Board 2003b; 2003). Desert King, Orangeglo, and Tender Sweet are all yellow-flesh type watermelons (National Watermelon Promotion Board 1999b). Although the average weight of a watermelon ranges from about 5 to 45 pounds, the world record for the largest watermelon ever grown was set in 1990 with a watermelon that weighed 262 pounds (National Watermelon Promotion Board 2008).

Availability

Although many people associate watermelon with summer and the Fourth of July holiday, it is actually available year-round in the United States. Those produced here in the U.S. are available from April through November, while watermelons that are imported are available from October through June. Peak months for domestic watermelon production are May, June, July and August, and peak months for the foreign imports are March, April and May (National Watermelon Promotion Board 2003d). Promotional programs such as the NWPB's "Wonder in Winter" campaign implemented in November 1999, help consumers become more aware of watermelon's year-round availability (Watson 1999).

Nutritional Value

A two-cup serving of watermelon contains no fat and has only 80 calories. Watermelon also has no cholesterol or saturated fat per serving, and therefore carries the American Heart Association's heart check-mark logo (National Watermelon Promotion Board 2003e).

Although watermelons are 92 percent water, they contain many vitamins and nutrients essential for good health, such as vitamins A, B6, and C. The vitamin A found in watermelons increases the number of lymphocytes, or white blood cells, that help fight off infections and, in turn, improve the immune system. Vitamin A also aids in good eye health. Vitamin B6 helps in the development of serotonin, dopamine and melatonin, all of which are neurotransmitters that help the body manage anxiety. Vitamin C helps prevent infections and viruses, and also helps slow the aging process and development of cataracts. In addition, vitamin C aids in strengthening blood vessels and bones as well as

helping repair damaged tissue and healing wounds. Small amounts of potassium, which can help alleviate muscle cramps, along with miniscule amounts of calcium and iron are also found in watermelons (National Watermelon Promotion Board 2003e).

Recent research has discovered yet another health benefit of watermelons. Lycopene, which is found in watermelons, is a powerful antioxidant that is thought to prevent diseases and help fight certain types of cancer. This carotenoid is what gives fruits and vegetables their red color and is found in several other foods, such as guava, tomatoes and grapefruit. Lycopene was once thought to only be found in tomatoes; however, it was recently discovered that watermelons contained larger amounts of lycopene than any other vegetable or fruit. Per one cup serving, watermelons have 9.09 mg of lycopene, compared to the 4 mg found in one cup of fresh tomatoes (National Watermelon Promotion Board 2003e). Currently, pill or capsule forms of vitamins containing lycopene only possess five to ten milligrams of lycopene, which is the average daily dosage. Therefore, eating one serving of watermelon per day could provide about the same health benefits as taking over-the-counter vitamins (National Watermelon Promotion Board 2003c). In a recent Harvard University report, men who ate foods containing significant amounts of lycopene were at a lower risk for developing cancer, and in particular, prostate cancer (Watson 2000b). Another study proved that women who consumed high amounts of lycopene were five times less likely to develop precancerous indications of cervical cancer than those women with low amounts of lycopene in their bodies. Lycopene is also thought to help battle cardiovascular disease by prohibiting hardening of the arteries (National Watermelon Promotion Board 2003e).

Trends in Watermelon Consumption

Recently, several trends have evolved in watermelon consumption, and convenience is the key factor. Seedless, smaller and pre-cut watermelons provide the consumer with more convenience, and therefore have become popular sellers in stores (Watson 2000a).

Several seed companies have recently capitalized on the consumer desire for smaller watermelons. Along with several other companies, Syngenta Seeds, Inc. and Seminis Vegetable Seeds have both developed single-serving size watermelons. Syngenta's "PureHeart" and Seminis's "Bambino" mini-melons both weigh three to five pounds and have a diameter of only six to eight inches (Poorman 2003). While consumers in other countries have preferred small watermelons for years, these mini-melons only gained popularity in the U.S. during the new millennium (Obra 2007). In fact, Seminis's "Bambino" was selected as one of Time magazine's "Most Amazing Inventions of 2004" (Koppenjan 2004), and the attractiveness of the mini-melon has continued to grow each year since. During the 2006-2007 watermelon season, the number of pounds sold of the mini-melons jumped approximately 33 percent from the previous year (National Watermelon Promotion Board 2007). Convenience is one of the key factors for the growth of this mini-melon market segment. According to the 2006 Watermelon Consumer Report, 80 percent of the respondents purchased the mini-melon varieties because it was more convenient (National Watermelon Promotion Board 2006b).

Past Research

In previous agricultural studies, conjoint analysis has been used to determine consumer preferences for apples, bell peppers, satsuma mandarins, nursery stock, processed meat and farm-raised hybrid striped bass (Manalo 1990; Frank et al. 2001; Campbell et al. 2004; Gineo 1990; Huang and Fu 1995; Halbrendt et al. 1991). Although other types of research methods have been used in the watermelon industry, conjoint analysis has not yet been used to determine consumer preferences for watermelons (McManus 2003).

According to Wendy McManus, the National Watermelon Promotion Board's Director of Marketing, most consumer demand and consumer preferences research has been performed by outside research firms. These research agencies have utilized both telephone surveys and focus groups to obtain information about consumers' purchasing behavior. Previous questions have also been asked independently of one another, rather than by product profiles as in conjoint analysis (McManus 2003). The United States Department of Agriculture has also implemented personal interviews to acquire watermelon consumption information (Lucier and Lin 2001).

II. LITERATURE REVIEW

Although the foundation of conjoint analysis techniques was constructed in the 1920s, Luce and Tukey's 1964 paper is generally regarded as the beginning of conjoint analysis literature (Green and Srinivasan 1978). Green and Rao briefly discussed conjoint methodology in their 1969 working paper, 'Nonmetric Approaches to Multivariate Analysis in Marketing,' as did Green and Carmone in their 1970 book, *Multidimensional Scaling and Related Techniques in Marketing Analysis*; however, "the first detailed, consumer-oriented paper did not appear until 1971" with Green and Rao's journal article, 'Conjoint Measurement for Quantifying Judgmental Data.' (Green and Srinivasan 1978).

Since then, conjoint analysis has been frequently used in most types of marketing research. According to Green, Krieger and Wind (2001), "Conjoint analysis is, by far, the most used marketing research method for analyzing consumer trade-offs." In fact, one study deduced that more than 400 commercial conjoint studies were performed in the early 1980s (Green and Srinivasan 1990). Large companies such as Ford, General Electric, General Foods, General Motors and Xerox have even employed conjoint analysis for research on a wide array of products (Green, Carroll and Goldberg 1981). Other marketing research firms have used conjoint analysis for studies on advertising, competitive analysis, distribution, new-product identification, market segmentation and product repositioning (Manalo 1990). Besides use in marketing research, conjoint

analysis applications have recently become more diverse. An area of increasing interest is using conjoint analysis in litigation. Here, conjoint analysis techniques have given key contributions to the settlement of lawsuits in telecommunications, airline and pharmaceutical businesses (Green and Srinivasan 1990).

Conjoint analysis is a better method for determining consumer preferences than the other methods of research that have previously been used by the NWPB and others in the watermelon industry because “in compositional models, customers’ explicit perceptions or beliefs about each attribute of a product are measured separately...[but] conjoint analysis takes a holistic view of a product. In other words, a researcher asks the respondent to rate his or her preference...for a product by evaluating the entire product...This approach is thought to reflect the situation buyers encounter in real life” (Reddy and Bush 1998).

Conjoint analysis has been utilized in a number of agricultural studies. For example, Frank et al. (2001) evaluated consumer preferences for color, price and Vitamin C content of bell peppers. Using a conjoint analysis, an ordinary least squares regression and a multinomial logit, Frank et al. concluded that consumers in this study preferred green bell peppers at a low price but containing a large percentage of Vitamin C.

Campbell et al. (2004) looked at price, color, size, seediness, blemishes, production region label and organic production to evaluate consumer preferences for Satsuma mandarins. In this study that facilitated the use of a conjoint analysis and a multinomial logit, Campbell et al. found that consumers preferred a large yellow-orange fruit with no blemishes and no seeds that was organically produced in Alabama and sold at a low price.

In Gineo's (1990) paper on rhododendrons, delivery time, flower color, origin, price, quality, size, terms of payment and other products offered by the seller were assessed to show the effects of these attributes on purchase behavior. This study used conjoint analysis, an ordinary least squares regression and a logit model to analyze consumer preferences. Gineo discerned that consumers most desired good-to excellent-quality stock, taller plants, cash discounts from wholesalers, a wholesaler that offered a full line of additional plants and plants that originated from the Northeast. Consumers in this study were not influenced by the attributes of delivery time, flower color and container size.

Halbrendt et al. (1991) observed buyer-preferences for farm-raised hybrid striped bass by studying fish size, product form, seasonal availability and purchase price. This study evaluated the preferences of wholesale buyers, retail buyers and those buyers purchasing the hybrid striped bass for restaurant use. Using a conjoint analysis, Halbrendt et al. found that both the wholesale and retail markets preferred the low price and round form, while the restaurant sector preferred the filleted form. All three groups of buyers preferred year-long availability and a larger fish size.

Mackenzie (1990) even used conjoint analysis to determine consumer preferences for deer hunting. This study used both conjoint analysis and logit techniques to determine that hunters preferred a lower priced trip and license fee, shorter travel times and less congestion at the hunting site. The results also proved that the hunters preferred hunting with friends or family rather than just acquaintances and also preferred to bag a deer during the hunting trip.

III. METHODOLOGY

Recent biotechnological and technological advances in agriculture make it easier than ever for producers to provide consumers with appealing products. The important task is to establish exactly what consumers want, and conjoint analysis helps researchers do just that.

Because conjoint analysis is practical for imitating real-life scenarios and gives the researcher an understanding about consumer preferences (Hair et al. 1998) and also is the most widely used tool for examining consumer trade-offs (Green, Krieger and Wind 2001), it was chosen as the method of research to be used in this study for determining consumers' preferences for various watermelon traits.

Conjoint analysis is defined as “Any decompositional method that estimates the structure of a consumer's preferences (e.g. part-worths, importance weights, ideal points) given his/her overall evaluations of a set of alternatives that are prespecified in terms of levels of different attributes” (Green and Srinivasan 1978).

Steps in a Conjoint Study

The first step in a conjoint analysis is to define the product attributes and corresponding levels that will be used in the study. According to Green and Srinivasan (1978), steps following attribute identification should include: model selection, data

collection, construction of an experimental design, stimulus presentation, assignation of a measurement scale, administration of survey and evaluation of the survey results.

Attributes and Corresponding Levels

Attribute definition

To define the particular attributes and corresponding levels needed to accurately perform this study, past research in agriculture, and more specifically past research in the watermelon industry, was studied. In general agriculture, Lin, Payson and Wertz (1996) performed an opinion survey to determine important attributes; Mackenzie (1990), as well as Sy et al. (1997), utilized focus groups to better understand the significance of including certain attributes; Gineo (1990) consulted buyers, sellers and plant scientists before choosing the attributes for his conjoint analysis. But more importantly, the National Watermelon Promotion Board elected to use focus groups and personal interviews to evaluate which attributes to incorporate in consumer preference studies for watermelon (McManus 2003). The attributes chosen in this study are almost parallel to the attributes included in several of the NWPB's previous surveys.

Since not all influential attributes could be included in this study, five major factors were decided on - price, seed content, flesh color, form and lycopene sticker possession. As a general rule, the maximum number of attributes allowed in a traditional conjoint analysis is nine (Hair et al. 1998). Green and Srinivasan (1990) reported that survey respondents have difficulty assessing more than six characteristics, and also warned against "information overload" (see Table 3).

Flesh color

Color has consistently been an important attribute in previous fruit and vegetable analyses. The relative importance for color of apples was 20 percent in Manalo's study (1990), and was 15.7 percent in Campbell's et al. (2004) study on Satsuma mandarins. Grain color was also analyzed in Baidu-Forson, Ntare and Waliyar's (1997) study on Nigerian groundnuts, and the attribute was found to have 17 percent relative importance. Color was by far the most important attribute seen in bell peppers (Frank et al. 2001), having a 74.6 relative importance. In this study on watermelons, the color attribute refers to the flesh color, or the inside meaty part, rather than the color of the rind. The two most commonly found flesh colors were included in this study – red and yellow. Although orange-fleshed watermelons do exist, few people are aware of these varieties.

Seed content

According to the NWPB, seedless watermelons are a major contributor to total watermelon sales; they accounted for 68 percent of national sales in 2003 (National Watermelon Promotion Board 2003a). However, the seeded varieties are still selling well in the Midwest in states including Arkansas, Louisiana, Oklahoma and Texas. Seeded watermelon comprised 52 percent of that region's total watermelon sales in 2003 (National Watermelon Promotion Board 2003a). Two levels, seeded and seedless, of seed content were used in this analysis. In Campbell's et al. (2004) study on Satsuma mandarins, the relative importance of seediness was 22.7 percent.

Form

Although form has not been a prevalent factor in previous conjoint studies, it is important when considering the convenience to the purchasers of watermelons. Three

levels of form were evaluated in this analysis – cubed, half or sliced or section and whole. In Halbrecht, Wirth and Vaughn's (1991) paper studying striped bass, product form had a relative importance ranging from 20.96 percent for the wholesale segment to 42.76 percent for the restaurant segment. According to Gillespie's et al. (1998) study on ostrich meat, product form had a relative importance of 38.1 percent, and in restaurants where entrees were less than \$10, product form was the most important attribute with a 50.5 percent relative importance.

Weights of the specified watermelon form were also included in this study to better standardize the form variable. The products were described as: one pound of cubed watermelon, five pounds of half or sliced or sections of watermelon and a 15-pound whole watermelon. These sizes were selected to fit the range of prices used in the analysis. In addition to looking at form, Halbrecht, Wirth and Vaughn's (1991) study on striped bass also evaluated size and found the relative importance of this variable to range from 16.80 percent with the restaurant sector to 19.03 percent for the wholesale sector. Campbell et al. (2004), too, evaluated the importance of size of Satsuma mandarins and found its relative importance to be 13.9 percent. In addition, Manalo's (1990) research on apples found size to be the most important variable in the study with a relative importance of 20 percent. Gineo's (1990) paper on rhododendrons found size to be an important variable also- the second most important in the study, in fact. The relative importance of size was 72 percent in Gineo's paper.

Lycopene Sticker possession

Labeling the product with a sticker or label has also been studied in previous conjoint analyses. Two label options, with and without sticker, were defined in this

analysis. A sticker reading “Lycopene Leader in Fresh Produce” was placed on some of the displays and not on others. Customers were not informed by the investigators as to what lycopene was.

A label proclaiming the product’s production region in Campbell’s et al. (2004) study on Satsuma mandarins had a relative importance of 6.9 percent. A label was also displayed in Huang and Fu’s (1995) analysis to indicate that the meat product met the Chinese Agricultural Standard. The relative importance of this variable ranged from 3.08 percent to 18.34 percent in different sectors.

Price

“Although price is not technically a product attribute, it is commonly included as an attribute in conjoint analyses because it is a major factor in product selection” (Gillespie et al. 1998). And as observed in earlier fruit and vegetable conjoint analyses, price is consistently seen as a relatively important attribute. Manalo’s (1990) study on apples reported a relative importance of 11 percent of the attribute of price; whereas Baker (1990) recorded a relative importance factor of 14.53 percent of the same fruit. The price of bell peppers showed a relative importance of 22.9 percent in Frank’s et al. (2001) conjoint study, and the relative importance of price for Satsuma mandarins was noted as 16.6 in Campbell’s et al. (2004) analysis. In Gillespie’s et al. study on ostrich meat, price had a relative importance of 41.4 percent. For this study on watermelons, three price levels were defined: \$3.00, \$5.00 and \$7.00, which were parallel with the market prices for whole watermelons in Auburn, Alabama during the 2004 season. As mentioned earlier, this range of prices also was compatible with the weight selected for the other forms of watermelon.

Preference Model

Once the attributes and corresponding levels were identified, a preference model was outlined. Equation one specifies the preference model.

$$[1] \quad R_i = B_1 + B_2(P1) + B_3(P2) + B_4(P3) + B_5(S1) + B_6(S2) + B_7(F1) + B_8(F2) + B_9(C1) \\ + B_{10}(C2) + B_{11}(C3) + B_{12}(L1) + B_{13}(L2) + E_i,$$

Where:

R_i = Rating given by survey respondent on a scale of 0-10;

P1-P3 = variables for price levels: \$3.00, \$5.00, \$7.00;

S1-S2 = variables for seed content: seeded, seedless;

F1-F2 = variables for flesh color: red, yellow;

C1-C3 = variables for form: whole, slices or sections, cubed;

L1-L2 = variables for lycopene sticker possession: with lycopene sticker, without lycopene sticker.

The consumer's rating on his or her preference for each product is the amount of satisfaction, or utility, that consumer gets from consuming that specific product.

(Gillespie et al. 1998).

Data Collection and Stimulus Construction

Using the full-profile method would result in respondents evaluating all 72 (3x2x2x3x2=72) hypothetical products. Therefore, a fractional factorial design, which does allow respondents to only analyze a portion of the hypothetical products, was used to reduce the number of products to be evaluated. Bretton-Clark's Conjoint Designer

(1990) was utilized to develop a more manageable number of hypothetical products. This program allows the production of “full profile conjoint designs...[but uses] orthogonal arrays...[to] reduce the size of the task necessary to estimate the respondent’s preference (utility) function” (Bretton-Clark 1990). According to Hair et al. (1998), consumers can easily analyze as many as 20 conjoint scenarios. However after 20, the responses become less accurate and less symbolic of their true preferences. Conjoint Designer randomly created 16 product profiles and suggested that number to be sufficient to measure values for all other combinations of attributes. Even though some of these created profiles may seem unrealistic in respect to price and quantity, Moore and Holbrook (1990) mention this will not affect the results. “While respondents do notice that some profiles are less realistic than others,...differences in realism do not appear to affect judgments about purchase likelihoods” (Moore and Holbrook 1990).

Stimulus Presentation

According to Green and Srinivasan (1978), stimuli can be presented pictorially, in paragraph form, verbally and/or in a live manner. Pictorial representations make analyzing the product profiles more entertaining to the respondent, and pictures also offer a simpler and less confusing method of communicating important information (Wedel and Kamakura 1998).

To better standardize size, ripeness, color and other visible characteristics of watermelons in this study, pictures were used for evaluations. In addition to the pictures, captions presenting some non-visible information were displayed for respondents to view while scoring the hypothetical products.

The watermelons were purchased in grocery stores in Auburn, Alabama and photographed with identical lighting and backgrounds, from the same angle with the same magnification and in the same container (for the cubed form). Only consistent sizes of slices, sections, halves and cubes were photographed, and the same watermelon was used for all whole watermelon pictures. A small insert of the flesh color was attached to the bottom corner of those pictures of the whole watermelons to let the respondents know the flesh color. Because the seeded yellow-fleshed varieties of watermelon were not in season, seeds were digitally inserted onto the pictures of the seedless yellow watermelon using Adobe's Photoshop 7. The number and placement of the naturally occurring seeds observed and counted in the red-fleshed watermelon pictures were consistent with the number of digitally created seeds in the pictures of the yellow-fleshed varieties.

A mock survey was administered to the faculty, staff and graduate students from Auburn University's Department of Agricultural Economics and Rural Sociology to obtain feedback, suggestions and comments on improving the survey. It was suggested that the pictures be more equally distributed in the display and that the investigators notify the respondents that all the products taste exactly the same. These changes were implemented before the surveys were conducted in stores.

Measurement Scale

The respondents of this survey were asked to rate the items, rather than rank them. Some respondents prefer rating scales because they are quicker and more convenient to complete; in addition, researchers like them because they are easier to analyze (Cattin and Wittink, 1982). According to Mackenzie (1990), "ratings provide at least as much

information about respondent preferences as ordinal rankings since they also provide some indication of intensity or preferences.” As Hair et al. (1998) suggested in chapter 7 of *Multivariate Data Analysis*, 11 categories (rating from 0 to 10) were used as the measurement scale. Circling 0 signified that the respondent did not prefer the pictured item at all, while marking 10 represented that they greatly preferred the product. The respondents were reminded that all products pictured tasted identical. They were asked to only take into consideration price, flesh color, seed content, lycopene sticker and form of the product when rating each item.

Survey Implementation

Surveys were administered in several Alabama grocery stores from September 4, 2004, to October 9, 2004. Customers in stores in Opelika, Troy, Enterprise, Hartford, Auburn and Phenix City were asked to participate in this survey. The stores that allowed this survey to be given included: Piggly Wiggly, Winn-Dixie, Food World, Bruno’s, Kroger, Publix and Grocery Outlet. Due to the store managers’ request and higher volumes of traffic, most of the surveys were administered on Fridays and Saturdays. The surveys were given in both the morning and evening hours, but approximately four hours was spent in each store. A total of 501 surveys were collected.

Tables with an Auburn University banner attached were set up at the entrance to the store or in the produce section of each store. These tables were used to present the display boards with the 16 product profiles attached in a highly visible manner. The profiles were re-ordered for display in each store. Respondents were chosen from those customers entering the store and /or produce section. They were given a clipboard, a

pencil and a survey (all to be returned), and an information sheet for their keeping.

The survey consisted of the 16 pictorial evaluations of the profiles and 19 demographic and purchasing questions (see Appendix A for product profiles and Appendix B for survey given to customers). On average, the self-administered questionnaire took 10 minutes to complete. After completion of the survey, respondents were asked to take some watermelon related literature as a token of appreciation.

Data Input

After administering all of the surveys, the data was initially put into Microsoft Excel. For those respondents who failed to circle a number or for those who circled more than one number indicating their preferences on the product profile section, SPSS (Statistical Package for the Social Sciences) (Nie, Hull and Bent 1989) was used to predict what the respondent might have chosen. Because their responses would lead to incorrect model estimates, those respondents who chose the same number for all 16 product profiles (e.g. all 10's or all 0's) surveys were eliminated from the data set. A total of 449 surveys, or 89.6 percent of the surveys collected, were usable and analyzed. Because many respondents failed to answer the same several questions on the demographics section of the survey, questions 2, 7, and 17 were omitted from the data (see Appendix B). If one respondent simply skipped one of the demographic questions, the mean of the other respondents' answers to that specific question was used to fill in the blank.

Mean Deviation Coding

Before each respondent's part-worth utilities were determined, the data was coded by effects coding, or mean deviation coding (Hair et al. 1998). "Mean deviation coding [is when] the coefficient for the base level is easily calculated as the negative sum of the level coefficients. The intercept becomes the mean preference rating, and dummy variable coefficients measure deviation from the mean rating" (Halbrendt, Wirth and Vaughn 1991). The base level for this study was a \$7, red, seedless, sliced watermelon without a lycopene sticker. These attributes were given a value of a -1, while other levels of these attributes were marked as 0, 1 or -1. See Table 4.

Bretton Clark's Conjoint Analyzer (1992) was used to derive the part-worth utility estimates for each respondent.

Relative Importance

Bretton Clark's Conjoint Analyzer (1992) was also used to determine the relative importance each respondent put on the attributes. The relative importance equation is shown in equation two.

$$[2] \quad R.I._i = \text{range}_i * 100 / \sum_{i=1}^n \text{range}_i \quad i= 1, \dots, n.$$

Where:

R.I._i represents the relative importance of attribute i, and range_i signifies the range of the respondent's utilities for attribute i.

This relative importance figure is representative of the strength of the attribute in influencing the respondent's buying intention. It "indicates how important each...attribute is in relation to all other attributes in influencing a respondent's perceived value" (Reddy and Bush 1998) (see Table 5).

Distribution of Preferred Levels

Bretton Clark's Conjoint Analyzer (1992) program was also utilized to determine the distribution of preferred levels. This program "displays the percentage of respondents that 'preferred' each of its levels; the sum of the percentages for each feature is 100 %" (Bretton Clark 1992) (see Table 6).

Cluster Analysis

SPSS was also used to divide respondents with similar coefficients into homogeneous groups, or clusters. Cluster analysis helps to identify consumer segments, and targeting these specific segments can make marketing the product more efficient (Campbell et al. 2004). Specifically, a hierarchical cluster analysis using Ward's minimum variance method of cluster analysis was used to determine each cluster. With this method, "each observation begins in a cluster by itself [and] the two closest clusters are merged to form a new cluster that replaces the two old clusters. Merging of the two closest clusters is repeated until only one cluster is left" (Frank et al. 2001). The results of the analysis are presented in an agglomeration schedule. To determine the optimal number of clusters, the squared Euclidean distance is observed. Clustering should be stopped when there is a large increase in the coefficient of two adjoining phases (Varady

and Lipman 1994). There was a large jump in the difference of the coefficients between the three-cluster and four-cluster models, indicating that clusters with dissimilar members were being combined, and therefore indicating that the three-cluster model was ideal.

Multinomial Logit Analysis

William H. Greene's LIMDEP (1995) was then used to perform a multinomial logit to determine the characteristics of these three different clusters. A multinomial logit model explains the actions of consumers when they have an assortment of goods to choose from, but still have the same consumption goal (Goktolga, Bal and Karkacier 2006). The results from the multinomial logit can "determine how much a one-unit change in the overall sample mean for a given variable would change the probability of membership in each segment" (Frank et al. 2001).

Multinomial logit analyses have been used worldwide in many agricultural economics studies. For example, Ferto and Szabo (2002) used it in his study on Hungarian fruit and vegetables, and Hatirli, Ozkan and Aktas (2004) utilized a multinomial logit model in his study on milk purchasing sources in Turkey.

For more in depth information on multinomial logits, see Yoo and Ohta (1995) (see Tables 7 and 8).

The multinomial logit model equation is described in equation 3 (Greene 1993).

$$[3] \quad \text{Prob} [\text{group } j] = \frac{e^{X_i B_j}}{1 + \sum_{j=1}^{m-1} e^{X_i B_j}} \quad j = 1, \dots, m-1 \quad I = 1, \dots, n$$

Where:

Prob [group j] = the probability of the respondent belonging to the j^{th} cluster

X_i = set of n socioeconomic characteristics of the respondent

B_j = vector of parameters to be estimated for the $m-1$ clusters

IV. RESULTS

Descriptive Statistics

A total of 501 surveys were collected; however, only 449 were usable – resulting in a usable response rate of approximately 89.6 percent. Of those usable surveys, 70.1 percent of the respondents were female, 74.5 percent were Caucasian and the majority (74.1 percent) of them had completed at least some college or technical school. The average age of the total sample was 46. Approximately half of the total sample reported that their annual income was \$49,999 and below; 49.5 percent answered that their annual income was below this number, while 50.1 percent responded that their income was \$50,000 or more per year.

In the purchasing section of the survey, 49 percent of the respondents of the total sample reported that they purchased watermelon mostly because of the flavor or taste, and 63.2 percent answered that they most often purchased watermelon at a grocery store. In addition, 60.5 percent of the total sample reported that where they typically purchased watermelon was less than five miles away from their home. While 20.6 percent of the total sample's respondents answered that they did not have a preference on what region their watermelons originated from, 43.9 reported that they preferred Alabama-grown watermelons and 24.8 percent said they preferred Southern-grown watermelons. The total sample's favorite size for a whole watermelon was five to nine pounds; in fact, 40.1 percent of the respondents answered this way. Twenty-four percent of the respondents in

the total sample did not have children; however, the majority of the remaining respondents were split on whether their children influenced their decision to purchase watermelon – 25.3 percent said that their children do not influence them at all in their decision while 28.4 said that their children greatly influenced their decision to buy watermelon.

Examining the part-worth coefficients and the relative importances from the conjoint analysis can reveal the total sample's preferences for watermelon. The total sample placed the greatest amount of relative importance on the color attribute. They placed 30.44 percent relative importance on this factor and specifically preferred a red-fleshed watermelon, as is signified by the positive sign on the red coefficient in table five. This variable was significant at the .01 level. The total sample also preferred a whole watermelon, with 24.62 percent of their relative importance going toward the form attribute. Both the whole form and the sliced form were significant at the .01 level. About 21 percent of the total sample's relative importance was for the price attribute; they preferred the \$3.00 product, which was the lowest price choice. This \$3.00 price was also significant at the .01 level. In addition, the total sample preferred a seedless watermelon. They placed 14.83 percent relative importance on the seed content attribute. Like all the other clusters, the total sample placed their least amount of relative importance on the lycopene sticker attribute. Although they chose that they preferred a watermelon with a lycopene sticker present, only 9.2 percent of their relative importance was placed on this attribute. This could be attributed to the fact that 49.7 percent of the total sample reported that they were "not at all familiar" with lycopene.

Cluster 1: “Seeing Red”

There were 143 respondents to form the first cluster, comprising 31.8 percent of the total sample. Because these respondents placed a very high importance on the color attribute, specifically preferring the red-fleshed watermelon, this group is called the “Seeing Red” cluster. Marketing red-fleshed watermelons to this consumer segment would likely benefit the retailer since 54 percent of these respondents’ relative importance was placed on this attribute.

The “Seeing Red” group was the only cluster to have a positive evaluation of the \$7 price level. This cluster, like the others and the total sample, placed the least relative importance on the lycopene attribute. The respondents limited knowledge of lycopene and its corresponding health benefits are factors that could possibly explain this low rating. In fact, 49 percent of the respondents in this cluster said that they were “not at all familiar” with lycopene.

Although the multinomial logit found that this cluster was not significantly different from the other clusters, several of the “Seeing Red’s” qualifying characteristics are worth discussing. One identifying characteristic of this cluster is that a greater percentage of these people answered as having “some college or technical school” than the other two clusters. Actually, the “Seeing Red” cluster has a greater percentage of this education level than the total sample’s percentage; this cluster has 37.1 percent of the respondents with this education level, while the whole sample has 35.5 percent.

This “Seeing Red” group was, as a whole, slightly younger than the other clusters and the total sample. The average age of this group was 45.8, compared to cluster two’s average age of 46.4, cluster three’s 46.15 and the total sample’s 46.14 average age.

Like the total sample, most of this cluster bought their watermelon at the grocery store rather than at a roadside stand or farmers' market. However, more of this cluster than the total sample or the other clusters purchased watermelon at a farmers' market; 18.9 percent of this cluster responded that they typically bought at a farmers' market compared to the 16.2, 17.2 and 12.4 of the total sample, cluster two and cluster three, respectively. Most of this "Seeing Red" cluster also lived within five miles of where they purchased watermelon, as in the total sample. Forty-six percent of them purchased watermelon because of the flavor/taste. More of the "Seeing Red" cluster than the other two clusters and the total sample also responded that their children did not influence their decision to buy watermelon at all. Thirty-nine percent of this cluster reported that they prefer a watermelon to weigh less than ten pounds, and 41 percent said that they preferred Alabama grown watermelons. The "Seeing Red" cluster had no one to respond that they preferred an imported watermelon, implying that they prefer U.S. grown watermelons.

As in the total sample, most of the respondents were female; 76 percent in the "Seeing Red" cluster were women, compared to 70 percent in the total sample. Seventy-four percent responded that they were Caucasian, while no one in this cluster answered that they were Asian. There also were more respondents in this cluster to report that they were Native American than any other cluster or the total sample; 4.2 percent of this cluster responded that they were Native American compared with the 2.4 percent of cluster two, 3.6 of cluster three and 3.3 of the total sample. This cluster, like the total sample, had the greatest percentage of respondents report that their approximate household income was between \$50,000 and \$74,999 a year (see Table 9).

As in the total sample and cluster two, this “Seeing Red” cluster had the greatest percentage of respondents to complete the survey in the Publix grocery store in Phenix City, Alabama. According to the 2000 U.S. Census, Phenix City had a population of 28,265. The “Seeing Red” cluster is fairly representative of the Phenix City population; like cluster one, Phenix City has a greater percentage of females than males and a greater percentage of Caucasians than non-whites (see Table 10).

Cluster 2: The Catch-All

Cluster two is the largest of the three clusters. It is comprised of 169 respondents, making up 37.6 percent of the total sample. Because this cluster placed almost equal relative importance on several different attributes, it is likely that cluster two is the “Catch-All” cluster. It is possible that the respondents in this cluster did not have the time, patience, concern or understanding of survey procedure to accurately answer this survey, therefore causing their answers to vary greatly. And it is likely that this “Catch-All” cluster took on all the respondents that simply did not fall into cluster one or three. Helping to verify this assumption is the fact that this group’s adjusted R^2 of 33.8 was lower than those of cluster one and cluster three, which had R^2 71.2 and 52.3 respectively. However, it is also plausible that these respondents form a viable consumer segment that does not greatly prefer one specific watermelon attribute, but instead places almost equal relative importance on most attributes. Because of their preference for pre-cut and seedless watermelon, this one would be a “Convenience Cluster” if in fact it were a viable consumer segment.

These respondents placed approximately 26 percent of their relative importance on the form of the watermelon, about 22 percent for both the seed and price category, and about 18 percent of relative importance on the color attribute. This cluster, like the others and the total sample, placed the least relative importance on the lycopene attribute. They were the only group to have a positive response for the sliced watermelon form, which was their most-preferred form. They were also the only group to have a positive evaluation for the cubed form, which was their second choice in watermelon form. In addition, they were the only group to have a negative response to a whole watermelon. Unlike the other two clusters, the “Catch-All” cluster preferred the \$5 price to either the \$3 or \$7 category. However, they were similar to the other two clusters and the total sample in that they preferred the red-fleshed watermelon to the yellow, and like the “Seeing Red” cluster in that they preferred seedless watermelons rather than seeded.

Several characteristics of this cluster help to differentiate them. Unlike the total sample and other clusters, this “Catch-All” cluster most frequently responded that they didn’t have children to influence their decision to purchase a watermelon. Both the total sample and other two clusters most frequently chose that their children did not influence their decision to buy at all. This variable was significant at the .10 level in the multinomial logit results.

There was also a greater percentage of this group than the other clusters and the total sample to choose that they were “slightly familiar” with lycopene; 40.2 percent of the “Catch-All” cluster chose that option as compared to the 37.8 percent of cluster one, 34.3 percent of cluster three and 37.5 percent of the total sample. All three clusters and

the total sample, however, selected most frequently that they were “not at all familiar” with lycopene.

When compared to the total sample and the other two clusters, the “Catch-All” cluster had the greatest percentage of respondents to prefer an Alabama-grown watermelon. 47.3 percent of the “Catch-All” cluster preferred Alabama watermelons while 43.9 percent of the total sample, 40.6 percent of cluster one and 43.8 percent of cluster three reported that they preferred this choice.

This cluster also had a greater percentage of males to complete this survey than the other two clusters and the total sample. Of those respondents in the “Catch-All” cluster, 34.3 percent were males, while only 24.5 percent of cluster one, 29.2 percent of cluster three and 29.5 percent of the total sample were males. This variable was also significant at the .05 level.

The “Catch-All” cluster also had a greater percentage of non-white respondents - 29.7 percent - than the other clusters and the total sample. Similarly, they had a greater percentage of respondents that answered that they were African-American -21.3 percent- and a greater percentage of respondents to answer that they were Asian - 3.6 percent- than any other cluster or the total sample. This variable was also significant at the .10 level.

Like the total sample and the other two clusters, the “Catch-All” cluster had the greatest percentage of respondents report that they had completed “some college or technical school.” However, when compared to the other two clusters and the total sample, this cluster had a greater percentage to respond that they were a high school graduate than the other groups. This variable was also significant at the .05 level.

The income of this cluster was also different than that of the total sample and the other clusters. While the majority of respondents in the other clusters and the total sample had stated that their approximate household income before taxes was \$50,000-\$74,999, this “Catch-All” cluster had a greater percentage that chose the \$35,000-\$49,999 category.

As in the total sample and the other clusters, the majority of the “Catch-All” cluster traveled less than five miles to the place where they usually purchased watermelon. On the other hand, this cluster had a greater percentage of respondents traveling farther to purchase a watermelon than the other two clusters or the total sample. Of the respondents in this “Catch-All” cluster, 45.3 percent reported that they traveled more than five miles to the place where they usually purchase watermelon as compared to 39.5 percent of the total sample, 38.5 percent of cluster one, and 32.8 percent of cluster three. This variable was also significant at the .10 level.

This cluster, like the total sample and the other clusters, had the majority of respondents purchasing watermelon at a grocery store. However, these respondents in the “Catch-All” cluster also had a greater percentage than the total sample or the other clusters to buy watermelon at a roadside stand. This variable was also significant at the .10 level.

Similar to the other clusters and the total sample, about half of this cluster’s respondents said that they purchased watermelon for the flavor or taste; they were also like the other clusters and the total sample in that they preferred a watermelon to weigh between five and nine pounds. The size variable for this cluster was significant at the .05 level.

As with the “Seeing Red” cluster and the total sample, the greatest percentage of this “Catch-All” cluster completed the survey at the Publix grocery store in Phenix City, AL.

Cluster 3: The Traditionalists

There were 137 respondents in this cluster, making up approximately 30.5 percent of the total sample. Because this group preferred the whole, red-fleshed, seeded watermelons, they can be termed “Traditionalists.”

This group placed the greatest relative importance on the form attribute; 30.8 percent of this cluster’s buying decision was based on their preference for whole watermelons. The “Traditionalists” also placed great relative importance on the price attribute. Like the total sample, this group preferred the cheapest, or \$3, watermelons.

As in the other clusters and the total sample, the “Traditionalists” preferred red-fleshed watermelons and placed the least relative importance on the lycopene attribute. In fact, the majority of this group - 54 percent - reported that they were “not at all familiar” with lycopene. This cluster was the only group to have a positive evaluation for seeded watermelons.

Apart from their buying preferences, there are several characteristics that make this cluster unique. Even though the greatest percentage of surveys was collected at the Publix grocery store in Phenix City, AL, the greatest percentage of the “Traditionalists” surveys were completed at the Kroger grocery store in Auburn, AL. According to the 2000 Census, Auburn has a population of 42,987. Like the statistics for Auburn, this cluster has a greater percentage of females than males. In addition, the numbers for

Caucasians in Auburn are almost mirrored exactly by this cluster; Auburn has 78.1 white and 20.9 percent non-white, while this cluster has 81 percent white and 18.8 percent non-whites. The ethnicity variable for this cluster was significant at the .10 level.

Like the total sample, the majority of this cluster purchased watermelons for their taste or flavor and purchased them at a grocery store that was less than five miles from their home. Twenty-seven percent of the “Traditionalists,” similar to the 28.4 percent of the total sample, reported that their children did not influence their decision to buy watermelon at all. This variable was also significant at the .05 level. As in the total sample and the other clusters, this cluster responded that they preferred a watermelon that was between five and nine pounds. The size variable for this cluster was also significant at the .10 level.

This cluster was similar to the “Seeing Red” cluster in that no one reported that they preferred watermelons that were not U.S. grown.

Although the “Traditionalists” cluster echoed the total sample in respect to income with the greatest percentage of respondents reporting that their approximate household income was \$50,000 to \$74,999 annually, some of this cluster’s responses to income differ from the total sample and the other clusters. For example, 10.2 percent of this cluster reported that their approximate household income was less than \$10,000 a year, compared to 8.0 percent of the total sample, 8.4 percent of cluster one and 5.9 percent of cluster two. Of the 137 respondents in this cluster, 59.7 percent of them completed the survey at stores in the Auburn/Opelika area. The large student population in the cities of Auburn and Opelika provided by Auburn University and/or the people in

the area living on fixed incomes can possibly explain this lowest income level. The income variable was significant at the .10 level.

In addition, 4.4 percent of the “Traditionalists” reported that they had an annual household income of more than \$200,000, compared to the total sample’s 2.7 percent, cluster one’s 2.1 percent and cluster two’s 1.8 percent. The education level of these respondents can possibly explain this high income level. Like the total sample, the greatest percentage of respondents in the “Traditionalists” cluster reported that they had “some college or technical school;” 35.8 percent of this cluster responded this way. Additionally, 43.8 percent of the respondents in this cluster reported that they had a college degree and/or a graduate degree of some kind. The education variable was significant at the .10 level.

Multinomial Logit Results

When examining the multinomial logit results, it is essential to look at both the sign and the magnitude of the coefficient to determine the probability of belonging to a specific cluster. The coefficients of the multinomial logit are those from the marginal effects. The marginal effects derivation can be seen in equation 4 (Greene, 1993).

$$\begin{aligned}
 [4] \quad \eta_j &= \delta \text{ Prob } [y=j] / \delta X_i \\
 &= P_j [B_j - \sum_{k=1}^{m-1} P_k B_k] \quad j=1, \dots, m-1
 \end{aligned}$$

Where:

η_j = change in the probability of a respondent being associated with group j with respect to a one unit change in the i^{th} socioeconomic characteristic, X_i

P_j = observed probability of group membership

B_j = estimated regression coefficient associated with X_i for Prob [$y=j$]

The multinomial logit marginal effects showed that cluster one, the “Seeing Red” group, was not significantly different from the other clusters. However, several variables in cluster two, the “Catch-All” cluster, were significant. For example, the variable WHERE2 (see Table 10 for variable description) was significant at the .10 level. So the likelihood is 8.9 percent greater that the respondents in this cluster purchased watermelon at somewhere other than a grocery store. MILES2 was also significant at the .10 level. For this variable, the probability of belonging to this cluster is 11.7 percent greater if the homes of the respondents were 11 or more miles away from where they typically purchased watermelon. The variable CHILD2 was also significant at the .10 level. The chance of the respondents’ children not influencing their decision to purchase watermelon is increased by 10.9 percent in this cluster. Also significant at the .10 level is the variable ETHN3. The likelihood of being a Caucasian in this cluster is decreased by 11.7 percent. Significant at the .05 level is the variable GENDER1. Here, the probability of being a male in this cluster is decreased by 11.5 percent. EDU2 is also significant at the .05 level. For this cluster, the chance that the respondent had some college or technical school or had completed a four-year degree is decreased by 14.1 percent. SIZE2 was also significant at the .05 level. The possibility that the respondent in this

cluster would prefer a whole watermelon weighing 15 pounds or more is decreased by 13.9 percent.

Several variables in cluster 3, or the “Traditionalists” cluster, were also significant. For instance, the variable ETHN3 is significant at the .10 level. The likelihood of being a Caucasian in this cluster is increased by 16.1 percent. EDU2 is also significant at the .10 level. For this cluster, the chance that the respondent had some college or technical school or had completed a four-year degree is increased by 11.8 percent. SIZE2 was also significant at the .10 level. The possibility that the respondent in this cluster would prefer a whole watermelon weighing 15 pounds or more is increased by 9.1 percent. Also significant at the .10 level is the variable INCOME2. The probability of the respondents in this cluster having an income of \$25,000 to \$49,999 annually is decreased by 12.7 percent. The variable CHILD2 was significant at the .05 level. The chance of the respondents’ children not influencing their decision to purchase watermelon is decreased by 9.5 percent in this cluster.

Marketing Strategies

Three separate groups were identified in this model, and beneficial marketing information can be obtained by observing each of these clusters’ different part-worth values, demographic information and relative importance figures.

When observing each cluster’s part-worth values, it is evident that there were two attribute levels that all clusters agreed upon. First, all clusters responded negatively to a yellow-fleshed watermelon. Therefore, retailers could benefit from marketing red-fleshed watermelon to all segments of customers. Since most respondents relayed

verbally that they were not aware that a yellow watermelon tastes very similar to a red one, free samples of yellow watermelons could be given out to increase the awareness and, in return, the sales of this type of watermelon. Because 63.2 percent of the total sample most frequently bought watermelons in a grocery store, samples could be administered in this type of environment. Even though all clusters preferred a red watermelon, the “Catch-All” cluster was less opposed to a yellow watermelon, and retailers could target their marketing efforts of yellow watermelon to this type of group for a more concentrated effort.

Although 49.7 percent of respondents answered that they were not at all familiar with lycopene within the questionnaire, all clusters responded positively to a lycopene sticker being placed on a watermelon during the conjoint analysis part of the survey. Therefore retailers could benefit by displaying a lycopene sticker on each of its watermelon products, even though their customers might not understand what it represents. Retailers could also benefit by having a sticker in place from those respondents that reported that they were very familiar with lycopene; these people may be familiar with lycopene, but may be unaware that watermelon is a great source of this antioxidant, so the visible lycopene sticker might persuade them to purchase a watermelon product. Retailers must remember, however, that a watermelon’s possession of the lycopene sticker influenced the respondents’ buying behavior the least of all the attributes that were examined.

The “Seeing Red” cluster placed very high relative importance upon the flesh-color of the watermelon, so retailers could likely benefit by targeting this consumer segment with red-fleshed watermelon. 18.9 percent of this cluster most often purchased

watermelon at a farmers' market, so farmers could also profit by targeting this "Seeing Red" cluster. This segment was even willing to pay a higher price, which would generate still more income for the retailer or farmer if this cluster were successfully targeted by marketing. This group was slightly younger, comprised of mostly Caucasian females and had a greater percentage of respondents than the other clusters to report that they had some college. Therefore retailers and farmers of red-fleshed watermelons would likely benefit more from educational and marketing efforts aimed at customers with those characteristics.

If the "Catch-All" cluster was just that – a catch-all, then targeting this segment could prove to be difficult because they placed almost equal importance on four of the five attributes.

However, if this cluster is really a viable consumer segment, they demand the "total package." Their almost equal relative importance of the form, seed, price and color of a watermelon prove that they want it all, so retailers could benefit by providing this type of customer with their premium watermelon products. This cluster had more respondents than the other clusters to report that they most often bought watermelon at a roadside stand. Therefore retailers and owners of these stands alike could benefit by targeting this consumer segment. This group preferred sliced or cubed watermelon, so retailers and stand owners could profit by adding the extra labor to pre-cut and package the watermelon they sell to this segment. The "Catch-All" cluster also had more males to complete the survey than the other clusters did, and this group was not as likely as the other groups to have children. The cluster also had a greater percentage of non-whites

than the other clusters. Aiming marketing efforts at this type of customer would likely benefit the retailer or stand owner.

Retailers can also easily target the “Traditionalists” cluster. This was the only group to positively evaluate a seeded watermelon. They also placed a high relative importance on form, particularly preferring a whole watermelon. In addition, they favored a red-fleshed watermelon. Retailers could benefit by emphasizing these watermelon characteristics in their marketing efforts. Retailers should remember, however, that this group preferred the lowest price.

V. CONCLUSION

The results and analysis from this survey are important to the prosperity of the watermelon industry. The U.S. has consistently ranked in the top four producing countries of watermelon, and one way to ensure the continued success of the watermelon business is for those in the industry to know exactly what characteristics their consumers desire. The purpose of this study was to uncover just that – the consumer preferences for watermelon.

Looking at all 449 usable surveys collected, the total sample fulfilled the *a priori* expectations. The total sample implied that the attribute that influenced their decision to purchase a watermelon the most was flesh color. And as expected, almost 84 percent preferred red-fleshed watermelons. Price was also perceived as an important attribute when deciding to purchase watermelons. As anticipated, the total sample showed preference for the lowest price listed for this survey, \$3. The total sample's ideal watermelon product is \$3, seedless, red, whole and is displaying a lycopene sticker.

Grouping the total sample in clusters relayed that different respondents placed different levels of importance on certain attributes. This study identified three categories of consumers – the “Seeing Red” group who placed greatest relative importance on a watermelon being red-fleshed; the “Catch-All” group who either was an actual group who placed almost equal relative importance on several attributes of a watermelon or indeed was a type of “catch-all” group where those respondents that didn't fit in the other

clusters fell; and the “Traditionalists” group who preferred a whole, red-fleshed, seeded watermelon.

Although these three clusters had some similarities to the total sample, there were several distinguishing characteristics that could prove to be viable marketing information. For example, not all clusters preferred the lowest price category as the total sample did. In fact, the “Seeing Red” cluster actually preferred the \$7 price, which was the highest price category listed. In addition, the “Traditionalists” cluster differed from the total sample because they were the only group to prefer seeded watermelons. Another example is the “Catch-All” cluster’s dislike of the whole watermelon form, which was also different from the total sample and the other clusters. These examples help to justify the purpose of clustering the consumers into different segments for marketing purposes.

Including the demographic variables into each cluster can communicate even more valuable information about consumer preferences for watermelons to marketers. For example, those consumers in the “Seeing Red” cluster who prefer a red watermelon are more likely to be female, be younger, have some college or technical school and have an annual income of \$50,000 - \$74,999. And those “Traditionalists” who preferred a whole, red-fleshed, seeded watermelon are more likely to be Caucasian.

This study used a relatively small number of attributes. Since some of the attributes that were not included in this study could possibly have some importance to consumers and therefore influence their buying intention, other research could be done in the future to further examine the consumer preferences for watermelon. Future research could focus on those people that typically do not buy watermelon and the reasons they do not purchase it. Other research could be done on preferences for processed watermelon

products, such as watermelon popsicles, watermelon salsa and watermelon rind pickles. Even items that were included in the demographics and purchasing section of this survey could be used in a future conjoint study to determine the influence of such things as taste, season, nutritional value and production locale.

This research, along with possible future research on consumer preferences for watermelon, could benefit most everyone in the watermelon industry. From retailers knowing which products to carry in their stores, to distributors knowing where to send specialized products like yellow-fleshed watermelons, to growers knowing which varieties to plant and harvest, and finally to the researchers developing new hybrids - most everyone in the industry can profit from knowing specifically what watermelon attributes their consumers prefer.

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Table 1. Top Watermelon Producing Countries in 2004 (Million Pounds)^Z

Rank	Country	Million Pounds
1	China	150,576
2	Turkey	8,818
3	Iran	4,189
4	USA ^Y	3,682
5	Egypt	3,527
6	Mexico	2,139
7	Korea	1,676
8	Spain	1,517
9	Greece	1,433
10	Brazil	1,367
11	Kazakhstan	1,323
12	Italy	1,102
13	Uzbekistan	1,014
14	Japan	1,074
15	Syria	1,058
	World	205,072

^Y USDA - Economic Research Service 2007

^Z United Nations - FAO Database 2004

Table 2. Top Watermelon Producing States in 2005 (Million Pounds) ^Z

Rank	State	Million Pounds
1	Florida	819
2	California	637
3	Texas	579
4	Georgia	525
5	Arizona	335
6	Indiana	277.4
7	North Carolina	103.7
8	Missouri	96.3
9	Delaware	85.4
10	South Carolina	77
11	Oklahoma	72.5
12	Maryland	67.2
13	Mississippi	43.5
14	Virginia	34.5
15	Alabama	20.3
	USA	3,789.6

^Z National Watermelon Promotion Board

Table 3. Attributes and Levels

Attributes	Levels
Price	\$3.00 \$5.00 \$7.00
Seed Content	seeded seedless
Flesh Color	red-fleshed yellow-fleshed
Lycopene Sticker	with sticker without sticker
Form	whole cubed sections or slices

Table 4. Mean Deviation Coding

Product	Price			Seed Content		Flesh Color		Form			Lycopene Sticker	
	\$3	\$5	\$7	Seedless	Seeded	Red	Yellow	Whole	Sliced	Cubed	Without Sticker	With Sticker
1	0	1	-1	1	-1	-1	-1	0	1	-1	1	-1
2	-1	-1	-1	-1	-1	1	-1	0	1	-1	1	-1
3	1	0	-1	1	-1	-1	-1	0	1	-1	-1	-1
4	-1	-1	-1	-1	-1	1	-1	0	1	-1	-1	-1
5	-1	-1	-1	1	-1	1	-1	-1	-1	-1	1	-1
6	0	1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1
7	-1	-1	-1	1	-1	1	-1	-1	-1	-1	-1	-1
8	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
9	1	0	-1	-1	-1	1	-1	1	0	-1	1	-1
10	-1	-1	-1	1	-1	-1	-1	1	0	-1	1	-1
11	0	1	-1	-1	-1	1	-1	1	0	-1	-1	-1
12	-1	-1	-1	1	-1	-1	-1	1	0	-1	-1	-1
13	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1
14	1	0	-1	1	-1	1	-1	-1	-1	-1	1	-1
15	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
16	0	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1

Table 5. Part-Worths, Relative Importances and Adjusted R²

Attributes & Levels	Total Sample	Cluster I	Cluster II	Cluster III
	(100%)	"Seeing Red" (31.8%)	"Catch-All" (37.6%)	"Traditionalists" (30.5%)
	Part-Worth	Part-Worth	Part-Worth	Part-Worth
Price				
\$5.00	-0.009	-0.053	0.034	-0.045
\$7.00	-0.274	0.060 ***	-0.006 ***	-1.019 ***
\$3.00	0.316	-0.007 ***	-0.028 ***	1.064 ***
<i>Relative Importance (%)</i>	20.91	12.43	21.55	28.97
Seed Content				
Seedless	0.002	0.133 **	0.259 ***	-0.459 ***
Seeded	-0.002	-0.133 **	-0.259 ***	0.459 ***
<i>Relative Importance (%)</i>	14.83	8.88	21.69	12.53
Flesh Color				
Yellow	-1.202	-2.481 ***	-0.391 ***	-0.858 ***
Red	1.202	2.481 ***	0.391 ***	0.858 ***
<i>Relative Importance (%)</i>	30.44	54.43	18.89	19.75
Form				
Sliced	-0.183	-0.323 *	0.064 ***	-0.332
Cubed	-0.336	-0.130 **	0.012 ***	-0.970 ***
Whole	0.519	0.453	-0.076 ***	1.301 ***
<i>Relative Importance (%)</i>	24.62	16.77	26.15	30.84
Lycopene Sticker				
Without	-0.051	-0.019	-0.072	-0.060
With	0.051	0.019	0.072	0.060
<i>Relative Importance (%)</i>	9.20	7.5	11.72	7.91
Adjusted R²	0.514	0.712	0.338	0.524

*** = significant at .01 level

** = significant at .05 level

* = significant at .10 level

Table 6. Distribution of Preferred Levels

Price	Seed Content	Flesh Color	Lycopene Sticker	Form
\$5.00 29.5%	Seedless 47.4%	Yellow 16.3%	Without 47.30%	Sliced 22.00%
\$7.00 26.2%	Seeded 52.6%	Red 83.7%	With 52.70%	Cubed 26.70%
\$3.00 44.3%				Whole 51.30%

Table 7. Demographic and Purchasing Variables

Variable	Total Sample	Cluster I	Cluster II	Cluster III
N:	449	"Seeing Red" 143	"Catch-All" 169	"Traditionalists" 137
Demographic Questions				
% of Sample	100%	31.8%	37.6%	30.5%
Average age	46.1	45.8	46.4	46.2
Gender (% male)	29.5%	24.5%	34.3% **	29.2%
Ethnicity (% Caucasian)	74.5%	74.1%	70.4% *	81.0% *
Education (% some college or college degree)	60.3%	62.3%	55.0% **	65.7% *
Income (% \$25,000 - \$49,999 per year)	27.3%	26.6%	31.4%	23.4% *
Purchasing Questions				
Purchased in last year	87.6%	88.8%	85.8%	89.8%
Purchase for flavor/taste	49.0%	46.2%	47.9%	54.0%
Purchase most often at farmers market, roadside stand, etc.	36.8%	33.6%	42.0%	32.8%
Home is 11 miles or more away from where purchase	15.8%	11.9%	20.7% *	12.4%
Children do not influence decision to buy	28.4%	32.2%	26.6% *	27.0% **
Not familiar with lycopene	49.7%	49.0%	47.3%	54.0%
15 pounds or more for most preferred whole watermelon size	29.5%	30.7%	24.3% **	33.6% *
Prefer Alabama grown watermelons	43.9%	40.6%	47.3%	43.8%

** = significant at .05 level

* = significant at .10 level

Table 8. Multinomial Logit Marginal Effects

Variables	Marginal Effects					
	Prob [Y=1]		Prob [Y=2]		Prob [Y=3]	
	coefficient	P	coefficient	P	coefficient	P
Intercept	-0.0458 [.1265]	0.72	0.1076 [.1256]	0.39	-0.0618 [.1265]	0.63
Where2	-0.0202 [.0491]	0.68	0.0891 * [.0518]	0.09	-0.0690 [.0496]	0.16
Miles2	-0.0710 [.0689]	0.30	0.1174 * [.0666]	0.08	-0.0464 [.0669]	0.49
Child2	-0.0055 [.0470]	0.91	0.1009 * [.0516]	0.05	-0.0954 ** [.0478]	0.05
Lyco2	0.0158 [.0466]	0.74	0.0466 [.0492]	0.34	-0.0624 [.0463]	0.18
Size2	0.0487 [.0521]	0.35	-0.1397 ** [.0586]	0.02	0.0910 * [.0520]	0.08
Region2	0.0488 [.0514]	0.34	-0.0549 [.0552]	0.32	0.0061 [.0508]	0.90
Income1	-0.0272 [.0552]	0.62	0.0506 [.0574]	0.38	-0.0235 [.0552]	0.67
Income2	0.0191 [.0697]	0.78	0.1081 [.0719]	0.13	-0.1272 * [.0707]	0.07
Edu2	0.0230 [.0589]	0.70	-0.1418 ** [.0621]	0.02	0.1188 * [.0617]	0.05
Edu3	-0.0180 [.0688]	0.79	0.0409 [.0740]	0.58	-0.0229 [.0672]	0.73
Ethn 2	-0.0670 [.1083]	0.52	-0.0254 [.1079]	0.81	0.0950 [.1094]	0.39
Ethn3	-0.0436 [.0638]	0.49	-0.1177 * [.0681]	0.08	0.1613 * [.0727]	0.03
Gender1	0.0863 [.0544]	0.11	-0.1157 ** [.0552]	0.04	0.0295 [.0512]	0.57
Age	-0.0004 [.0015]	0.81	0.0004 [.0015]	0.78	-0.0001 [.0015]	0.97

** = significant at .05 level

* = significant at .10 level

Table 9. Variable Description

Variable Name	Question	Coding	
WHERE2	Where do you most often purchase watermelon?	0=grocery store	1=other than grocery store (farmers' market, roadside stand, other)
MILES2	How many miles is your home from where you usually buy watermelon?	0=10 or fewer miles	1=11 miles or more
CHILD2	How much do your children influence your decision to purchase watermelon?	0=children greatly or somewhat influence	1=children do not influence, don't have children, or don't know
LYCO2	How familiar are you with lycopene?	0=not familiar	1=slightly or very familiar
SIZE2	What is your favorite size for a WHOLE watermelon?	0=14 pounds or less	1=15 pounds or more
REGION2	Which would you most prefer if visible labels specifying the production region of the watermelon were clearly displayed on the product?	0=grown in Alabama or in the South	1=grown outside of the South (including outside the U.S.), or no preference
AGE	In what year were you born?		Continuous Variable; no coding
GENDER1	What is your gender?	0=female	1=male
ETHN2	What is your ethnic group?	0=African American	1=if not
ETHN3	What is your ethnic group?	0=Caucasian	1=if not
EDU2	What level of education have you completed?	0=high school graduate or less	1=if not
EDU3	What level of education have you completed?	0=some college or college degree	1=if not
INCOME1	What was your approximate household income in 2003 before taxes?	0=\$25,000 - \$49,999	1=if not
INCOME 2	What was your approximate household income in 2003 before taxes?	0=\$50,000 or more	1=if not

Table 10. Stores where surveys were collected

Store Name	Store Location	Total collected	% of total collected	Total in Cluster	% in Cluster	Total in Cluster	% in Cluster	Total in Cluster	% in Cluster
				I "Seeing Red"	I "Seeing Red"	II "Catch-All"	II "Catch-All"	III "Traditionalists"	III "Traditionalists"
Winn Dixie	Opelika	36	8.0%	10	7.0%	18	10.7%	8	580.0%
Food World	Troy	32	7.1%	11	7.7%	9	5.3%	12	8.8%
Food World	Enterprise	40	8.9%	10	7.0%	20	11.8%	10	7.3%
Piggly Wiggly	Hartford	27	6.0%	10	7.0%	14	8.3%	3	2.2%
Bruno's	Auburn	32	7.1%	9	6.3%	13	7.7%	10	7.3%
Kroger	Opelika	33	7.3%	6	4.2%	12	7.1%	15	10.9%
Winn Dixie	Auburn	31	6.9%	10	7.0%	7	4.1%	14	10.2%
Kroger	Auburn	45	10.0%	7	4.9%	14	8.3%	24	17.5%
Winn Dixie	Opelika	45	10.0%	15	10.5%	19	11.2%	11	8.0%
Publix	Phenix City	68	15.1%	28	19.6%	26	15.4%	14	10.2%
Winn Dixie	Enterprise	56	12.4%	27	18.9%	16	9.5%	13	9.5%
Grocery Outlet	Enterprise	4	0.9%	0	0.0%	1	0.6%	3	2.2%
TOTAL		449		143		169		137	

APPENDICES

Appendix A: Product Profile Cards

Product Profile Cards																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">CARD 1</th> </tr> </thead> <tbody> <tr><td>Price:</td><td style="text-align: right;">\$5.00</td></tr> <tr><td>Seed Content:</td><td style="text-align: right;">seedless</td></tr> <tr><td>Flesh Color:</td><td style="text-align: right;">yellow</td></tr> <tr><td>Cut/Form:</td><td style="text-align: right;">sections or slices</td></tr> <tr><td>Lycopene Sticker:</td><td style="text-align: right;">without sticker</td></tr> </tbody> </table>	CARD 1		Price:	\$5.00	Seed Content:	seedless	Flesh Color:	yellow	Cut/Form:	sections or slices	Lycopene Sticker:	without sticker	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">CARD 2</th> </tr> </thead> <tbody> <tr><td>Price:</td><td style="text-align: right;">\$7.00</td></tr> <tr><td>Seed Content:</td><td style="text-align: right;">seeded</td></tr> <tr><td>Flesh Color:</td><td style="text-align: right;">yellow</td></tr> <tr><td>Cut/Form:</td><td style="text-align: right;">sections or slices</td></tr> <tr><td>Lycopene Sticker:</td><td style="text-align: right;">without sticker</td></tr> </tbody> </table>	CARD 2		Price:	\$7.00	Seed Content:	seeded	Flesh Color:	yellow	Cut/Form:	sections or slices	Lycopene Sticker:	without sticker
CARD 1																									
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CARD 11																									
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CARD 13																									
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Appendix B: Survey given to consumers



Consumer Preferences for Watermelon Survey

Auburn University is administering a survey to better comprehend the consumer preferences for watermelon. We would deeply appreciate your participation. The survey will only take a few minutes to complete, and your answers will help improve future types of watermelon products available to you.

I. Product Profile Ratings

Please view each of the watermelon pictures on display. For each product, please **circle** the number that designates your preference for the product as it appears in the picture. A response of 0 would indicate that you **DO NOT** prefer the product at all, and a response of 10 would indicate that you **DO** greatly prefer the product. **Assume all products pictured taste identical.** In your assessment please take into account price, flesh color, seed content, lycopene sticker and form or cut of the product.

Please rate your preference for each product.

Product A	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product B	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product C	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product D	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product E	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product F	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product G	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10

Product H	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product I	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product J	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product K	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product L	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product M	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product N	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product O	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10
Product P	Do <u>NOT</u> prefer 0 1 2 3 4 5 6 7 8 9 <u>DO</u> prefer 10

We would like to have some further information to help us understand if there are different sectors of consumers who prefer different watermelon attributes. Please remember that we cannot use any incomplete surveys, and we encourage you to answer each question. Your responses will be extremely beneficial to our studies, and **we promise that your responses will remain confidential.**

II. Purchase Information

1. **Have you purchased watermelon in any form in the past 12 months? (If yes, please skip question 2, and go on to question 3)** _____ yes _____ no
2. **If not, why? (Please check one, and skip to question 8)**
 _____ too large _____ too expensive _____ don't like taste/texture
 _____ allergies or other medical reasons
 _____ other (Please specify)_____

3. **What is the most important reason you purchase watermelon? (Please check one)**
 health benefits flavor/taste family likes it
 fun to eat party/special occasion
 price compared to other fruits/vegetables
 other _____
4. **Where do you most often purchase watermelon? (Please check one)**
 grocery store roadside stand farmers' market
 other _____
5. **How many miles is your home from where you usually purchase watermelon? (Please check one)**
 less than 5 miles 6-10 miles 11-15 miles
 16-20 miles 21-25 miles 26-30 miles
 31-35 miles more than 35 miles
6. **About how many times during each season do you purchase watermelon? (Please write number of times per season on EACH line, i.e. put a number in EACH blank)**
 times in fall (September, October, November)
 times in winter (December, January, February)
 times in spring (March, April, May)
 times in summer (June, July, August)
7. **About how many pounds on average do you purchase each time per season? (Please write average number of pounds purchased each time per season on EACH line, i.e. put a number in EACH blank)**
 pounds each time during fall (September, October, November)
 pounds each time during winter (December, January, February)
 pounds each time during spring (March, April, May)
 pounds each time during summer (June, July, August)
8. **How much do your children influence your decision to purchase watermelon? (Please check one)**
 children greatly influence children somewhat influence
 children do not influence at all don't know don't have children
9. **How familiar are you with lycopene? (Please check one)**
 not at all familiar slightly familiar very familiar
10. **What is your favorite size for a WHOLE watermelon? (Please check one)**
 5-9 pounds 10-14 pounds 15-19 pounds
 20-24 pounds 25-29 pounds more than 30 pounds
11. **What other fruits/vegetables do you regularly purchase? (Check as many as apply)**
 cantaloupe other (please specify ONLY 3) _____
 honeydew
12. **Which would you most prefer if visible labels specifying the production region of the watermelon were clearly displayed on the product?**
 Alabama grown watermelons Southern grown watermelons
 U.S. grown watermelons imported watermelons
 no preference

III. Demographic Information

13. In what year were you born? 19_____
14. What is your gender? _____ male _____ female
15. What is your ethnic group? (Please check the one that best applies)
_____ African American _____ Asian _____ Caucasian
_____ Hispanic _____ Native American
_____ Other (Please specify) _____
16. What level of education have you completed? (Please check one)
_____ less than high school _____ high school graduate
_____ some college or technical school _____ completed four-year college degree
_____ completed graduate degree
17. Including yourself, how many people in each age category live in your household?
_____ less than 4 years old _____ 4 - 8 years old _____ 9 - 13 years old
_____ 14 - 18 years old _____ 19 - 25 years old _____ 26 - 35 years old
_____ 36 - 45 years old _____ 46 - 55 years old _____ 56 - 65 years old
_____ 66 - 75 years old _____ older than 75 years old
18. What was your approximate household income in 2003 before taxes? (Please check one)
_____ less than \$10,000 per year _____ \$10,000 to 14,999 per year
_____ \$15,000 to 24,999 per year _____ \$25,000 to 34,999 per year
_____ \$35,000 to 49,999 per year _____ \$50,000 to 74,999 per year
_____ \$75,000 to 99,999 per year _____ \$100,000 to 149,999 per year
_____ \$150,000 to 199,999 per year _____ more than \$200,000 per year
19. What percentage does your individual income contribute to the household income?
_____ %

Thank you for your time and participation!