

**DOES ORGANIC SUNSCREEN BENEFIT  
FROM A SPILLOVER EFFECT  
FROM USDA ORGANIC FOOD**

by

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A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Science in Agricultural and Resource Economics

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## **ABSTRACT**

Consumers look for the USDA organic label to define organic food but many may not understand what defines a sunscreen labeled organic even after purchasing it. To better understand consumer behavior for non-agricultural organic products, a study was conducted to determine if consumers believe an organic label on oranges and sunscreen have the same meaning, creating consumer confusion. In addition, certification information was provided to learn if government and/or third party certification closes the asymmetric gap on the meaning of organic food and nonfood products. Participants' willingness to pay (WTP) for four products, three conventional and organic oranges, and one ounce of conventional and organic sunscreen were examined and a survey was conducted before and after information on knowledge, perception and trust for organic food and nonfood products. Information was provided in between the auctions to determine the effect of certification information on participants' WTP.

The study was conducting using field experiments in New Castle County, Delaware. An auction was utilized to get consumers initial demand for organic products. The second auction was conducted to better understand if participants' WTP for organic sunscreen would decrease, suggesting an organic label was misleading participants. One of three facts sheets was provided to participants in between the

auctions. One with information from USDA, FDA and FTC regarding government regulations, one of NATRUE, the third party certification, which certifies the sunscreen used in the study, and another of a combination of both information sheets. A total of 204 participants took part in the study.

Initially, participants' were willing to pay on average from \$2.81 to \$3.15 for organic sunscreen and \$2.09 to \$2.43 for three organic oranges. After information, mean bids decreased for organic sunscreen, ranging from \$2.16 to \$3.02 and increased slightly for organic oranges of \$3.01 to \$3.54. To analyze the results before and after information more closely, paired t-tests were utilized. The t-test showed that consumers are willing to pay significantly less for organic sunscreen after reading government information. The tests also showed participants do not believe a product should be labeled organic without USDA certification. Lastly, there were significantly different responses to the survey question "the meaning of an organic claim on a organic orange is the same as the meaning on an organic sunscreen" after information was provided.

Lastly, tobit regression analysis for organic sunscreen showed participants changed their WTP as a result of the information. If participants had a positive opinion of organic, they were willing to pay more after government information. Participants that received third party certification information, were willing to pay more in the second auction if they had a higher trust for the certification, trust in organic enforcement and if they were the household shopper, which implies information about the third party certification is important when making purchasing decisions.

Participants that received both pieces of information significantly increased WTP if their trust increased in organic labeled personal care products, while WTP decreased the more education degrees participants had compared to participants with a high school degree. The differences in WTP by treatment group implies that the lack of a organic personal care products labeling standards are effecting purchasing decisions and could have damaging effects on consumer welfare. This could lead to a market failure if information to the public does not become more readily available.

## **Chapter 1**

### **INTRODUCTION**

An organic label on food products is a visual representation that it meets the standards of, and is certified by, the United States Department of Agriculture (USDA). These defined organic agriculture standards under the USDA National Organic Program (NOP) promote confidence and strengthen trust the product does not contain synthetic pesticides, additives, or growth hormones (USDA, 2011). Today, consumers are becoming just as concerned about what they put on their body as what they consume (OTA, 2016). These concerns are leading consumers to demand products with fewer chemicals and many are turning to organic personal care products (OTA, 2016). While a food product can only be labeled organic if it follows the NOP standards, at this time organic personal care products do not have a consistent national definition. The organic labels on personal care products could lead consumers to believe the organic claim has the same standards as organic food. This thesis aims to understand consumers' purchasing behavior and willingness to pay for organic personal care products.

The market demand for organic is growing steadily. The organic industry reached record high sales of \$47 billion in 2016 (OTA, 2017). Organic personal care products are a highly demanded good, sales in 2015 reached \$848 million and have an 11% growth rate, a higher growth rate than the organic food market and personal

cares' conventional counterpart (OTA, 2016). The organic personal care market includes skin care, hair care, cosmetics and oral care however skin care is the most highly demanded (Grand view research, 2016).

### **1.1 Motivation**

In 2002, the USDA NOP was created to provide consistent information regarding organic agriculture (USDA, 2016). The USDA defines organic as having 95% or higher organic ingredients, while the remaining ingredients must be included on the USDA's National List of Allowed Substances, and only then can the product display the USDA organic seal. Products that contain at least 70% organic ingredients can label their products as "made with organic ingredients" but cannot display the USDA organic seal. A product with less than 70% organic ingredients may not display the term "organic" anywhere on the display panel. While organic personal care products can be USDA certified if the product meets the NOP standards, there is no enforcement or regulation. The organization states "the USDA have no authority over the production and labeling of cosmetics, body care products and personal care products that are not made up of agricultural ingredients or do not make any claims to meeting USDA standards" (USDA, 2008). The Food and Drug Administration (FDA) regulates drugs and cosmetics but does not define or regulate organic, as it is the USDA's jurisdiction (FDA, 2010). Currently, organic personal care products are neither defined nor regulated by any US government agency.

Voluntary third party certifiers are available for organic personal care products. However, each independent certifier has a range of different standards for organic. The first American third party certifier of organic personal care products is the National Sanitation Foundation (NSF), which allows products with 70% organic ingredients to be certified organic. NATRUE is a Belgium third party certifier and has different requirements for different personal care products, and certifies the product used in this study. There are many more European third party certifiers with different standards and labels. Third party organic certification labels could mean different things to different consumers, which may only add to consumer confusion.

The Federal Trade Commission (FTC) conducted an online study "Consumer Perception of 'Recycled Content' and 'Organic' Claims nonfood Organic Products" to examine consumer understanding of green labeling (FTC, 2016). The study examined consumer knowledge and behavior of organic mattresses, shampoo and dry cleaning. After the study was conducted, the FTC held a roundtable discussion and the panel collectively showed concerns that consumers could be misled to purchase organic nonfood products based off the meaning of organic in the food industry.

At this time, there is no authority over the organic personal care product market and no clear standards for organic personal care products. Consumers trust the organic certification process and the information on an organic food label (Giannakas, 2002). Many consumers view a product with a USDA organic agriculture label as safer, healthier, and more environmentally friendly (Lee &

Hwang, 2016). Consumers may be unaware of the differences of the standards between agriculture and non-agriculture organic products, which could lead to market failure from asymmetric information. Without clear labeling on products only the producers know if organic productions methods were used. Consumers could be purchasing personal care products with false organic claims if a label does not provide information differentiating the product. This study will be the first to find out if consumers believe the meaning of organic is the same for agriculture and non-agriculture products and are willing to pay more for organic personal care products.

The purpose of this thesis is to better understand consumers' attitudes, beliefs and willingness to pay. In addition, this study will discover if these preferences change when provided organic certification information on food and organic personal care products. The results of this study will be beneficial information to the organic food market, organic producers, consumers and government agencies. It is also important to understand consumer behavior towards organic personal care products and how this will affect organic food. This will be useful to protect the trust and positive reputation the organic food industry has built. There could be a positive spillover effect from the organic food industry to personal care producers, who do not have to bear the cost of organic certification. Consumers therefore, may be paying more for organic personal care products but unaware of the meaning. This has the potential to damage the organic food market if people lose trust in the organic seal.

## **1.2 Objectives**

The primary objective was to determine if consumers believe the organic claim on sunscreen has the same meaning as an organic claim on an orange. Organic labeling on agriculture products must follow USDA standards and many consumers could believe an organic claim on personal care products follow the same standards. Oranges and sunscreen were chosen to represent a food and nonfood product, and for participants to compare organic claims. Through the field experiment and survey conducted, this study will better understand if consumers are informed of organic standards and trust organic certifications.

The second goal was to examine if information on organic certification will change consumer behavior and WTP for organic oranges and sunscreen. This was done by having different participants read different pieces of information from government agencies and a third party certifier. The government agencies information included information that organic personal care products cannot be USDA organic and is not regulated by any other government agency. The third party certification informed participants the sunscreen in this study is certified by a third party to see how this will impact consumers' WTP compared to the government information. This will be important to understand whether third party certification allows consumers to make well-informed decisions when there is no government involvement.

The study is a non-hypothetical field experiment, which allows consumers to have more of a real shopping experience. Oranges were chosen because this study



began in August and oranges are a summer fruit and it would be easier for participants to put a value on in terms of dollars. Sunscreen was chosen as a unisex personal care product, which is also popular in the warmer months. None of the original product labeling was shown and the only additional information provided was both sunscreens were SPF 30. Participants had the chance to receive either three oranges or sunscreen with the money from participating, which provides incentives for consumers to write their true values for the four products. Participants were asked to write down WTP both before and after the information for 3 oranges, 3 organic oranges, 1 oz. of sunscreen and 1 oz. of organic sunscreen.

The study will also discover if consumers believe the word organic is regulated by a government agency. From these results the study can examine if the organic personal care industry is gaining demand from a positive spillover effect from the organic food industry. This will be useful to learn if a lack of government certification impacts participants' value of organic personal care products. It could also show that an organic label is misleading consumers to purchase organic personal care products, and has the potential to damage the organic food industry if consumers lose trust in labeling.

This study could have important implications if organic certification information changes participant premiums for organic sunscreen. This research could show there is asymmetric information between consumers and producers. In addition, if consumers believe the meaning of organic is the same for different product categories, public education may be necessary. Further steps may be needed

to ensure an organic label is not misleading consumers, including a clear standard of organic personal care products.

### **1.3 Organization of Thesis**

Following the introduction, chapter 2 will include a literature review examining past organic food WTP studies and consumer behavior for organic and organic nonfood studies. In addition, the chapter will discuss how this study is unique and contributes to the literature. Chapter 3 will describe the experimental design and hypotheses. Chapter 4 will follow with a discussion on the methodology, survey and the econometric model for data analysis. Chapter 5 will present results and summary statistics. Finally, the discussion, implications and limitations will conclude chapter 6 of the thesis.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Organization of Literature**

The literature review will begin by examining work on the value a label adds to organic, a credence attribute, which consumers cannot directly see the extra value of (Janssen & Hamm, 2012). While the organic label signals the product meets standards and provides trust to consumers, numerous studies have found consumers believe an organic product is safer and a higher quality. Next, the review will discuss the impact government and third party certification labels have on closing the asymmetric information gap between producers and consumers. Studies using willingness to pay for organic food will follow, evaluating how information changes participants' decisions. Then, the review will include past research on natural and organic labeling confusion indicating that consumers are unaware of the differences in standards but are willing to pay more for both organic and natural claims. The review will discuss organic nonfood studies including on organic cotton clothing and an organic personal care product study to illustrate that consumers are using their beliefs and knowledge of organic food to purchase nonfood organic products. The chapter will conclude with how this study will add to the current literature.

## **2.2 Organic perception and purchasing intentions**

The US Department of Agriculture National Organic Program (USDA NOP) was developed due to a push from consumers for clear information (Environment News Service, 2000). Since the adoption of the national standard for organic labeling, the demand for organic food has grown. Due to the high demand and growing sales of organic food, numerous studies have been conducted on the driving forces for purchasing organic food. Hughner, McDonagh, Prothero, Shultz, & Stanton (2007) highlights organic means different things to do different consumers. Studies have determined the main motives for purchasing organic are the product contains less chemicals and is perceived as healthier, environmentally friendly and safer (Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Lee & Hwang, 2016). In addition, food scares have increased consumers fear in conventional production, leading consumers to demand more information and trust organic (Falguera, Aliguer, & Falguera, 2012; Schleenbecker & Hamm, 2013).

Teng and Wang (2015) in Taiwan conducted a survey in supermarkets and health stores to understand organic food purchasing intentions. The survey found organic labeling information and perceived organic knowledge significantly affected participants' trust and positive attitudes of organic, increasing participants purchasing intentions. A study conducted on independent organic certifications on private, local and global brands found an organic label is a way to differentiate a brand (Bauer, Heinrich, & Schäfer, 2013). The research examined positive consumer perceptions of the organic label and using a multivariate analysis of

variance (MANOVA) showed that an organic label increased the positive perceptions of the brand and increased purchasing intentions. The brand was then perceived as healthy, environmentally friendly and safe.

Organic food has also been seen by consumers as a higher quality product and taste better. A field experiment by Bernard and Liu (2017) used labeled and unlabeled apples to better understand if prior beliefs influence taste. The tobit regression concluded participants rated the labeled organic apple significantly higher than the unlabeled counterpart. Participants at the natural food store rated the organic labeled product the highest, due to positive beliefs and attitudes towards organic food.

### **2.3 Certification Labels**

Research shows consumers value the USDA label and have a higher trust for certification agency labeling. Van Loo et al. (2011) study analyzed WTP for a USDA certified organic label and a generic organic label without identifying the certifying agent for organic chicken. There was a significantly higher premium for the USDA label. Using a hypothetical choice experiment and mixed logit model, participants were willing to pay 104% premium vs. 35% premium for the generic label. Janssen and Hamm (2012) analyzed consumer responses to government and private organic labels due to a new mandatory EU label. The study used a choice experiment on different organic certification logos to better understand consumer behavior towards certification labels on apples and eggs. This study found

consumers trust certification over a generic organic label. In addition, consumer awareness and positive attitude led to a higher WTP premium. Government logos had a higher premium in Germany, Denmark, Czech Republic and Italy. This study presented data that third party certifications were not as effective as closing the information gap of credence goods because they were less well known and therefore less trusted.

Another study by Janssen and Hamm (2014) specifically in Germany analyzed whether voluntary labeling provides additional benefits to consumers or whether the extra labeling add to consumer confusion. They conducted a choice experiment with different certification logos and one generic organic label on apples and eggs, and interviews were conducted after on trust, and awareness of labels. The mixed logit model revealed the Bio-Siegel, Germany government logo received significantly higher WTP values than the old EU label even though they have the same standards. In addition, frequent buyers were willing to pay more for the private label while occasional buyers were willing to pay more for the government logo, but both the apple and eggs had significant higher WTP values with a certification logo. Therefore, organic products with certification logos do influence consumer behavior, and information is necessary for consumers to gain awareness and trust in labels.

Sønderskov and Daugbjerg (2011) analyzed countries Sweden, Denmark, US and UK varying organic labeling and consumer confidence in organic labels with different certifiers. These countries were chosen because each country has

different levels of government involvement in labeling. Countries with the highest level of government involvement are Denmark and the US. The difference is Denmark certifies the products and labeling, while the US certification process relies on accredited third party certifiers. UK has a similar system to the US, while Sweden's certification is through a third party authorized by the government. They found credible information that a product claims to be environmentally friendly increases green consumerism due to higher level of trust in the government. Ordered logit regression analysis of the survey data found Danish consumers have significantly more trust in organic food labels than other countries due to heavy state involvement in certification labeling. In addition, participants that trust state institutions had higher confidence in the labeling.

#### **2.4 Organic Willingness to Pay (WTP)**

Many WTP studies have been conducted to determine the value of organic food to consumers. Vecchio et al. (2016) WTP study on organic, functional and conventional yogurt, found consumers have significantly higher WTP for organic initially. The studies provided information that the plain yogurt contained no preservatives, functional yogurt contained ingredients useful to the immune system and the organic yogurt did not contain pesticides or genetically modified ingredients. After the information was given, premiums for organic decreased and functional yogurt had a greater increase in WTP than organic. Rousseau and Vranken (2013) studied the impact of environmental information of organic

production methods for apples in Belgium. The study used a within subjects online choice experiment to examine if information reduces information asymmetries. The conditional logit model found organic WTP significantly increased after environmental information was provided.

Gifford and Bernard (2011) found many consumers believe natural and organic have the same standards. Participants were originally willing to pay a premium for natural chicken, however after reading information about the certification of natural and organic products, the WTP for organic increased significantly and the premium for natural decreased. Syrengelas, DeLong, Grebitus, & Nayga (2017) conducted a choice experiment to determine if a natural label was misleading consumers. The study found informed consumers were not willing to pay more for natural steak, while uninformed consumers were willing to pay more for natural steak labeled with other positive perceived labels including: no antibiotics, no GM feed, and grass-fed. The study showed consumers were unaware of the standards for these labels leading consumers to pay a premium for natural.

A study by McFadden and Huffman (2017) conducted on conventional natural and USDA organic apples, broccoli and eggs found consumers were willing to pay more for organic after information was provided. In addition, participants that received natural information increased their willingness to pay for organic. The study showed that consumers are unaware of the legal standards for natural and third party information did not have an effect on consumer premiums for natural. The research implies there could be misconceptions of the benefits regarding natural



and due to a lack of information, consumers may believe a natural claim has the same meaning as an organic one.

## **2.5 Organic Nonfood Studies**

Due to the high demand for organic many studies have examined consumer preferences for organic cotton. Bernard, Hustvedt, and Carroll (2013) used a Vickrey fifth price auction to determine willingness to pay for labeled wool socks. They found consumers were significantly willing to pay more for organic and sustainable socks once definitions were provided, while the natural and eco-friendly premium decreased slightly. Ellis, McCracken and Skuza (2012) study on organic cotton t-shirts used a second price auction and found participants were willing to pay a 25% premium for organic cotton t-shirts over conventional cotton t-shirts and participants believed organic cotton is a higher quality. Hustvedt and Dickson (2009) organic attitudes and purchasing intentions survey found consumers that self-identify as organic, environmentally and socially responsible were more likely to purchase organic cotton apparel due to perceived health and production method benefits from organic farming.

There is one study on organic personal care product consumer behavior using the theory of planned behavior (Yeon Kim & Chung, 2011). The theory states consumer values and past experiences will determine consumer purchasing intentions. An online survey on organic shampoo and body lotion found consumers

with positive experiences purchasing organic food and that are health conscious will purchase organic personal care products for the same reasons.

The FTC conducted an online survey on organic shampoo, mattresses and dry cleaning in 2015 (FTC, 2016). The goal of the study was to learn consumers' perception of organic claims. The study was online from January to February and received a little over 8,000 respondents but was not a representative sample of the general population. The study consisted of multiple choice and open-ended questions. The study found one third of participants believed organic means the same thing for apples as it does for shampoo. In addition, 35% believed an organic claim meets some government standards and 30% believed by the USDA.

## **2.6 Contribution to the Literature**

Previous research highlights consumers have a positive perception of organic and lack of knowledge regarding labeling standards. However, to the author's knowledge there has yet to be a non-hypothetical field experiment on organic personal care products. This study is unique because it will be the first to better understand if consumers believe different organic product categories mean the same thing as organic food. In addition, this study will learn if consumers believe organic personal care products are government certified and if this is leading consumers to pay a premium. This research will also be the only study to examine if organic personal care products could impact trust in organic labeling and hurt the organic food industry.

## **Chapter 3**

### **EXPERIMENTAL DESIGN**

#### **3.1 Organization of the Experiment**

The field experiment will be thoroughly reviewed in this chapter. The chapter will begin by explaining the information that was chosen to provide to participants and the importance of providing an information treatment. Next, this chapter will describe the products that were shown to the participants and the labeling that was created for the sunscreen. The chapter will then review pretesting the experiment and how the pilot improved the design. Then, specific locations and dates chosen for the field experiment will be reviewed. After, the set up and recruitment of participants for the experiment will be discussed. The experimental design and the bidding mechanism auction will follow. Lastly, this section will explain the survey design and the questions for the first and second survey will be analyzed.

#### **3.2 Fact Sheet**

This study used a within subject design and obtained each participant's willingness to pay values before and after information. Information was provided to better understand if participants were aware of the standards for organic oranges and sunscreen and that the government did not regulate organic non-agriculture

products. There were three different fact sheets, one with government agency information only, which explained organic certification, and a second fact sheet described the third party that certifies the organic sunscreen. The third fact sheet contained both pieces of information with two different versions to account for an ordering effect; an example is displayed in Figure 3.1. The three fact sheets were randomly assigned to participants after completing the first auction and survey. Participants were told to read over the information carefully.

The organic label on this sunscreen is not certified or defined by any US government agency.

US Dept. of Agriculture (USDA) Guidelines:

- To be certified as USDA Organic and display the label a product must contain at least 95% organic ingredients
- The remaining ingredients must be on the USDA's nonagricultural approved substances National List
- Note: The main ingredient of sunscreen, zinc oxide, is a nonagricultural material that is not on the approved List

Federal Trade Commission (FTC) Guidelines:

- The FTC helps marketers ensure that the environmental claims they make are truthful and non-deceptive. However, they do not have specific guidance for non-food organic products or claims

US Food and Drug Association (FDA) Regulations:

- While the FDA regulates sunscreen products, the term organic is not defined or regulated under the FDA's authority

Third party Certification:

The organic sunscreen here is certified by NATRUE, a Belgium certification, which certifies organic and natural cosmetics. Label shown below.



**Figure 3.1: Fact Sheet Example**

The information on the fact sheets was obtained directly from the sources to minimize bias and provide clear definitions of organic standards. The information chosen was from government agencies USDA, FTC and the Food and Drug Administration (FDA), that regulate organic agriculture, green labeling and sunscreen products. The organic labeling guidelines were provided from the USDA to inform participants of the organic agriculture definition and that the organic sunscreen does not meet the USDA standards (USDA, 2008). The FTC mission was provided because it is the commission's responsibility to regulate eco-friendly labeling however the FTC does not regulate organic products (FTC, 2012). The Food and Drug Administration regulates drugs and cosmetics, which includes sunscreen however does not regulate organic because it is the USDA's jurisdiction (FDA, 2010).

The third party certification information in the study described NATRUE, a non-profit association that certifies the organic sunscreen used in this experiment (NATRUE, 2017). It is an organic cosmetic certification that has different organic standards depending on the product. This was included to determine if a third party certification label is beneficial information to the participants, and to learn if it is a valid label to consumers. This could be pertinent to purchasing decisions, and therefore impact willingness to pay values.

The goal of providing certification information from the government and third party certification was to discover if certification added value to the product or if a lack of government certification would decrease the value of the sunscreen. In

addition, the information was provided to understand if trust in organic in general was affected. Therefore, this information was also chosen to understand if certification labels are important to consumers and if the NATRUE information, a credible organic claim, added trust in the organic labeled sunscreen. It is important to learn if it does differentiate the organic sunscreen from the conventional, or if consumers are just paying more for an organic sunscreen because of expectations in organic.

### **3.3 Product and Labeling**

Three oranges and an ounce of sunscreen and organic sunscreen were displayed to participants. Three oranges were displayed to control for differences in color, shape, and size for conventional and organic oranges. The sunscreen was in white labeled bottles. The sunscreens were labeled “Sunscreen SPF 30” and “Organic Sunscreen SPF 30”, shown in figure 3.2. All of the products were as claimed therefore there was no deception used in this study. The original product name of the organic sunscreen used is “organic whole body sunscreen” and is certified by NATRUE. The original labeling was not shown to participants to control the experiment for differences in brand name, product name, design and color of the label. Participants were told to write down their WTP for three oranges and one ounce of sunscreen for conventional and organic.



**Figure 3.2: The Label on the Sunscreen Bottles**

### **3.4 Pre-Testing**

Participants were recruited next to the University of Delaware UDairy Creamery to test out the experiment. The pretesting was conducted August 9<sup>th</sup>, 2017. Pretesting was useful to determine how long the experiment would take a participant and if participants were able to understand the survey questions. The pretest was important to learn if participants were willing to pay for oranges and sunscreen and if the information provided was easy to read. In addition, the pretest was useful to learn if there were too many questions and if participants were losing interest in finishing the experiment. The pretest also allowed the experimenters to become comfortable using the script and practicing the auction. Participants were able to receive a product of either 3 oranges, a sunscreen and up to \$6 for participating. The pretest received 27 respondents and after respondents' feedback the survey was shortened.



### **3.5 Locations and Dates**

One of the benefits of the field experiment included obtaining a wide sample from the general public of Delaware. The field experiments began in August 24, 2017 until October 18<sup>th</sup>, 2017. In total, the experiment received 204 respondents throughout all locations. Experiments were conducted at six different locations. The locations included: the UDairy Creamery (39), Battery Park (19) in New Castle County, Newark Farmer's Market (41), a UD Student Center (30), New Castle Art Fair (54), and the Delaware City DMV (21).

The UDairy Creamery was chosen to conduct the experiment after the pretesting because it is a popular place for families, students, and the local community in the summer. A park in New Castle County was chosen on a Saturday to get a wider demographic of people in the Delaware park. Next, the farmer's market was selected to obtain consumers who may be more knowledgeable of organic standards and may be more likely to purchase organic. The study took place at a booth during the farmer's market on a Sunday. The student center was chosen to get a younger demographic of consumer who may be more knowledgeable about government standards, the experiment was conducted in the afternoon on a weekday, to obtain students in between classes and going to lunch. The "Art on the Green" art fair has many different vendors and brings many people to the park. A booth at the art fair allowed people to take part in the survey who were at the event and these participants may not have otherwise taken part in the study. The Delaware City DMV was chosen to get a wider sample of people in Delaware. This location

was chosen to receive a sample of different income levels and ethnicities of consumers. The study took place in the late afternoon on a weekday, when many people are getting out of work.

### **3.6 Set Up and Recruitment**

The main setup of the experiment consisted of a tent, table and chairs. A foldout table and two chairs were provided so participants could sit and fill out the study. A tent provided shade over the experiment. During the study, three experimenters assisted at all times. Two experimenters would assist participants with the study and one other would recruit participants. Experimenters stood on the opposite side of the table of participants. The experimenters would explain the experiment and provide instructions as participants filled out each sheet of the study, see the full script in Appendix B. To inform the public of the experiment, signs were placed in the ground near by the experiment, the signs stated “Participate in UD Research Earn Cash”. The table consisted of pens and clipboards for each participant, the clipboards organized the papers and each one contained: the first WTP sheet, survey, a fact sheet, the second WTP sheet, second survey and a demographic form in that order and pens were provided for participants to fill it out. The full survey is in Appendix A.

Three oranges and one ounce of organic and conventional sunscreen were in the center of the table for participants to see the products they would be bidding on. The oranges that were given to participants were in a cooler with ice under the table.

Oranges were purchased throughout the field experiments to ensure participants were receiving fresh oranges each time. The oranges sitting on the table were not given to participants. Many participants were interesting in the display would then come over and ask about the experiment and others were recruited to get a wide sample of participants to take part. Each participant had a chance to receive either three oranges, one sunscreen and could potentially receive up to six dollars from taking part in the experiment. The University of Delaware provided funding for this study.

### **3.7 Experimental Design**

The field experiment provided an environment where purchasing decisions are made similar to a shopping experience. By targeting participants from the general population reduced sample selection bias and received a wider demographic (Lusk & Fox, 2003). It is important to note that each location was chosen specifically to collect a wide sample of Delaware, the locations were chosen to receive a sample similar to the population demographic, which will be described further in chapter 4.

The experiment began by going out to the public and asking people if they would like to take part in a study on oranges and sunscreen. If participants agreed to take part in the study, participants were told they had to be 18 years of age and their responses would be kept anonymous and confidential. Participants were told the study would take up to ten minutes to complete. The study was then explained to

participants, that it included writing willingness to pay for four items, reading some information, and filling out two brief surveys. Participants were also told they could receive up to six dollars for participating with a chance to receive either three oranges or one ounce of sunscreen. Participants were told it was in their best interest to be honest and write true values because you may end up receiving one of the products, this was also repeated in the second auction to make sure that there was not a demand effect, where participants understand the experiments intentions and change their behavior (Charness, Gneezy, & Kuhn, 2012).

Once participants understood the instructions, the study began by asking participants to write down the maximum amount they would be willing to pay for each product from \$0 to \$6. Participants were told to not write down the cost of these products in a store, but what they would want to pay. Participants were informed that entering too high a value could mean receiving a product at more than it is worth to you and entering too low of a value could mean not receiving a product at a price you would like.

After a brief survey, which will be discussed further in section 3.9, participants received one of three fact sheets to read over. It was critical to have different participants read different information to see how these facts affects the participants' value for conventional and organic oranges and sunscreen. Participants were told to not consult with other participants or discuss the information after they were done if other people were still taking part in the study and didn't want them to

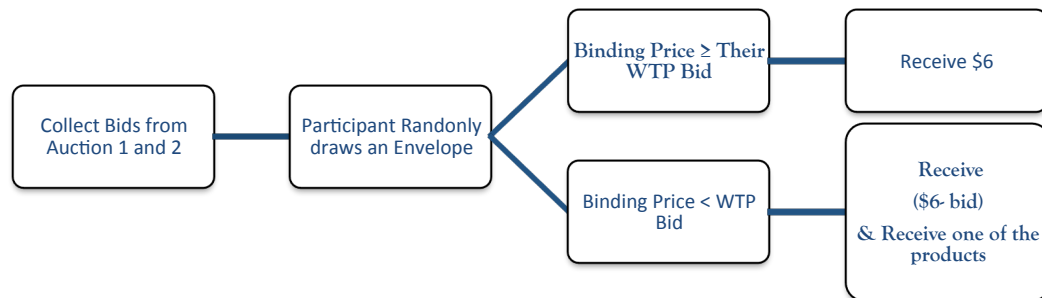
effect the experience or add any information to other participants (Harrison & List, 2004).

A second round of bidding was then conducted to measure participants' willingness to pay for oranges and sunscreen after certification information was provided. Participants were told that only one of the auction would count and reminded it was important to write the actual amount that you would be willing to pay for the four products, anywhere from 0 to 6 dollars. They were also reminded that they could end up receiving one of the products. The order the products were listed on the bid sheet was randomized and ensured participants were carefully reading the sheet before recording their bids. After the bidding was completed, participants were asked to fill out a second survey. Next participants found out if they were receiving a product or money through the BDM auction explained further in section 3.8. Lastly, participants were asked to fill out a demographic form and to write any comments in the optional comment section. Then the experiment asked the participant to fill out a receipt and the experimenters would prepare the product and/or money for the participant and thank them for their participation.

### **3.8 Bidding Mechanism**

An elicitation mechanism was chosen to reveal participants true preference for conventional and organic oranges and sunscreen (Lusk & Hudson, 2004). The BDM method was utilized because it's incentive compatible and participants receive real money and products (Becker, Degroot, & Marschak, 1964). This has been

shown to be a useful method compared to a hypothetical lab setting where participants are more likely to overestimate WTP values (List & Shogren, 1998). It is the participants dominant strategy to state their true preference because participants do not determine the binding price (Cason & Plott, 2014). The BDM method is shown in the flow chart in figure 3.4.



**Figure 3.3: BDM Mechanism Flow Chart**

To collect bids, participants wrote down WTP values from \$0 to \$6, however it was never called a bid or auction to participants. Each bidding sheet listed four products, randomly ordered, a version of the bidding sheet is shown in figure 3.4. The four products on the bidding sheets were randomly ordered to account for an ordering effect and to ensure they were no demand effects.

### Willingness to Pay 1

Please indicate the most you would be willing to pay for 3 conventional and organic oranges and 1 ounce of conventional and organic sunscreen. Your amount must fall between \$0 and \$6.

Note that your best strategy is to enter the most you are actually willing to pay. Please do not just enter how much you think the products actually cost.

Oranges (3)	\$ _____
Organic Oranges (3)	\$ _____
Sunscreen (1 oz.)	\$ _____
Organic Sunscreen (1 oz.)	\$ _____

**Figure 3.4: Bidding Sheet**

After both rounds of bidding were completed and handed to the experimenters, participants were asked to select an envelope. Envelopes were randomly assorted for participants to choose from. Each envelope contained a piece of paper with an auction number 1 or 2, one of the four product names, and a binding price ranging in \$1 intervals to ensure participants had a fair chance of receiving a product (Lusk, Feldkamp, & Shroeder, 2004). The participant would then open the envelope and then learn if they would be receiving three oranges or an ounce of sunscreen. The only value that would be compared would be the participant's WTP value with the exact auction number and product name that was specified in the envelope. If the price in the envelope for that auction and product

were equal to or higher than the participant's value they would receive \$6 for participating in the study and would not receive oranges or sunscreen. If the price in the envelope was lower than the participant's WTP for that specific product then the participant would receive the product listed in the envelope and \$6 minus the value listed in the envelope.

### **3.9 Survey Design**

A survey was conducted before and after information was provided to participants. The first survey was conducted after the initial auction to grasp participants' knowledge and trust in different organic products. The second survey was given to better understand consumers' beliefs of organic, trust in government and third party certification as well as to see if participants' definition of organic changed between agricultural and non-agriculture products. The full survey is in Appendix A.

The first survey began with questions regarding organic knowledge, trust, and beliefs the oranges and sunscreen is USDA certified for four different categories: food, cleaning products, clothing and personal care products. Examples of cleaning and personal care products were listed to ensure participants were aware of what the category entailed. Four different categories were chosen to understand participants' knowledge and behavior of different organic products and to ensure participants were not aware of the experimenters' intentions. The categories were randomized to control for ordering effects. Questions regarding knowledge, trust,



and purchase frequency were on a 1 to 5 scale where 1 =not at all and 5=completely. Agree/ disagree questions were on a Likert scale where 1 = strongly disagree to 7 = strongly agree, this followed Qualtrics survey design, an online survey platform used at the University of Delaware (Qualtrics, 2018).

Participants were then asked if they believed the organic claim had the same meaning for oranges and sunscreen and how confident they were the oranges and sunscreen were certified organic by the USDA from 1, not at all confident to 7, extremely confident on a Likert scale. Four statements were then given for participants to agree or disagree, to learn more about their beliefs of food and nonfood organic products. Statements include “if you believe organic products must have the USDA seal”, “if all organic products have the same definition”, “if you believe an organic label was misleading without the USDA label” and products should not be called organic unless it has the USDA seal”. The last question on the initial survey was asked to understand participants’ knowledge of third party certification and government labeling. This question included six labels and asked participants how confident they were each one was government certified. The labels included the USDA seal, certified vegan, cruelty free, NATRUE, NSF, and certified gluten-free certification labels, the order was randomized to not bias participants.

After the information was provided from government agencies and NATRUE on organic certification standards and a second auction was completed, a brief second survey was administered. The second survey asked participants to state how much they agree or disagree that organic is safer, a higher quality and better for

the environment on a one to seven scale for the four categories: food, cleaning products, clothing and personal care products. These statements were chosen to learn if participants have beliefs that organic food is safer, a higher quality and better for the environment and if they also have these beliefs towards organic clothing, cleaning products and personal care products. Next, opinions and trust for organic, USDA and third party certification was asked to understand if this could affect a participant's WTP. All the categories were randomized to reduce bias. Lastly three questions were repeated from the first survey to learn if the information provided changed a person's behavior. The questions chosen to repeat were to rate your level of trust for the organic label on a one to five scale, to agree or disagree to the statement "I don't believe the product is organic without the USDA seal" and lastly if the meaning of an organic claim is the same for organic oranges and sunscreen.

Participants were then asked to fill out a demographic page. The demographics asked included gender, age, ethnicity, education level, income, if participants have children under 18, the area they lived in, and if they were the main shopper in their household. On the back of the page was an optional comment page, asking participants to feel free to add any comments they had about the information provided to them in the study.

## **Chapter 4**

### **METHODOLOGY**

#### **4.1 Organization**

This chapter will explain the methods used to better understand participants' behavior for organic sunscreen and oranges. The chapter will begin by reviewing the hypotheses tested in this study. The chapter will then progress into the methods chosen to analyze responses to survey questions and WTP values. Paired t-test will be described and the variables examined before and after information treatments. Then, a description of the Tobit regression for the data analysis and variables chosen for the Tobit regression will be detailed. Lastly, a description of the demographics of the participants in the study will be reviewed.

#### **4.2 Hypotheses**

When developing this study, the following hypotheses were formulated. The first hypothesis was the information treatment would affect participants' WTP in the second auction. While it was hypothesized participants will pay a premium for organic compared to conventional, it was hypothesized the premium for organic sunscreen will decrease after the information from government agencies. In addition, the information that the sunscreen is NATRUE certified was hypothesized to not affect consumers' WTP, due to a possible lack of awareness and trust in the

NATRUE label similar to past literature (see section 2.3). Therefore, the government certification information was hypothesized to have a bigger impact on consumer preferences than the third party label NATRUE.

The second hypothesis was the organic claim on sunscreen would have the same meaning to participants as the organic claim on an orange. To learn consumers' understanding of organic food and nonfood products, participants were asked "do you believe sunscreen with an organic claim has the same meaning as the organic claim on an orange". This question was later asked again on the second survey to learn if the meaning of organic sunscreen to participants had changed. After participants read that the organic claim on sunscreen is not regulated by a government agency, it was hypothesized the responses would change and circle no, these organic claims do not mean the same thing. It was also hypothesized that participants that received the third party certification information would not change their original responses of the meaning of organic. This was in part because the third party information notifies participants that an organization regulates the organic sunscreen, which is believed to not effect the meaning of an organic claim to participants.

The third hypothesis was a strong trust and expectations for organic food would lead participants to pay a premium for organic sunscreen. It was believed that organic foods are leading consumers to purchase organic nonfoods, creating a positive spillover to products that claim to be organic. Therefore, it was also

hypothesized the lack of government certification could lead to a decrease in premiums for organic oranges from a lack of trust in the organic claim.

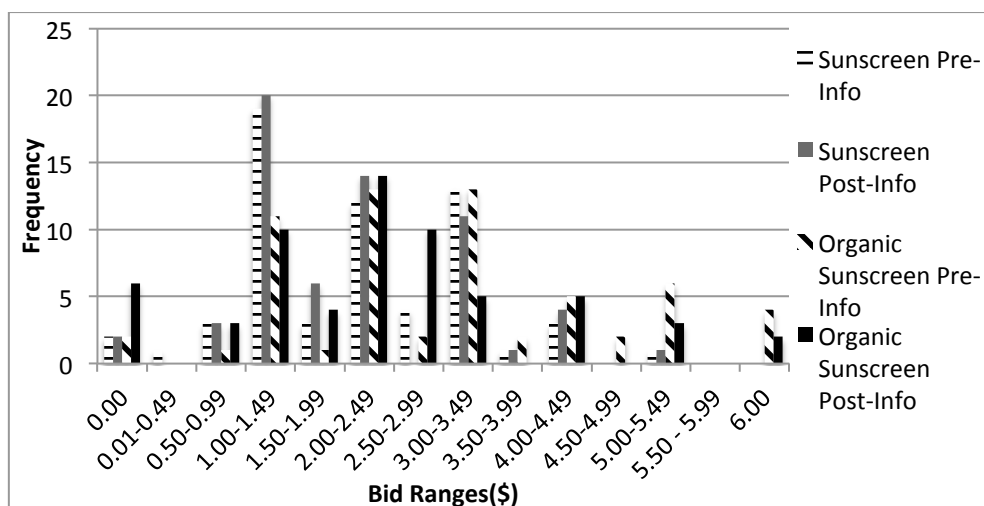
Lastly, it was hypothesized that there is a free rider problem of organic. Consumers are WTP more for organic food that the USDA certifies under specific regulations. If participants believe organic means USDA organic, it was hypothesized the assumption would lead into nonfood organics. Therefore, organic personal care product companies would not need to pay the cost of organic certification but charge consumers more for their product claiming to be organic. It could mislead consumers to purchase organic nonfood products under beliefs nonfood organic products are USDA certified.

To better understand if organic means USDA organic, a question was asked on the survey before and after the information provided. Participants were asked to rate how much they agree or disagree “I don’t believe a product is organic without the USDA seal” to understand beliefs initially and at the end of the survey. Therefore, if consumers believed organic means USDA certified, this could provide information that an organic claim is leading consumers to purchase organic nonfood products, creating a free rider problem from organic food. It could also be pertinent to learn if more public education is needed on the meaning of organic.

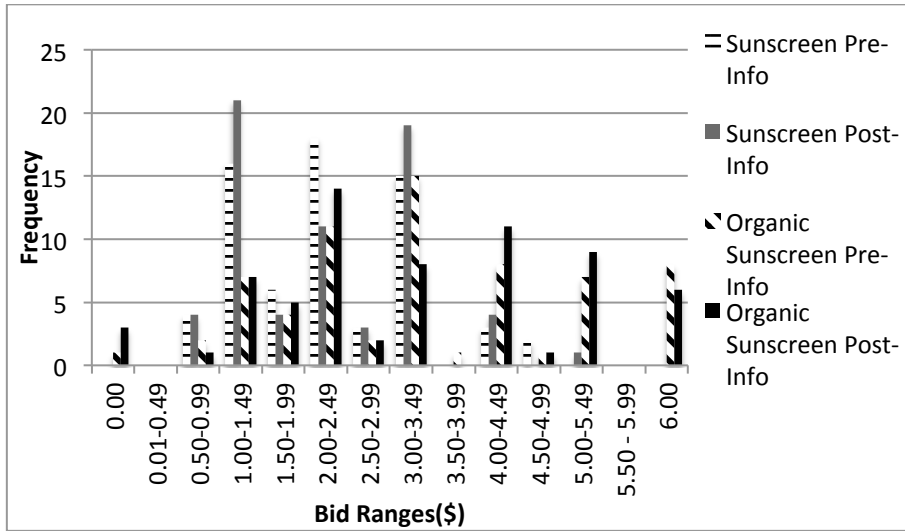
#### **4.3 WTP Paired t-Test**

T- tests were chosen to analyze WTP values and survey questions before and after information to determine if different information treatments had an effect on

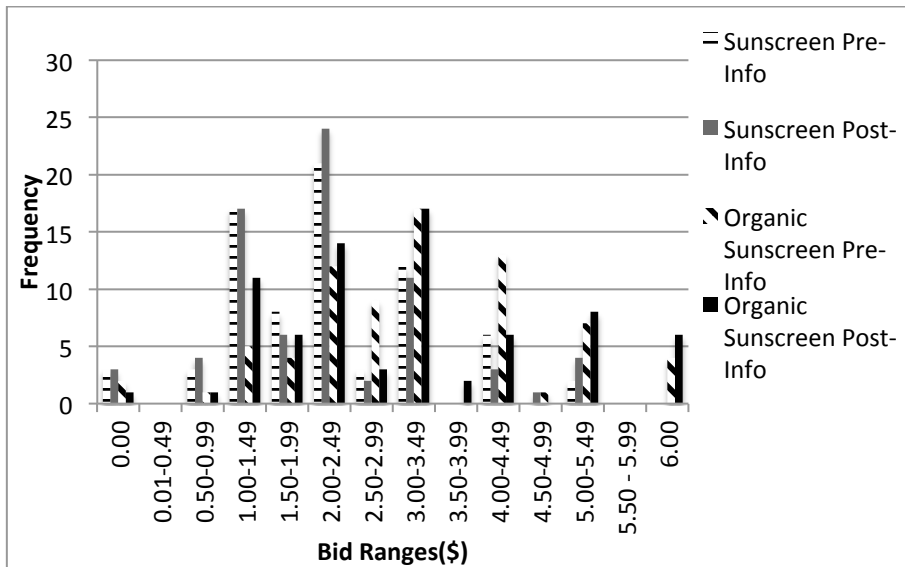
participants' behavior. The test analyzed the means of participants responses before and after information and measured if the pairs means difference is zero (McDonald, 2014). To use t-test the follow assumptions must be met, that the data is continuous, and the matched pairs follow a normal distribution. Histograms of the WTP values by treatment group are located in figures 4.1 to 4.3 below, the willingness to pay values follow a fairly normal distribution. After examining the histograms, the paired t-test was used to determine if information changes participants' WTP comparing means of pre and post information.



**Figure 4.1: Sunscreen WTP Pre and Post Information by Treatment 1**



**Figure 4.2: Sunscreen WTP Pre and Post Information by Treatment 2**



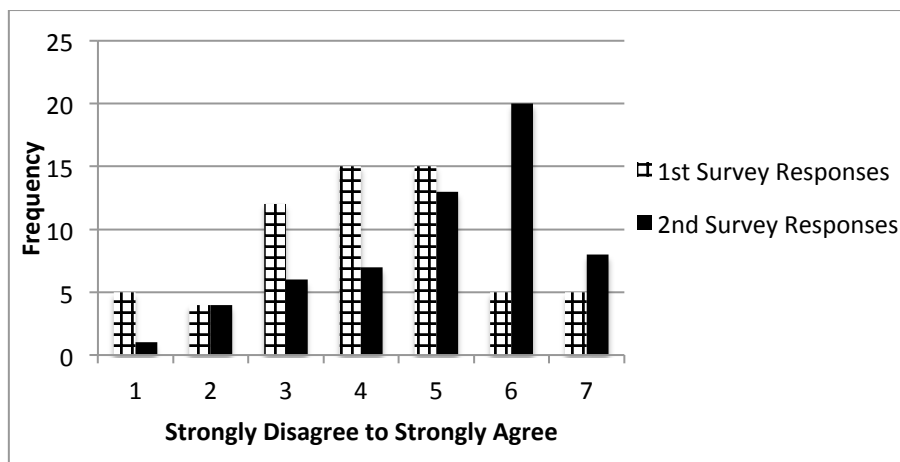
**Figure 4.3: Sunscreen WTP Pre and Post Information by Treatment 3**

#### 4.4 Paired t-Test Survey Questions

Paired t-test was used to analyze matched survey questions asked before and after the information treatments. There were three survey questions that were asked

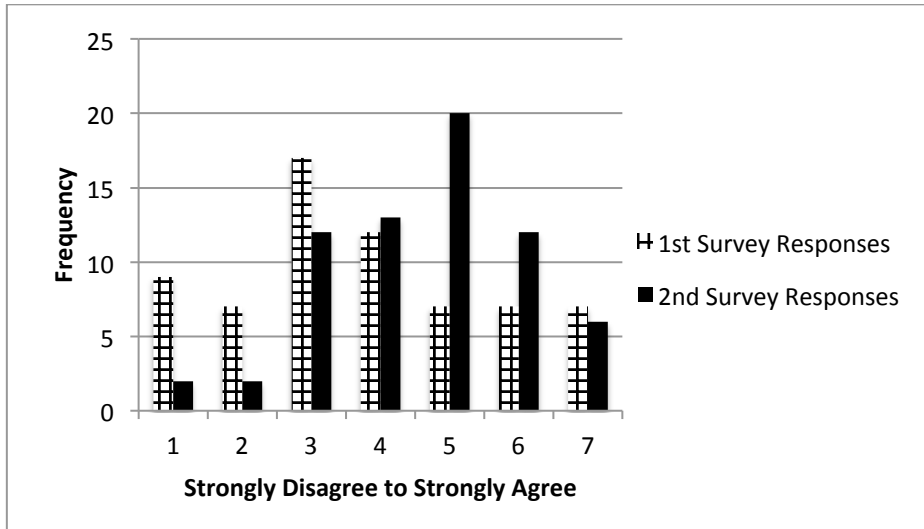
before and after the information treatment. One of the questions asked participants to circle yes, no, or not sure to the statement “the organic claim on the sunscreen has the same meaning as an organic claim on an orange”. This question was chosen to understand initially if consumers believe the sunscreen follows the same standards of organic agriculture products. It was later asked again to understand if the participants learned any new information and changed their response for the meaning of organic sunscreen.

Next, participants were asked to agree or disagree with the statement “I don’t believe a product is organic without the USDA seal”. This question was chosen to understand if consumers believe organic means USDA certified, and if participants believe organic products without the government certification should not be called organic. Responses before and after each treatment groups are shown in figure 4.4 to 4.6.

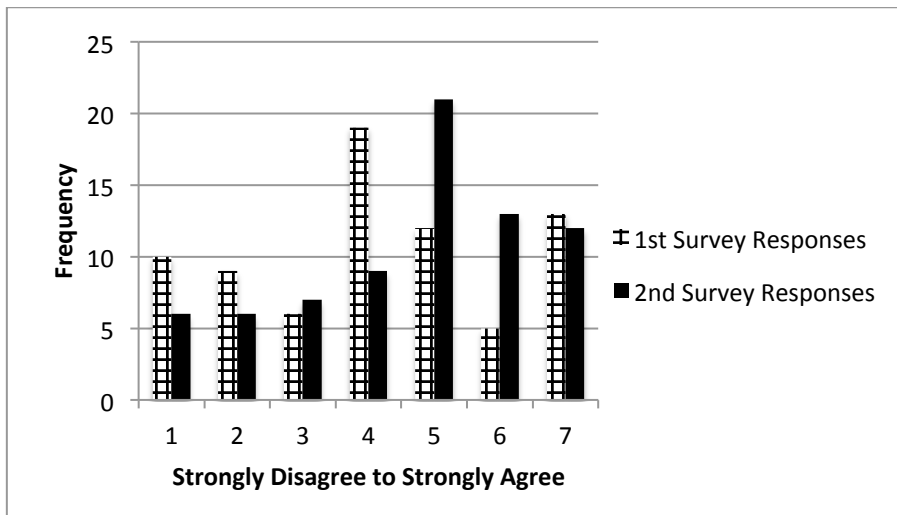


**Figure 4.4: A Product should not be labeled Organic with the USDA seal, Treatment 1**





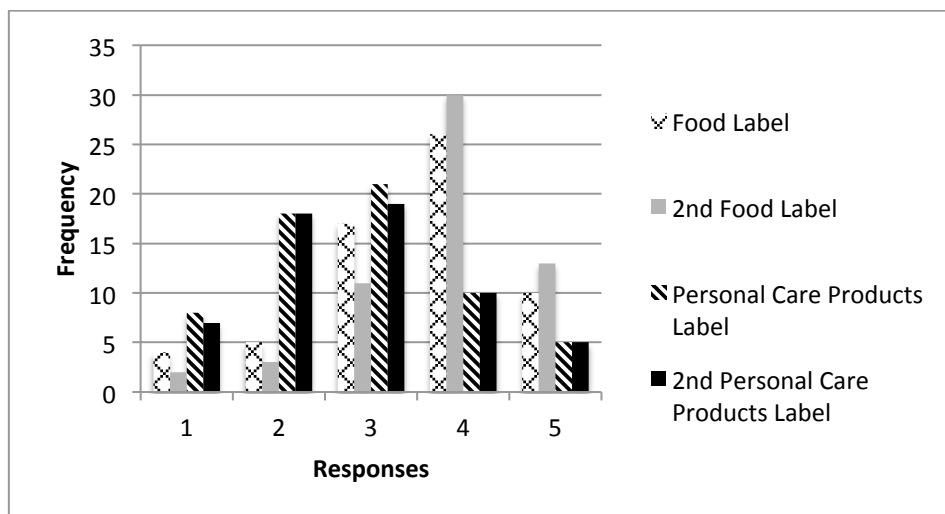
**Figure 4.5: A Product should not be labeled Organic with the USDA seal, Treatment 2**



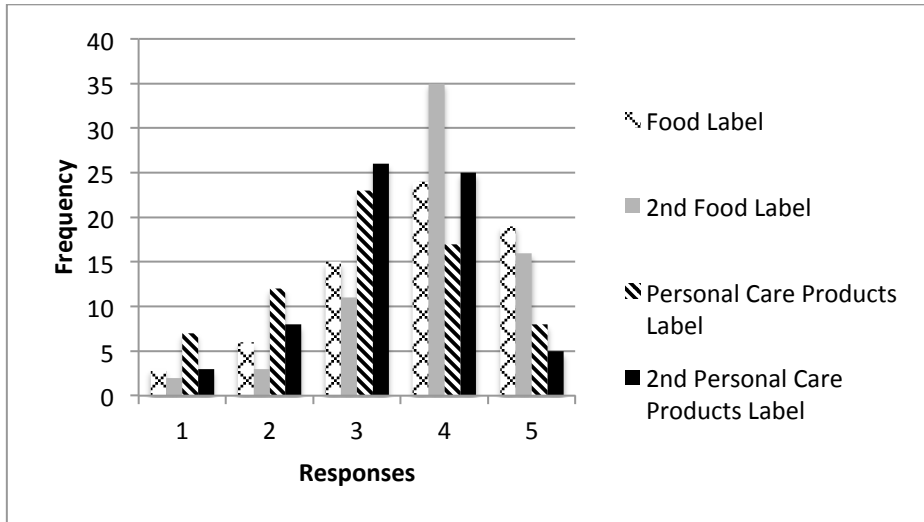
**Figure 4.6: A Product should not be labeled Organic with the USDA seal, Treatment 3**

The last repeated question asked participants to rate how much you trust an organic label each of the following categories: food, clothing, cleaning products and

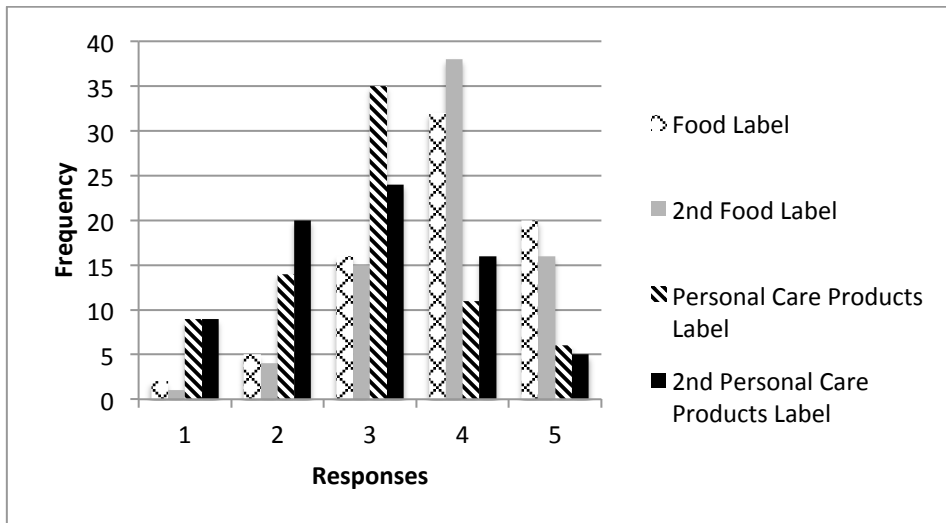
personal care products. This question examined if new information impacted trust in organic products, and if there was a decrease in trust for organic products due to uncertainties in organic labeling. Figure 4.7, 4.8 and 4.9 show participants' trust in organic labeled food and personal care products before and after each treatment group. It was also hypothesized that participants who believe organic food is safer, a higher quality and better for the environment will have these beliefs about organic personal care products. Paired t-test determined if participants' beliefs and opinions change after certification information and if trust in organic food and personal care products changes as a result of information.



**Figure 4.7: Trust in a organic label on food and personal care products by information treatment 1**



**Figure 4.8: Trust in a organic label on food and personal care products by information treatment 2**



**Figure 4.9: Trust in a organic label on food and personal care products by information treatment 3**

#### 4.5 Regression Model

The Tobit regression was chosen to analyze the data, because WTP values were bounded and participants could not bid below \$0 or above \$6. The dependent variable is the difference in WTP for the two auctions. The first dependent variable is the differences in WTP for organic sunscreen in the first auction and the WTP for organic sunscreen in the second auction. The second dependent variable is the differences in WTP for organic oranges in the first auction and the second auction.

$$rdiff_{ijk} = \begin{cases} -6 & \text{if } WTP_j = 0 \text{ and } WTP_k = 0 \text{ or} \\ & WTP_j = 6 \text{ and } WTP_k = 6 \\ rdiff^*_{ijk} = x\beta + \varepsilon_i & \text{if } 0 < WTP_j < 6 \text{ and } 0 < WTP_k < 6 \\ 6 & \text{if } WTP_j = 0 \text{ and } 0 < WTP_k < 6 \text{ or} \\ & WTP_j = 6 \text{ and } 0 < WTP_k < 6 \text{ or} \\ & WTP_k = 0 \text{ and } 0 < WTP_j < 6 \text{ or} \\ & WTP_k = 6 \text{ and } 0 < WTP_j < 6 \end{cases}$$

The Tobit model is used because there is an upper and lower limit and a latent variable is assumed, the  $rdiff^*_{ijk}$ , shown above (Long & Freese, 2001). This variable is the difference in subject  $i$ 's willingness to pay for the organic labeled product in the first auction, label  $j$ , and the organic labeled product in the second auction, label  $k$ . The dependent variable is WTP for the organic product in the second auction minus the WTP for the organic product in the first auction,  $WTP_{ik} - WTP_{ij}$ . In the model shown above  $x$  is a vector of independent variables,  $\beta$  is a vector of the coefficients, and  $\varepsilon$  represents the error term. The variables chosen for the regression model, and a description of each is shown in table 4.1. The table

includes the dependent variables, the WTP values, as well as the independent variables.

**Table 4.1: Regression Variables WTP (2-1)**

<b>Variable Name</b>	<b>Variable Type</b>	<b>Variable Description</b>
O_Bid1	WTP Values	1 <sup>st</sup> WTP for 3 oranges
OrgO_Bid1		1 <sup>st</sup> WTP for 3 organic oranges
S_Bid1		1 <sup>st</sup> WTP for 1 oz. sunscreen
OrgS_Bid1		1 <sup>st</sup> WTP for 1 oz. organic sunscreen
O_Bid2		2 <sup>nd</sup> WTP for 3 oranges
OrgO_Bid2		2 <sup>nd</sup> WTP for 3 organic oranges
S_Bid2		2 <sup>nd</sup> WTP for 1 oz. sunscreen
OrgS_Bid2		2 <sup>nd</sup> WTP for 1 oz. organic sunscreen
Bothfacts	Fact Sheet Version	Fact Sheet containing 3 <sup>rd</sup> party and govt. information compared to 3 <sup>rd</sup> party information
Govtfacts		Fact sheet containing govt. information only compared to 3 <sup>rd</sup> party information
Opinion_organic	Opinion of Organic	Rate your opinion of a product labeled organic from 1 very negative to 7 very positive
Confidence_USDA oranges	Confidence oranges are USDA certified	Rate how confident you are that the oranges labeled as organic are certified organic by the USDA from 1 to 7
Confidence_USDA sunscreen	Confidence the organic sunscreen is USDA certified	Rate how confident you are that the sunscreen labeled as organic are certified organic by the USDA from 1 to 7
Matter_food	Matter who certifies organic	What extent do you agree or disagree it does not matter who certifies an organic claim on food
Matter_pcp		What extent do you agree or disagree it does not matter who

Trust_enforcement	Trust in organic enforcement	certifies an organic claim on personal care products Rate your level of trust that organic labeling is enforced from 1 to 5
Trust_natrue	Trust in NATRUE certified	Rate your level of trust for the NATRUE label from 1 to 5
Difftrust_pcp	Trust in an organic label	The differences in rating for your level of trust for an organic label on personal care products after information and before information
Difftrust_food		The differences in rating for your level of trust for an organic label on food
Diffbeliefs	Beliefs	Differences in responses after and before information “I don't believe a product is organic without the USDA seal”
Diffmeaning1	Meaning of organic	Differences in the meaning of organic sunscreen is the same as an organic orange, first survey to second
Wousda_mislead	Organic without USDA is misleading	To strongly disagree to strongly agree “an organic product without the USDA seal is misleading”
Park Farmer’s Market Art Fair Student Center DMV	Location of the experiments	1= Batter Park New Castle 1=Newark Farmer's Market 1= Art Fair New Castle 1=UD Student Center 1=DMV Compared to UD Creamery

The Tobit model explaining participants’ WTP and demographics full model:  

$$WTP_{ij} - WTP_{ik} = \beta_{Bothfacts} + \beta_{Govtfacts} + \beta_{Opinion\_organic} + \beta_{Confidence\_USDAoranges} + \beta_{Confidence\_USDAscreen} + \beta_{Matter\_pcp} + \beta_{Trust\_enforcement} + \beta_{Trust\_natrue} + \beta_{Difftrust} + \beta_{Diffbeliefs} + \beta_{Diffmeaning1} + \beta_{Diffmeaning2} + \beta_{Wousda\_mislead} + \beta_{Creamery} + \beta_{Park} + \beta_{Market} + \beta_{StudentCenter} + \beta_{DMV} + \beta_{Male} + \beta_{Age} + \beta_{White} + \beta_{Bachelors} + \beta_{Graduate} + \beta_{Income} + \varepsilon_i$$

#### **4.6 Hypotheses of Regression Variables**

These variables explain the change in WTP between the 1<sup>st</sup> and the 2<sup>nd</sup>

auction for both organic sunscreen and organic oranges. It was hypothesized that the information from government agencies would decrease participants' WTP2 for organic sunscreen from WTP1. In addition, it was hypothesized that the 3<sup>rd</sup> party information would have a positive effect on WTP but not as large of an effect as the government information will have on WTP values. Both pieces of information were believed to increase participants' WTP. It was hypothesized that this factsheet would inform participants that even though the government is not involved, an organization is regulating the organic label on personal care products. Due to these hypotheses, the fact sheet with government information and the fact sheet with both pieces on information will be compared to NATRUE, the third party information in the regression analysis to determine if government information had a larger effect than the third party information on WTP.

Next, it was hypothesized that participants' opinion of organic would affect participants' WTP2. Therefore, if a participant had a positive opinion of organic, they would be less likely to change their WTP for organic oranges and sunscreen. In addition, participants who were highly confident that the oranges and sunscreen were USDA would be willing to pay more for organic sunscreen and decrease their WTP for organic sunscreen after the information. The next hypothesis was if participants agree it does not matter who certifies personal care products, then their WTP2 would not change for organic sunscreen. In addition, if participants agreed it

does not matter who certifies food, they would be willing to pay less for organic oranges. Next, if participants strongly trust that organic is enforced, participants will increase their WTP2. Similarly, it was important to understand if participants trust the third party certification, NATURE. If participants do trust NATRUE, it was believed this would increase participants WTP for the organic sunscreen and not affect oranges WTP. It was also hypothesized that the survey question regarding the statement “If you believe an organic product without the USDA seal is misleading” would decrease WTP2 values.

Survey questions in both the first and second survey were thought to be important to understand changes in WTP in the model. The difference in trust of organic labels in the food and personal care products categories was hypothesized to affect WTP. If trust decreased for an organic label on personal care products, then it was believed that WTP2 also would decrease, while it was hypothesized trust for organic food would increase and increase the 2<sup>nd</sup> WTP. Although, this could depend on the information provided, if participants received the government information, trust would most likely decrease for organic sunscreen, while the third party information was hypothesized to not effect trust. Next the statement “I don’t believe a product is organic without the USDA seal” response from the first to the second survey was expected to change to completely agree in the second survey, and the organic sunscreen WTP would decrease while the WTP for organic oranges would increase. The last question asked participants if the organic claim on a sunscreen has the same meaning as the organic claim on an orange. It was hypothesized that



participants that received government information would either change their responses to “no” or not change responses if they stated no in the initial survey. Participants with the third party information were hypothesized to not change their initial responses.

Demographic information was also expected to help explain differences in WTP values. It was hypothesized younger consumers would be willing to pay more for organic and decrease their WTP less than older consumers. Younger participants are believed to care more about protecting the environment and their skin. Also participants with a higher income would be willing to pay more. Females would be willing to pay more than males. Females tend to purchase organic food more than males and likely would be still willing to pay more after information than males. Participants with children under 18 would be willing to purchase organic for their children and would be less likely to decrease their WTP. In addition, participants with higher education levels would have a lower WTP because it was expected they would have more knowledge of the standards for organic.

Next, the variables for the location where the study took part would be analyzed in the regression model. It was hypothesized that participants at the farmer’s market would be willing to pay more than participants at the other locations for all the organic products. The park and DMV was hypothesized to contain more of the general population of consumers, while people at the farmer’s market are more likely organic consumers. Participants at the student centers would have a high trust for organic products due to knowledge of organic standards, and

would not decrease their WTP as much as participants in other locations. The Creamery is a popular location in the summer for both students and adults in the area therefore the other locations will be compared to the UD Creamery in the regression analysis.

#### **4.7 Summary of Demographic Variables**

The demographics of the study are shown in Table 4.2. Here the demographics are compared with the 2016 Delaware Census 5 year estimates. It is important to note, the data shows there were about 14% more females that participated the study then the population of Delaware. In addition, a higher amount of Asians (8%) participated, while there were less Hispanics (4%) and African American (12%) represented in this study than the Delaware Census; 73% of participants were White, representative of the White population in Delaware. Lastly, there was a larger percent of participants with a higher education, and a higher income than the Delaware Census Data. About 20% of the participants were in the lowest income range, and 7.5% reported the highest income level.

**Table 4.2: Demographic Variable Summary Statistics**

	N	Frequency in all Locations (%)	Delaware Census (2016) (%)
<b>Gender</b>			
Male	72	35.3	48.3
Female	132	64.7	51.7
<b>Ethnicity</b>			
White	150	73.5	71.6
Hispanic/Latino	9	4.40	8.80
African American	25	12.3	23.6
Asian	17	8.30	4.30
Other	3	1.50	3.50
<b>Education</b>			
Less than High School	0	0.00	10.7
High School	90	44.1	32.1
Bachelor's Degree	59	28.9	18.4
Graduate or professional degree	55	27.0	12.6
<b>Household Income</b>			
Less than \$25,000	41	20.6	31.7
\$25,000 to \$34,999	20	10.1	9.42
\$35,000 to \$49,999	24	12.1	13.3
\$50,000 to \$74,999	34	17.1	20.7
\$75,000 to \$99,999	29	14.6	8.38
\$100,000 to \$149,999	24	12.1	10.1
\$150,000 to \$199,999	12	6.0	3.35
\$200,000 or more	15	7.5	0.29
<b>Age (Average in years)</b>	41	20.2	21.9
<b>Children under the age of 18</b>	40.3		39.6

Source of Delaware Census Data: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

## **Chapter 5**

### **RESULTS & DISCUSSION**

#### **5.1 Organization of Results**

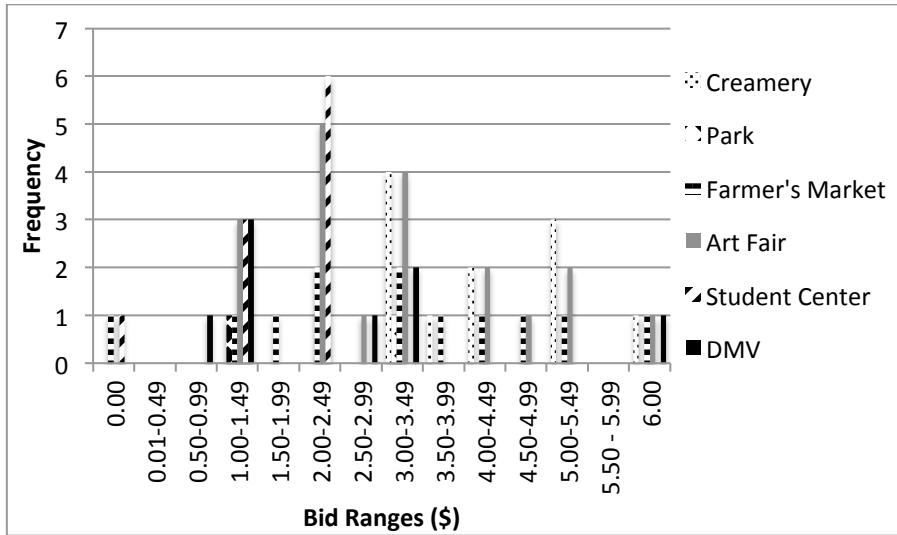
The chapter will begin with an overview of participants' WTP values for organic and conventional oranges and sunscreen. The analysis will describe participants' willingness to pay in the first and second auction and examine the effect of different information treatments on WTP. The chapter will then describe the paired t-test results and how the data compares to the original hypotheses. This test will analyze the effect of certification information on consumer behavior examining WTP values and survey questions before and after information. The Tobit regression model output will conclude the chapter. Lastly, the variables in the models will be explained to better understand differences in WTP for organic oranges and sunscreen from the first to the second auction.

#### **5.2 Willingness to Pay for Oranges and Sunscreen**

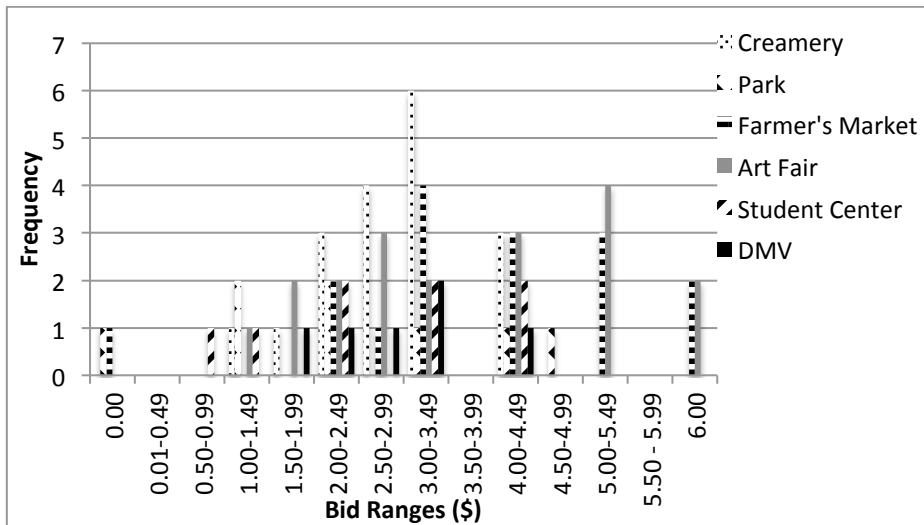
During the study, participants were asked to write down the amount they would be willing to pay for each of the four products: three oranges, three organic oranges, one ounce of sunscreen, and one ounce of organic sunscreen. The only information provided to participants in the initial auction was a label with the product name. In the second auction, information on organic certification was

provided either from government agencies, NATRUE (a third party certifier), or both. This information was chosen to determine if information describing organic certifications for food and nonfood products affected participants' WTP. After carefully reading over the information, participants were asked again for their WTP for the four products in a second auction. A total of 204 participants took part in the field experiments, across six different locations in Delaware. About a third of participants were randomly assigned to each information treatment group to examine the effect of information; 62 participants received the first treatment, 67 received the second treatment and 75 received both in the third treatment group.

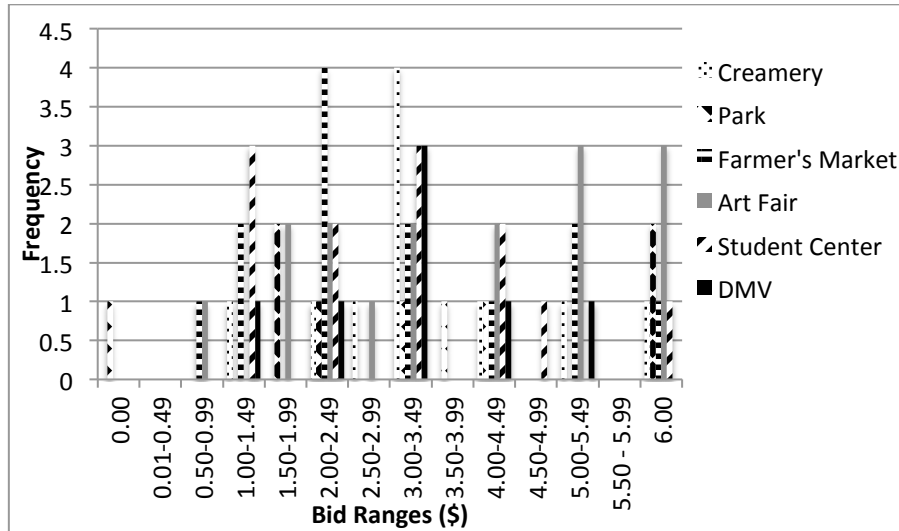
The initial WTP values of organic sunscreen are shown by location for each treatment group. Figures 5.1 displays WTP for Treatment 1, government information only, figure 5.2 shows location WTP values for treatment 2 NATRUE information and figure 5.3 shows WTP values for treatment 3, both government and NATRUE information. All three graphs show the participants were willing to pay for organic sunscreen from \$2.00 to \$5.00. In figure 5.1, participants at the student center were willing to pay at most \$2.00. In all three treatment groups, participants at the farmer's market were willing to pay anywhere from \$0.00 to \$6.00. Figure 5.3 shows participants at the art fair, the farmer's market, the UD Creamery and the Student Center were willing to pay \$6.00 for organic sunscreen.



**Figure 5.1: Treatment 1 Initial Organic Sunscreen WTP by Location**



**Figure 5.2 Treatment 2 Initial Organic Sunscreen WTP by Location**



**Figure 5.3: Treatment 3 Initial Organic Sunscreen WTP by Location**

The first hypothesis was participants would be willing to pay more for organic oranges and sunscreen compared to conventional ones. Table 5.1 shows participants' initial willingness to pay values for the four products. The average WTP values are separated into treatment groups, which will be analyzed with WTP values from the second auction later in the chapter. WTP values displayed in Table 5.1 were the lowest for 1 oz. of sunscreen at \$1.94. Three conventional oranges received the second lowest WTP values between \$2.09 to \$2.43. Participants were willing to pay the highest amount for organic oranges of \$3.59, while participants' WTP ranged from \$2.81 to \$3.15 for organic sunscreen. As hypothesized, participants were willing to pay more for food and nonfood products with an organic label.

**Table 5.1: Average WTP for each Product in the First Auction**

Product	Treatment	Mean Bid (\$)		Min WTP	Max WTP
		Before Information	Standard Deviation		
Oranges	1	2.26	0.842	0.00	4.00
	2	2.43	1.048	0.75	4.00
	3	2.09	0.877	0.75	6.00
Organic Oranges	1	3.27	1.452	0.00	6.00
	2	3.59	1.645	0.00	6.00
	3	2.99	1.292	0.00	6.00
Sunscreen	1	1.94	1.095	0.00	5.00
	2	2.08	1.027	0.50	5.00
	3	2.03	1.105	0.00	6.00
Organic Sunscreen	1	2.81	1.554	0.00	6.00
	2	3.15	1.619	0.00	6.00
	3	3.00	1.409	0.00	6.00

Treatment 1 = Government information only 2= NATRUE only 3= Both

**Table 5.2: Average WTP for each Product in the Second Auction**

Product	Treatment	Mean Bid (\$)		Min WTP	Max WTP
		After Information	Standard Deviation		
Oranges	1	2.33	0.912	0.00	4.50
	2	2.45	1.068	0.50	5.00
	3	2.19	1.023	0.75	6.00
Organic Oranges	1	3.27	1.497	0.00	6.00
	2	3.54	1.673	0.00	6.00
	3	3.01	1.431	0.50	6.00
Sunscreen	1	1.90	1.089	0.00	5.00
	2	2.05	1.060	0.50	5.00
	3	2.04	1.193	0.00	5.00
Organic Sunscreen	1	2.16	1.425	0.00	6.00
	2	3.02	1.689	0.00	6.00
	3	2.87	1.550	0.00	6.00



Treatment 1 = Government information only 2= NATRUE only 3= Both

In the second auction, it was hypothesized that participants would still be willing to pay more for organic products over conventional oranges and sunscreen. In addition, it was hypothesized that premiums for organic sunscreen would change based on the certification information participants received. In table 5.2, the mean WTP values for the four products are displayed from the second auction. The two lowest WTP values were \$1.90 for sunscreen and \$2.19 for oranges. Organic oranges remained participants' highest WTP, at \$3.54. Organic sunscreen WTP ranged from \$2.16 to \$3.02, the largest difference in WTP after the information compared to the other products. It was also hypothesized that the information that not all organic labels are USDA certified could have a negative effect on the premiums for organic oranges but did not have a large effect on participants' WTP. The difference in WTP before and after information will be discussed further in section 5.3.

### **5.3 Paired t-Test on WTP**

The paired t-test was applied to determine the effect of information on participants' behavior. It was hypothesized that certification information would affect participants' WTP for organic sunscreen depending on the information treatment. A summary of the hypotheses and paired t-test from the first and second auction and the differences are shown in Table 5.3. This provides an overview of

participants' behaviors while the effect of information will be examined more closely in the following section.

**Table 5.3 Hypothesis Tests and Results**

Hypothesis	Treatment Group	Variable 1	Mean	Variable 2	Mean	P-value <sup>1</sup>
1a. Participants will be willing to pay a premium for organic labeled sunscreen compared to a conventional one		S_Bid1	\$2.02	OrgS_Bid1	\$2.99	0.0000
1b. Participants that received government information will decrease WTP premiums	1	OrgS-	2.81	OrgS-	2.16	0.0001
	2	Bid1	3.14	Bid1	3.02	0.3785
	3		3.00		2.87	0.2004
2a. The meaning on an organic claim on an orange compared to a sunscreen will change after information	1	Meaning	0.86	Meaning	0.36	0.0002
	2	Organic	0.96	Organic	0.96	1.0000
	3		0.85	2	0.22	0.0000
3. Participants will believe an organic label is USDA organic	1	Organic	4.07	Organic	5.02	0.0000
	2	Same	3.76	Same2	4.62	0.0002
	3		4.10		4.62	0.0221

<sup>1</sup>The alternative hypothesis is  $H_a$ :  $\text{mean}(\text{Variable1}-\text{Variable2}) < 0$   
Treatment 1 = Government information only 2= NATRUE only 3= Both

It was hypothesized that the lack of government regulations and enforcement of organic personal care products would affect WTP for organic sunscreen the most. To provide a general comparison of participants' WTP for sunscreen and organic sunscreen the treatment groups are pooled. It does show that participants' WTP for organic labeled sunscreen was significantly different from conventional labeled sunscreen in the first auction. In addition, organic sunscreen WTP significantly decreased from the first auction after participants received government information, by \$0.65. This suggests the information had an effect on participants' behavior and their WTP for organic sunscreen. The average responses of meaning of organic significantly changed therefore the meaning of the organic claim on sunscreen and oranges are not the same for the first and third treatment groups. This suggests government information had an effect on the meaning of organic claim on food and nonfood products. Lastly, beliefs a product should only be labeled USDA organic significantly increased after government information and NATRUE certification information.

#### **5.4 T-Test by Fact Sheet**

To further examine changes in WTP, paired t-tests was used to analyze WTP values by fact sheet version, shown in Table 5.4 and 5.5. It was hypothesized that each fact sheet would have different effects on participants' behavior towards organic sunscreen. The fact sheet with government information, labeled treatment 1, was hypothesized to decrease participants' WTP for organic sunscreen. The

treatment labeled 2, NATRUE certification, was expected to be useful information to consumers, and increase participants' WTP. It was also hypothesized the government information would have a larger effect on participants' WTP than NATRUE due to consumer awareness of government standards. Lastly, the fact sheet with both pieces of information was hypothesized to increase WTP. It was believed that the information would provide confidence to participants that an organization does regulate an organic claim on personal care products even though the government is not involved.

**Table 5.4: Orange WTP per Treatment Group**

Product	Treatment	Mean Bid (\$)		P-value
		Before Information	After Information	
Oranges	1	2.26	2.33	0.4269
	2	2.44	2.44	0.8499
	3	2.09	2.19	0.1656
Organic Oranges	1	3.27	3.27	0.9503
	2	3.59	3.54	0.5912
	3	2.99	3.01	0.8633

Treatment 1 = Government information only 2= NATRUE only 3= Both

Table 5.4 shows the effect of the information treatments on WTP for three oranges, and three organic oranges. It was hypothesized that the differences in organic labeling standards including knowledge that the government does not regulated or enforce standards on all organic labels could cause a decrease in premiums for organic oranges. The results show all three information treatments did

not significantly affect participants' WTP for oranges or organic oranges. A possible explanation is that participants had prior knowledge of the standards for organic food products and trust organic labeled food. The information chosen was provided to better understand consumer behavior for organic sunscreen, therefore it was not unexpected that both conventional and organic oranges WTP values did not change significantly with any of the information treatment groups.

**Table 5.5: Sunscreen WTP per Treatment Group**

Product	Treatment	Mean Bid (\$)		P-value
		1 <sup>st</sup> WTP	2 <sup>nd</sup> WTP	
Sunscreen	1	1.94	1.90	0.7278
	2	2.08	2.05	0.7285
	3	2.03	2.04	0.8410
Organic Sunscreen	1	2.81	2.16	<b>0.0001</b>
	2	3.15	3.02	0.3785
	3	3.00	2.87	0.2004

Treatment 1 = Government information only 2= NATRUE only 3= Both

Note: P-values bolded are significant at the 10 percent level or better

Table 5.5 shows WTP values for one ounce of sunscreen and organic sunscreen by information treatment. Participants' WTP for an ounce of conventional sunscreen had a less than \$0.05 change from the initial auction in each treatment group. Exposure to government and NATRUE information did not impact participants' WTP for conventional sunscreen significantly. The differences in standards for organic claim on sunscreen did not affect consumer behavior for

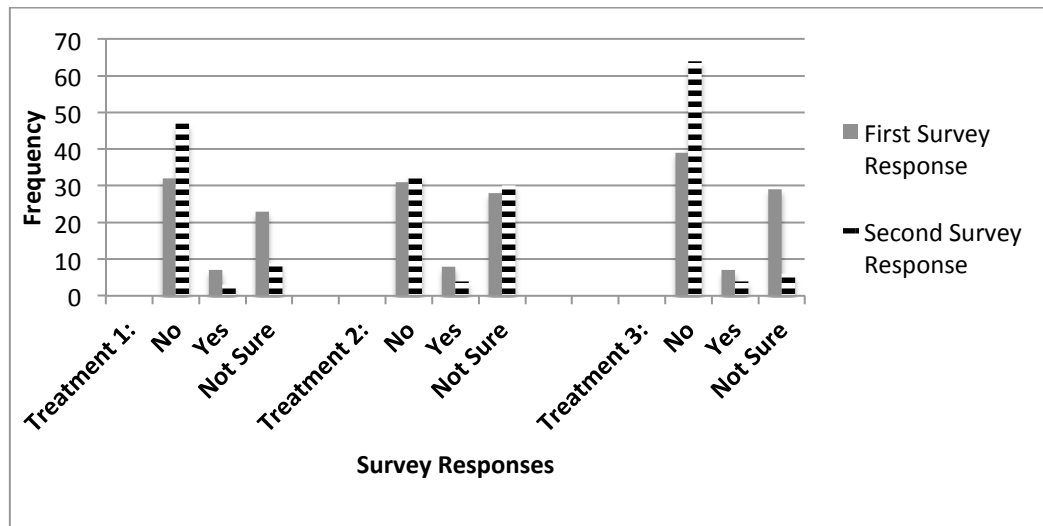
conventional sunscreen and participants still were willing to pay higher premiums for organic sunscreen.

As hypothesized, the information treatments impacted WTP for organic sunscreen, and effected participants differently. Participants, who received the government information, decreased their WTP for organic sunscreen from \$2.81 to \$2.16, significantly at the 10% level. The NATRUE certification did not significantly change participants' WTP. These results show a significant change in consumer behavior for organic sunscreen when participants received treatment 1, consisting of government information. This indicates that the difference in government standards and enforcement for organic products affected participants' demand for organic sunscreen.

### **5.5 Effect of Information on the Meaning of Organic**

It was hypothesized participants would initially believe the meaning of an organic claim on sunscreen was the same as an organic claim on an organic food, certified by the USDA. To determine the meaning of organic to participants, a survey question stated, circle a response to the statement "an organic claim for sunscreen has the same meaning as an organic claim for an orange". Participants were given the option to select yes, no, or not sure. Participants were then asked the question again on the second survey. It was hypothesized participants would change their response, to the meaning from yes or not sure after reading the government information. It was also hypothesized that participants would not change their initial

response after reading about the NATRUE certification, while those that received both pieces of information would most likely circle no, not the same.



**Figure 5.1: The Meaning as an Organic Claim on an Orange and Sunscreen Responses by Treatment Group**

**Table 5.6: Meaning of Organic Claims t- Test by Treatment Group**

Response:	Treatment	Mean 1 <sup>st</sup> Survey	Mean 2 <sup>nd</sup> Survey	P-Value
Organic claim means the same on an orange as a sunscreen	1	0.86	0.36	<b>0.0002</b>
	2	0.96	0.96	1.0000
	3	0.85	0.22	<b>0.0000</b>

Note: P-values bolded are significant at the 10 percent level or better

Figure 5.1 displays the frequency of responses in each treatment group before and after information. Treatment 1 and 3 shows an increase in participants selecting no in the second survey, while treatment 2 responses after the third party information are fairly similar to the first survey responses. Table 5.6 displays paired

t-test to the statement an organic claim for sunscreen has the same meaning as an orange by treatment group. Participants in treatment one significantly decreased their responses at the 10% level from not sure to no, this implies that the government information changed the meaning of an organic claim to participants. Participants that received third party information had interesting results and significantly changed responses to no and to not sure. This could imply that there is still some confusion on the meaning of an organic claim on food and nonfood products. This suggests the information on government standards and third party certification helped participants make decisions of the meaning of an organic claim on different labels.

## **5.6 Effect of Information on Organic Beliefs**

Participants were asked on the survey to agree or disagree with the statement “I don’t believe a product is organic without the USDA seal”. The question was asked to understand if consumers believe an organic claim can only be on a label if the product is USDA certified. Participants could select from 1, strongly disagree, to 7, strongly agree. The question was asked again after the certification information to determine if participants beliefs of organic and USDA organic had changed. It was hypothesized that participants would believe an organic product is USDA certified organic and would be misled by the organic claim. The fact sheets with government agency statements informed participants that nonfood products can be labeled organic but may not be USDA organic, and was hypothesized to change responses.



NATRUE, the third party certification also informed participants that the sunscreen was not USDA organic and potentially could lead participants to strongly agree with the statement.

**Table 5.7: Beliefs of Organic without the USDA seal t-test**

Survey Question	Treatment	Mean Before Information	Mean After Information	P-value
Agree/Disagree: “I don’t believe a product is organic without the USDA seal”	1	4.08	5.02	<b>0.0000</b>
	2	3.76	4.60	<b>0.0002</b>
	3	4.10	4.62	<b>0.0221</b>

Treatment 1 = Government information only 2= NATRUE only 3= Both

Note: P-values bolded are significant at the 10 percent level or better

Results in table 5.7 show after information participants agreed even more that a product should only have an organic claim if it is USDA organic in all three treatment groups. Participants in treatment 1 increased mean responses the most, from 4.08 to 5.02, a significant change in beliefs with a less than 10% p-value. Treatment 2 had the second largest change in beliefs below the 10% significance level. These results could imply that participants believe a product is only organic with the USDA seal. Participants that received not only information from the government but also third party information agreed they do not believe a product is organic without USDA certification. This suggests that there is asymmetric information around the organic label and participants could feel an organic claim is misleading without the USDA seal.

### 5.7 Effect of information on Trust for Organic Claims

Another survey question asked participants to rate how much they trust an organic label on each of four product categories: food, cleaning products, clothing and personal care products. This question was later asked on the second survey to determine if information had an effect on trust on different organic labeled products. Participants could rate their level of trust from 1, no trust to 5, trust completely. It was hypothesized that trust in food products would be negatively impacted due to information on the lack of government regulations for nonfood organic, decreasing trust in organic labels in general. The third party certification was hypothesized to increase trust in nonfood products because the information shows a creditable third party is regulating organic personal care products. The information was not hypothesized to effect trust in cleaning products or clothing.

**Table 5.8: Trust for an Organic label**

Question	Category	Treatment	Mean Before Information	Mean After Information	P-value
Rate how much you trust an organic label on each of the following product categories:	Food	1	3.56	3.83	<b>0.0587</b>
	Cleaning Products	1	2.95	3.05	0.5173
	Clothing	1	2.69	2.54	0.3653
	Personal Care Products	1	2.76	2.80	0.7881
	Food	2	3.75	3.90	0.1416
	Cleaning Products	2	3.19	3.34	0.2209

Clothing	2	3.08	2.79	<b>0.0230</b>
Personal	2	3.10	3.31	0.1229
Care				
Products				
Food	3	3.85	3.87	0.9065
Cleaning	3	3.07	2.89	0.2196
Products				
Clothing	3	2.90	2.48	<b>0.0020</b>
Personal	3	2.88	2.84	0.7605
Care				
Products				

Treatment 1 = Government information only 2= NATRUE only 3= Both

Note: P-values bolded are significant at the 10 percent level or better

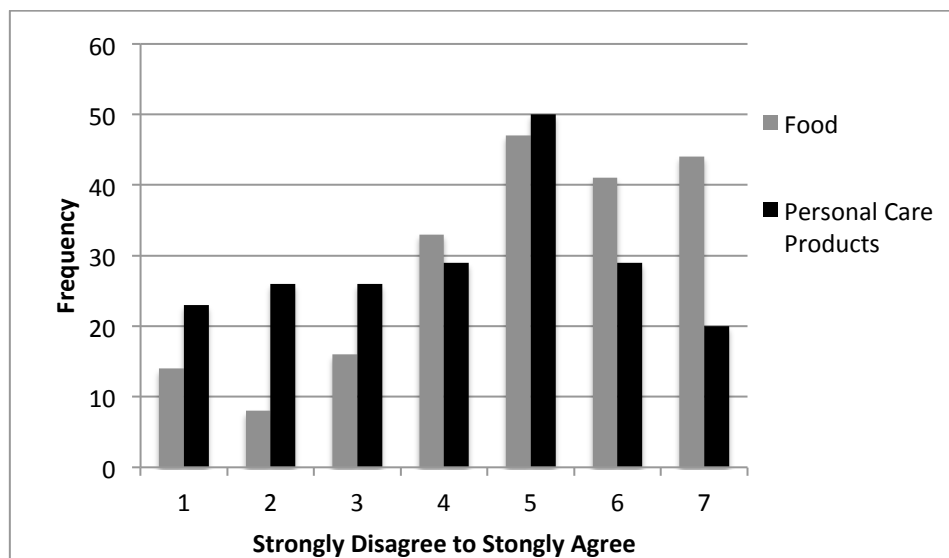
Table 5.8 shows the differences in trust for the product categories before and after information. The first treatment, government information, led participants to increase trust in food labeled organic. The difference in trust in organic labeled food from the first to the second survey p-value was 0.0587, significant at the 10% level. The information that the USDA regulates organic food to government standards may have increased trust in organic labeled food products. It was expected that this information would decrease trust in organic personal care products, however while responses did increase, the difference was not significant.

In addition, an interesting result was a significant decrease in trust for organic labeled clothing with the second and third information treatment group. It is possible participants were more aware of organic clothing and the information regarding different organic regulations effected trust for organic clothing more than organic personal care products. It is also possible that the participants in the study

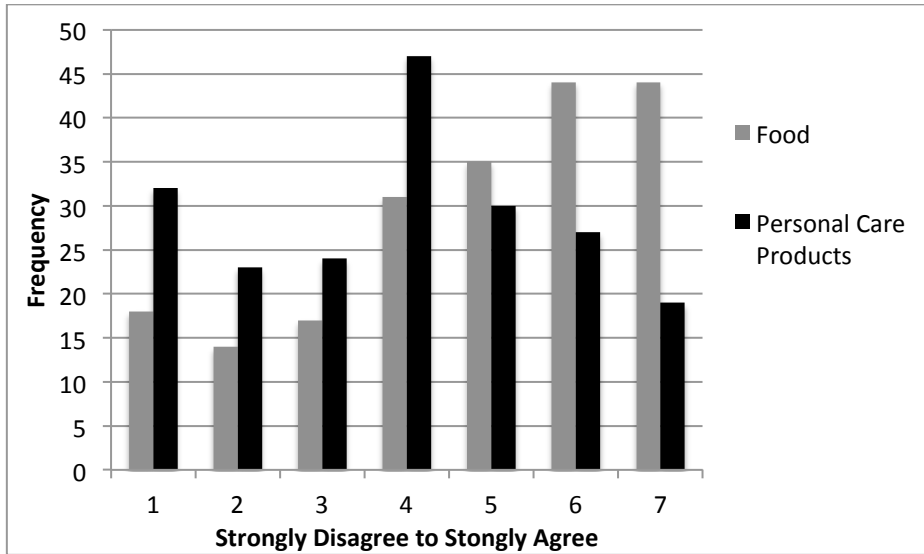
pay closer attention to what clothing is made of and the differences in standards for organic products had a stronger effect on their trust for organic clothing.

### 5.8 Perceptions of Organic

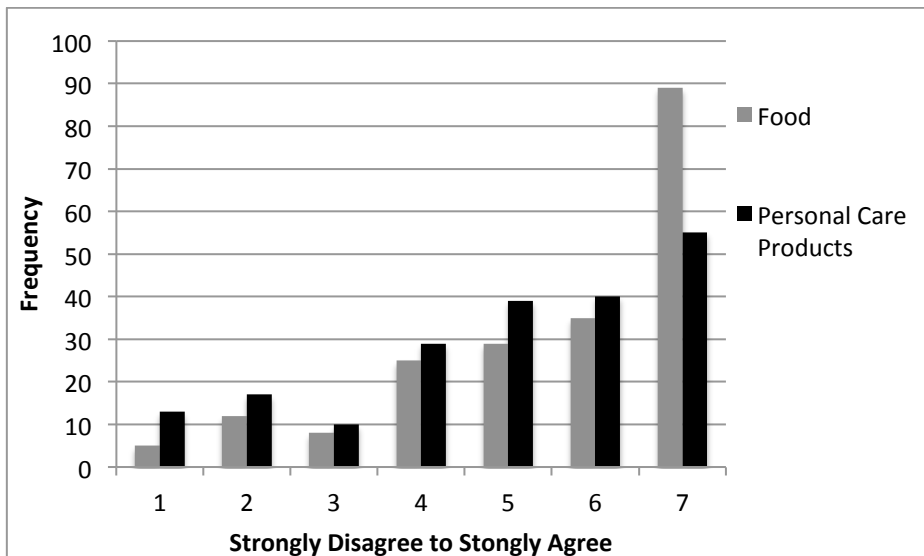
Past studies have shown that consumers have perceptions that organic food is environmentally friendly, healthier, and safer to consume which influences purchases (Yiridoe, Bonti-Ankomah, & Martin, 2005). Therefore, it was hypothesized that participants that believed organic food is safer, higher quality and better for the environment would have the same beliefs about organic personal care products. In the second survey, participants agreed or disagreed with the following statements; organic is safer, higher quality and better for the environment for food, clothing, cleaning products and personal care products. Figure 5.2 to 5.4 display responses for food and personal care products for each statement.



**Figure 5.2: Responses to the statement “Organic is Safer”**



**Figure 5.3: Responses to the statement “Organic is a Higher Quality”**



**Figure 5.4: Responses to the statement “Organic is Better for the Environment”**

**Table 5.9: Organic beliefs for Organic Food and Personal Care Products**

Treatment	Category	Mean for Food	Mean for Personal care Products	P-Value
1	Safer	4.85	4.00	<b>0.0002</b>
1	Higher Quality	4.74	3.97	<b>0.0001</b>
1	Better for the environment	5.39	5.02	<b>0.0085</b>
2	Safer	4.93	4.16	<b>0.0002</b>
2	Higher Quality	4.64	3.83	<b>0.0000</b>
2	Better for the environment	5.63	5.12	<b>0.0014</b>
3	Safer	4.97	4.13	<b>0.0000</b>
3	Higher Quality	4.95	3.84	<b>0.0000</b>
3	Better for the environment	5.67	4.85	<b>0.0000</b>

Treatment 1 = Government information only 2= NATRUE only 3= Both

Note: P-values bolded are significant at the 10 percent level or better

Table 5.9 displays the mean ratings from 1, strongly disagree, to 7, strongly agree, in each treatment group. Participants agreed strongly with the statements for organic food in all three treatment groups compared to ratings for organic personal care products. Paired t-test was applied to food and personal care products to determine if participants' ratings were the same, and the p-values are shown in the table as well. All p-values are significant, and the null hypothesis can be rejected. Therefore the mean ratings for organic food and organic personal cares products are significantly different. Participants did not have the same beliefs about organic personal care products as they do about organic food.

## **5.9 Tobit Regression Models**

Table 5.10, 5.11 and 5.12 display organic sunscreen Tobit model outputs by treatment group. The regression models explain the change in WTP for organic sunscreen after information to before it. The models examine the difference in WTP from the first and second auction when exposed to different information treatments. The differences in WTP are useful to learn if the government regulations or third party certification information impacted WTP. Table 5.13, 5.14 and 5.15 describes the difference in WTP for three organic oranges by treatment group, examining the effect of information. The organic orange models will analyze if organic orange and sunscreen certification information affected WTP for USDA organic oranges.

The independent variables displayed in all the models are explained and defined in chapter 4. These independent variables chosen help explain the difference in WTP for three organic oranges and one ounce of organic sunscreen. As specified in chapter 4, it was hypothesized that information would effect participants' purchasing behavior. In addition, it was hypothesized that WTP would not change if participants had a high opinion of organic. A higher trust in NATRUE, and trust in organic enforcement would increase WTP and confidence the organic labeled products are USDA organic responses would increase WTP values. Lastly, changes to responses of survey question asked in both surveys would impact participants WTP, possibly decreasing their WTP.

**Table 5.10: Organic Sunscreen Tobit Model by Treatment 1**

Pseudo R2 = 0.183

Model Variable	(1) WTP <sub>OrgS2</sub> - WTP <sub>OrgS1</sub>	P-values
Constant	0.847	0.518
Opinion of Organic	0.383	0.006***
Matter who certifies personal care products	-0.211	0.047**
Confidence organic sunscreen is USDA certified	-0.148	0.225
Confidence organic oranges are USDA certified	-0.021	0.857
Trust in NATRUE certified	-0.328	0.069*
Trust in organic enforcement	0.068	0.686
Differences in trust in organic personal care products	-0.183	0.249
Differences in belief organic label should be USDA organic	0.052	0.626
Differences in the meaning of an organic claim	0.240	0.155
Organic label without USDA seal is misleading	-0.139	0.145
Battery Park	1.166	0.176
Farmer's Market	0.166	0.744
Art Fair	1.307	0.017
Student Center	1.099	0.039
DMV	0.143	0.81
White	-0.803	0.035
Male	-0.548	0.131
Age	-0.065	0.544
Income	-0.024	0.767
Bachelors degree	0.864	0.035**
Graduate or Professional Degree	0.636	0.105
Household shopper	-1.152	0.005***

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level



**Table 5.11: Organic Sunscreen Tobit Model by Treatment 2**

Pseudo R2 = 0.139

Model Variable	(2) WTP <sub>OrgS2</sub> - WTP <sub>OrgS1</sub>	P-values
Constant	-0.866	0.444
Opinion of Organic	-0.328	0.012**
Matter who certifies personal care products	-0.034	0.716
Confidence organic sunscreen is USDA certified	-0.245	0.045**
Confidence organic oranges are USDA certified	0.172	0.137
Trust in NATRUE certified	0.417	0.010***
Trust in organic enforcement	0.275	0.062*
Differences in trust in organic personal care products	0.201	0.131
Differences in belief organic label should be USDA organic	0.028	0.743
Differences in the meaning of an organic claim	0.311	0.115
Organic label without USDA seal is misleading	0.104	0.255
Battery Park	-0.968	0.079*
Farmer's Market	-0.584	0.216
Art Fair	-0.377	0.419
Student Center	-0.348	0.481
DMV	0.249	0.635
White	-0.114	0.733
Male	0.341	0.325
Age	-0.100	0.274
Income	0.085	0.214
Bachelors degree	-0.369	0.291
Graduate or Professional Degree	-0.419	0.354
Household shopper	0.585	0.083*

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level

**Table 5.12: Organic Sunscreen Tobit Model by Treatment 3**

Pseudo R2 = 0.202

Model Variable	(3) WTP <sub>OrgS2</sub> - WTP <sub>OrgS1</sub>	P-values
Constant	-0.023	0.974
Opinion of Organic	0.044	0.606
Matter who certifies personal care products	-0.101	0.050**
Confidence organic sunscreen is USDA certified	-0.018	0.818
Confidence organic oranges are USDA certified	0.172	0.022**
Trust in NATRUE certified	0.010	0.933
Trust in organic enforcement	0.085	0.437
Differences in trust in organic labeled personal care products	0.299	0.004***
Differences in belief organic label should be USDA organic	-0.005	0.928
Differences in the meaning of an organic claim	0.157	0.113
Organic label without USDA seal is misleading	-0.099	0.104
Battery Park	-0.459	0.232
Farmer's Market	-0.339	0.229
Art Fair	-0.689	0.034**
Student Center	-0.609	0.136
DMV	-0.599	0.142
White	0.200	0.438
Male	-0.199	0.348
Age	0.098	0.192
Income	-0.017	0.756
Bachelors degree	-0.681	0.009***
Graduate or Professional Degree	-0.523	0.047**
Household shopper	-0.231	0.34

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level

Tobit regression output for organic sunscreen is shown above. The first model, table 5.10 shows the difference in WTP for organic sunscreen from the second to the first auction, examining a change in WTP for participants that received government information. The second model examines a change in WTP for participants that received third party certification information. The third examines

the effect of information of both pieces of certification information on participants' WTP.

In the first organic sunscreen model, participants with a more positive opinion of organic were significantly willing to pay \$0.38 more for organic sunscreen after the information at the 1% level. Participants that strongly agreed it does not matter who certified the organic personal care products were willing to pay less after learning the government does not certify the product. Participants with a higher trust in NATRUE certification were willing to pay significantly less in the second auction for organic sunscreen, which suggests that participants that read the government standards for organic only learned that the product was not certified and decreased their WTP. The location of the art fair had significant positive WTP in the second auction compared to participants at the UD creamery. The significant demographic variables were participants that identified as White were willing to pay more in the first auction compared to participants that identified as another ethnicity. Participants with a bachelor's degree were willing to pay more in the second auction compared to participants with a high school degree. Lastly, participants that stated they were the main shopper of their household were willing to pay more in the first auction compared to the second, the information had a significant impact on their WTP at the 1% level. These variables explain 18% of the change in WTP.

The second model displays the differences in WTP after the NATRUE certification information compared to participants' initial WTP. Participants with a

positive opinion of organic had a negative change in their WTP and decreased their WTP for organic sunscreen significantly. Participants who were strongly confident the organic sunscreen was USDA certified also had a significantly decrease in their WTP after the third party information. This question was asked before the information was provided that the organic sunscreen was NATURE certified, and after learning the products was third party certified WTP decreased. Participants that strongly trusted the NATRUE certification were willing to pay more significantly after information at the 1% level, which implies the information about the certification increased their trust and WTP. In addition, a higher trust in organic enforcement had a significantly higher willingness to pay in the second auction at the 10% level. Lastly, participants at Battery Park were willing to pay more in the first auction compared to participants at the UD Creamery and participants that stated they were the main shopper of their household were willing to pay \$0.659 more in the second auction for organic sunscreen than those that were not the shopper of their household. The regression model pseudo R<sup>2</sup> shows that 14% of the change in WTP was explained in this model.

The third model shows WTP difference after compared to before information when participants received both government and third party certification information. Participants that rated they agree it does not matter who certifies an organic claim on personal care products were willing to pay more for organic sunscreen by \$0.10 in the first auction. Participants that were highly confident the oranges were USDA certified had a positive change in their

willingness to pay by \$0.17 in the second auction for organic sunscreen, a significant difference in WTP from the first auction. The increase in WTP could imply there is a positive spillover effect from organic food leading consumers to pay more for organic nonfood products due to confidence in USDA organic food. Lastly, the model included differences in responses to questions before and after information to understand if responses impacted WTP. Participants with a large difference in their trust in organic labeled personal care products after compared to before the information, decreased their WTP significantly in the second auction at the 1% level. Participants with a bachelor's degree and a graduate or professional degree were willing to pay more for organic sunscreen in the second auction compared to participants with a high school degree. This suggests that participants with higher education are willing to pay more for organic labeled personal care products after reading information from both government and third party certifiers. Participants at the art fair were willing to pay more significantly at the 5% level after information compared to participants at the creamery. The information increased participants' WTP at the art fair suggesting the information was valuable when making purchases.

**Table 5.13: Organic Oranges Tobit Model by Treatment 1**

Pseudo R2 = 0.175

Model	(4)	
Variable	WTP <sub>OrgO2</sub> - WTP <sub>OrgO1</sub>	P-values

Constant	-0.168	0.849
Opinion of Organic	0.005	0.958
Matter who certifies food products	-0.037	0.519
Confidence organic sunscreen is USDA certified	-0.030	0.726
Confidence organic oranges are USDA certified	-0.062	0.463
Trust in government certification	-0.112	0.344
Trust in organic enforcement	0.208	0.086*
Differences in trust in organic food	0.139	0.229
Differences in belief organic label should be USDA organic	-0.084	0.249
Differences in the meaning of an organic claim	-0.319	0.015**
Organic label without USDA seal is misleading	0.022	0.734
Battery Park	-0.777	0.217
Farmer's Market	0.038	0.921
Art Fair	-0.391	0.275
Student Center	-0.120	0.742
DMV	-0.424	0.301
White	-0.332	0.179
Male	0.102	0.683
Age	-0.068	0.383
Income	0.046	0.408
Bachelors degree	0.643	0.026**
Graduate or Professional Degree	0.233	0.398
Household shopper	0.493	0.089*

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level

**Table 5.14: Organic Orange Tobit Model by Treatment 2**

Pseudo R2 = 0.179

Model	(5)	
Variable	WTP <sub>OrgO2</sub> - WTP <sub>OrgO1</sub>	P-values
Constant	-2.085	0.012**
Opinion of Organic	0.034	0.682
Matter who certifies food products	0.010	0.867
Confidence organic sunscreen is USDA certified	0.030	0.725
Confidence organic oranges are USDA certified	-0.104	0.159

Trust in government certification	0.084	0.487
Trust in organic enforcement	0.228	0.020**
Differences in trust in organic food	-0.025	0.856
Differences in belief organic label should be USDA organic	0.174	0.005***
Differences in the meaning of an organic claim	0.237	0.079*
Organic label without USDA seal is misleading	0.017	0.776
Battery Park	0.529	0.151
Farmer's Market	0.108	0.734
Art Fair	0.490	0.118
Student Center	0.038	0.907
DMV	0.497	0.158
White	0.102	0.650
Male	0.406	0.087*
Age	-0.021	0.725
Income	0.107	0.023**
Bachelors degree	-0.331	0.157
Graduate or Professional Degree	0.392	0.216
Household shopper	0.025	0.913

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level

**Table 5.15: Organic Orange Tobit Model by Treatment 3**

Pseudo R2 = 0.079

Model	(6)	
Variable	WTP <sub>OrgO2</sub> - WTP <sub>OrgO1</sub>	P-values
Constant	-0.461	0.564
Opinion of Organic	0.071	0.447
Matter who certifies food products	-0.019	0.722
Confidence organic sunscreen is USDA certified	-0.107	0.256
Confidence organic oranges are USDA certified	0.144	0.109
Trust in government certification	-0.043	0.730
Trust in organic enforcement	0.207	0.133
Differences in trust in organic food	0.191	0.137
Differences in belief organic label should be USDA organic	0.054	0.428

Differences in the meaning of an organic claim	-0.082	0.497
Organic label without USDA seal is misleading	-0.100	0.176
Battery Park	-0.487	0.314
Farmer's Market	-0.418	0.222
Art Fair	-0.025	0.946
Student Center	-0.317	0.528
DMV	-0.298	0.547
White	0.306	0.320
Male	-0.225	0.380
Age	0.045	0.605
Income	0.011	0.870
Bachelors degree	-0.478	0.115
Graduate or Professional Degree	-0.358	0.263
Household shopper	-0.262	0.357

\*Significant at the 10% level, \*\* significant at the 5% level, \*\*\* significant at the 1% level

WTP difference for three organic orange before and after organic certification information by treatment group are displayed in table 5.13, 5.14 and 5.15. Model 4 shows participants' WTP differences who received treatment 1 government information, model 5 shows difference in WTP for participants that received third party certification information and model 6 displays differences in participants' WTP who received both government and third part certification. In table 5.13 participants with a higher trust in organic enforcement were willing to by \$0.21 more significantly for organic oranges in the second auction. A change in the meaning of an organic claim between sunscreen and oranges decrease participants' WTP significantly. This suggests that the information regarding the differences in organic standards led participants to decrease the value of organic oranges. Participants with bachelors degree were willing to pay significantly more after the



information for organic oranges which suggests that participants with a bachelors degree are willing to pay more for organic compared to participants with a high school degree. After reading government information stating the organic sunscreen was not certified participants that were the main household shopper were willing to pay more for organic oranges, this suggests the information was beneficial and possibly educational to consumers however the pseudo R2 implies that only 18% of the change in WTP is explained in the model.

Participants that received treatment 2, third party certification information were willing to pay significantly more at the 5% level initially compared to the second auction, shown in the constant of model 5. It suggests that participants were willing to pay less for organic oranges after reading third party certification information certified the organic sunscreen possibly because the information did not add value to them when making food purchasing decisions. Participants that had a higher trust in organic enforcement were willing to pay more in the second auction significantly for organic oranges. This shows that trust in organic food certification increased the value of organic oranges to participants. In addition, if participants had strongly believed after information organic should only be USDA organic compared to responses on their original survey, they were willing to pay more for organic oranges. This could be due to the fact that participants have a higher trust in the organic USDA label. In addition if the meaning of organic claim on an orange and a sunscreen changed participants were then willing to pay more for organic oranges significant at the 10% level. Participants demographics that help explain the

differences in WTP are males were willing to pay more than females for organic oranges in the second auction compared to the first and participants with higher income levels were willing to pay more in the second auction for organic oranges. Participants with higher income may purchase organic food more frequently because organic tends to be more expensive.

## **Chapter 6**

### **CONCLUSION**

#### **6.1 Discussion**

A consumer can only be certain a food is organic from the information on the label (Giannakas, 2002). USDA organic certification signals the product follows organic regulations, which consumers cannot directly observe. The mislabeling of organic food creates uncertainty that affects consumer welfare and purchasing decisions. An organic claim on personal care products product have yet to be regulated creating asymmetric information to consumers if an organic claim has the same meaning as a organic claim on a food label and if it will effect consumer welfare. This could create a free rider problem if producers has an organic claim on a label without paying the cost of the certification and consumers believe the organic label follows USDA organic standards (Bougherara & Grolleau, 2005).

The goal of the thesis was to better understand consumer behavior for organic sunscreen and to learn the effect of certification information on WTP for an organic claim. This study is the first to analyze if there is a relationship between the definition of an organic claim on an organic orange and an organic claim on sunscreen. In addition, the study was conducted to learn if third party certification helped fill the asymmetric information gap to consumers when the government is not involved.

Using the BDM method, the experiment collected the maximum amount participants would be willing to pay for three oranges and one ounce of sunscreen from \$0 to \$6. Bids were collected before and after information to determine if organic certification affected participants' WTP and the meaning of an organic claim on nonfood products. A second auction was completed for the four products to determine if participants' WTP changed after reading information from one of three possible fact sheets. The study was conducted using field experiments and 204 participants took part in the study throughout New Castle County, Delaware.

The study found that initially participants were willing to pay more for one ounce of organic sunscreen compared to conventional sunscreen. Participants that received information from government agencies significantly decreased their WTP from an average of \$2.81 to \$2.16. The NATRUE certification information alone did not have a significant effect on WTP. This implies that participants that just received the third party certification were still willing to pay more for organic sunscreen. Participants may have been more knowledgeable of USDA organic food standards and the information on the lack of government regulation for organic sunscreen could have impacted the WTP for organic sunscreen. Paired t-tests showed that information from different organizations effected participants meaning of an organic claim significantly. This suggests the information that organic food is USDA certified while organic sunscreen is not regulated by any government agency changed the meaning of an organic claim to participants. It is possible NATRUE certification provided information that did not effect the meaning on organic claim

to participants and is beneficial to consumers when making purchasing decisions. The full Tobit models reveals participants had significant differences in willing to pay for organic sunscreen due to the information treatments. This could imply organic certification effected consumer demand.

## **6.2 Implications**

Comments from the study such as “ I feel I need to educate myself more on what is truly organic”, “the information was eye opening” and “I need to be more aware of labels in the future” reveal the information helped consumers better understand that they are were misled by a label. It suggests there is a lack of knowledge of the meaning of an organic claim on sunscreen and a positive spillover from the well-known organic label on food products, leading consumers to purchasing organic personal care products. This will harm consumer welfare if consumers are paying a premium for an organic product without full information. It could then lead to market failure, if producers are increasing the price for organic labeled personal care products.

Public education will be useful to provide more information on the differences in standards to allow consumers to make better purchasing decisions. Trust in NATURE also affected premiums, which could imply that education on third party certifications provided useful information. Currently, personal care products can use the word organic on their label without facing the costs of certifications and information on third party labeling could help decrease the gap in

asymmetric information and provide awareness around the NATRUE label on personal care products. This implies providing more information about the third party certification could increase trust and consumer WTP for organic sunscreen, adding transparency to organic claims on personal care products.

Public education is also necessary to help consumers understand the differences in the meaning of an organic claim on personal care products compared to USDA organic food. This could also be beneficial to prevent market failure, which could have larger effects on the organic food industry if demand and trust in the organic label begins to diminish. Going forward, a more standardized definition of organic for personal care products may be necessary to reduce confusion surrounding the meaning of organic agriculture and non-agricultural products.

### **6.3 Limitations and Future Research**

There has yet to be an organic nonfood WTP study published to the authors' knowledge, and some limitations are useful to note. The first is the products chosen in the study, the products oranges and sunscreen may not be items participants demand as much as other food and personal care products which could have effected WTP. The study auctioned one ounce bottles of sunscreen, this size is something many may not purchase as frequently and therefore could impact participants' decisions.

In addition, the information that was provided was chosen to help consumers make decisions and better understand if participants were knowledgeable of the

differences in standards for organic personal care products compared to organic food. The goal was to provide basic facts regarding organic certifications to learn if the information affected participants' behavior. To keep the information neutral, the third party certification had a smaller section to read than the government information this could have impacted WTP values. In addition, it is possible that some participants may not have read the information very clearly as or did not understand it. This could have impacted participants' survey responses and WTP for oranges and sunscreen.

Future research will be pertinent to better understand consumer behavior for nonfood organic products. It would be useful to examine the effect of different standards and labels of third party certifications on consumer behavior. Third party certifications provide beneficial information however different organizations have their own standards for organic certification and it would be useful to understand consumer demand for these labels. In addition it would also be useful to study the effect of different standards that third party certifications have compared to USDA organic standards to better understand the meaning of organic to consumers. Another research idea would be to examine different organic personal care products to learn more about consumer preferences. Lastly, it would be also useful to examine more closely the effect on different organic labeling on the organic food industry to understand the effect of organic labeling on the demand for organic food. These ideas would be useful to better understand the meaning of organic to consumers on nonfood products and to learn more about consumer understanding

and WTP for certification labels for organic personal care products compared to certified organic food.



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## Appendix A

### SURVEY

- 1. Rate your knowledge of organic standards for each of the following categories.**

	No Knowledge			Complete knowledge		
Food	1	2	3	4	5	
Cleaning Products	1	2	3	4	5	
<i>(e.g., dishwasher soap, laundry detergent)</i>						
Clothing	1	2	3	4	5	
Personal Care Products	1	2	3	4	5	
<i>(e.g., shampoo, lotion, sunscreen)</i>						

- 2. Rate how much you trust an organic label on each of the following product categories.**

	No Trust			Trust Completely		
Food	1	2	3	4	5	
Cleaning Products	1	2	3	4	5	
Clothing	1	2	3	4	5	
Personal care Products	1	2	3	4	5	

- 3. Choose to what degree you agree or disagree with the following statement.  
An organic label on each of the following product means it is USDA certified.**

	Strongly Disagree					Strongly Agree	
Food	1	2	3	4	5	6	7
Cleaning Products	1	2	3	4	5	6	7
Clothing	1	2	3	4	5	6	7
Personal Care Products	1	2	3	4	5	6	7

- 4. An organic claim for sunscreen has the same meaning as an organic claim for an orange. (Circle one)**

Yes

No

Not sure

- 5. Rate how confident you are that the oranges labeled as organic are certified organic by the USDA.**

Not at all Confident					Extremely Confident		
1	2	3	4	5	6	7	

**6. Rate how confident you are that the sunscreen labeled as organic is certified organic by the USDA.**

Not at all Confident							Extremely Confident
	1	2	3	4	5	6	7

**7. To what extent do you agree or disagree that it does not matter who certifies an organic claim on products in the following categories.**

		Strongly Disagree					Strongly Agree	
Food		1	2	3	4	5	6	7
Cleaning Products		1	2	3	4	5	6	7
Clothing		1	2	3	4	5	6	7
Personal Care Products		1	2	3	4	5	6	7

**8. How often do you purchase organic in the following categories.**

		Never					Always	
Food		1	2	3	4	5		
Cleaning Products		1	2	3	4	5		
Clothing		1	2	3	4	5		
Personal Care Product		1	2	3	4	5		

**9. Please read the following statements and choose to what degree you agree or disagree.**

		Strongly Disagree					Strongly Agree		
<b>I don't believe a product is organic without the USDA seal.</b>		1	2	3	4	5	6	7	
<b>The definition of organic is the same for all products.</b>		1	2	3	4	5	6	7	
<b>Organic should only be used on products certified by the USDA</b>		1	2	3	4	5	6	7	
<b>An organic label without USDA certification is misleading.</b>		1	2	3	4	5	6	7	

**10. I feel confident the following labels are certified by the US government.  
(Circle your answer for each label)**

	Not at all Confident					Extremely Confident	
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7



Second Survey:

**1. Circle how often you use sunscreen when outside in the summer?**

Always                  Often                  Sometimes                  Never

**2. Please read the following statements and choose to what degree you agree or disagree for each category.**

**Organic is safer.**

	Strongly Disagree					Strongly Agree		
Food	1	2	3	4	5	6	7	
Cleaning Products	1	2	3	4	5	6	7	
Clothing	1	2	3	4	5	6	7	
Personal Care Product	1	2	3	4	5	6	7	

**Organic is a higher quality product.**

	Strongly Disagree					Strongly Agree		
Food	1	2	3	4	5	6	7	
Cleaning Products	1	2	3	4	5	6	7	
Clothing	1	2	3	4	5	6	7	
Personal Care Product	1	2	3	4	5	6	7	

**Organic is better for the environment.**

	Strongly Disagree					Strongly Agree		
Food	1	2	3	4	5	6	7	
Cleaning Products	1	2	3	4	5	6	7	
Clothing	1	2	3	4	5	6	7	
Personal Care Product	1	2	3	4	5	6	7	

**3. Rate your opinion of products labeled as:**

	Very Negative						Very Positive	
Organic	1	2	3	4	5	6	7	
USDA Organic	1	2	3	4	5	6	7	
NATRUE certified	1	2	3	4	5	6	7	

**4. Rate your level of trust for each of the following.**

	No Trust					Trust Completely	
Government Certification	1	2	3	4	5		
Organic labeling is enforced	1	2	3	4	5		
3rd Party Certification	1	2	3	4	5		
NATRUE label	1	2	3	4	5		



For the following questions place a check in front of your answer. Please remember your responses are anonymous and this information will remain confidential and is important to the study.

**1. What is your gender?**

\_\_\_\_\_ Male \_\_\_\_\_ Female

**2. What is your age?**

\_\_\_\_\_ 18-24 \_\_\_\_\_ 25-34 \_\_\_\_\_ 35-44  
\_\_\_\_\_ 45 -54 \_\_\_\_\_ 55-64 \_\_\_\_\_ 65 -74  
\_\_\_\_\_ 75 or older

**3. What ethnicity best describes you?**

\_\_\_\_\_ White \_\_\_\_\_ Black/ African American  
\_\_\_\_\_ Hispanic/ Latino \_\_\_\_\_ Asian \_\_\_\_\_ Other

**4. What is your highest level of completed education?**

\_\_\_\_\_ Less than high school \_\_\_\_\_ Bachelor's Degree  
\_\_\_\_\_ High School \_\_\_\_\_ Graduate or professional  
degree

**5. What is your annual household income?**

\_\_\_\_\_ Less than \$24,000 \_\_\_\_\_ \$75,000 to \$99,999  
\_\_\_\_\_ \$25,000 to \$34,999 \_\_\_\_\_ \$100,000 to \$149,999  
\_\_\_\_\_ \$35,000 to \$49,999 \_\_\_\_\_ \$150,000 to \$199,999  
\_\_\_\_\_ \$50,000 to \$74,999 \_\_\_\_\_ \$200,000 or more

**6. Do you have children under the age of 18?**

\_\_\_\_\_ Yes \_\_\_\_\_ No

**7. Where do you live?**

\_\_\_\_\_ Urban Area  
\_\_\_\_\_ Suburban Area  
\_\_\_\_\_ Rural Area

**8. Are you the main shopper of your household?**

\_\_\_\_\_ Yes \_\_\_\_\_ No

**\*\*Please flip over to complete the final part of the survey \*\***

We appreciate you taking the time to fill out the survey, please take a moment to comment. How do you feel about the information that was provided?

**Thank you for participating in the study!**

## Appendix B

### FIELD EXPERIMENT SCRIPT

Hi, I'm \_\_\_\_\_ and this is \_\_\_\_\_ and we are from the University of Delaware.

We are conducting an economic study looking at consumer preferences for oranges and sunscreen for summer product market research. You can earn money and potentially take home either 3 oranges or a 1 ounce bottle of sunscreen!

Participating includes telling us your value for oranges and sunscreen, reading a short fact sheet, and answering a few survey questions. It shouldn't take more than ten minutes of your time. You need to be a consumer of oranges and sunscreen and over 18 to participate. Your responses will be anonymous and kept confidential.

Are you willing to help us with our study?

**If No:**

Have a nice day.

**If Yes: Hand them the first auction sheet**

For the first part of our study, we will be asking you to state the true amount that you would be willing to pay, between \$0 and \$6, for conventional and organic oranges and sunscreen. You will be bidding on 3 oranges and 1 ounce of sunscreen. While we will be asking you for your willingness to pay for conventional and organic oranges and sunscreen, only one auction will count so that the most you would be purchasing is either 3 oranges or 1 ounce of sunscreen using the \$6 in cash you get from participating in the study. The auction that counts will be revealed in one of these randomly selected envelopes. The envelopes are equally distributed with dollar amounts ranging from \$1 to \$5 for each product and auction number. Since you may end up buying 3 oranges or 1 ounce of sunscreen after the auction is conducted it is very important that you enter your true willingness to pay for each. Entering too high of a value could lead you to buy one at more than it is worth to you while entering a lower value could mean missing a chance to buy oranges or sunscreen at a price you would like. Note that the price you'd pay for any oranges or ounce of sunscreen would be less than what you bid by rules of the auction.

**Collect bids and hand out Section 1 of survey and make sure they see it is front and back.**

Please take the time to answer these questions on your knowledge of organic products.

**Collect finished survey. Give them a fact sheet and the Auction Set 2 form.**

Please read this short information sheet on organic guidelines. When you have finished, please state the true amount that you would be willing to pay, between \$0 and \$6, for 3 oranges and 1 ounce of sunscreen for both conventional and organic. Only one auction will count from this and the previous auction set so that the most you would be purchasing is 3 oranges or 1 ounce of sunscreen using the money you get from participating in the study. The auction that counts will be revealed in one of these randomly selected envelopes. Since you may end up buying 3 oranges or 1 ounce of sunscreen it is very important that you enter your true willingness to pay for each. Entering too high of a value could lead you to buy one at more than it is worth to you while entering a lower value could mean missing a chance to buy oranges or an ounce of sunscreen at a price you would like. Note that the price you'd pay for any oranges or ounce of sunscreen would be less than what you bid by rules of the auction.

**Collect information sheets and new bids. Hand them Section 2 of survey and make sure they see it is front and back.**

Please fill out this short survey on your beliefs and shopping habits.

**Collect Section 2 of survey.**

Now that we have your bids for the oranges and sunscreen, we will use these numbers you have given in a two person auction, where I will be the other person and you will randomly draw one of these envelopes. In the envelopes there is a number indicating the auction set, the name of the product either conventional or organic oranges or sunscreen, and a binding bid price. If the number you draw is higher than your number for 3 oranges or 1 ounce of sunscreen, I will pay you \$6 and you will not receive oranges or sunscreen. If the number you draw is lower than your number, then you will receive a product of either 3 oranges or 1 ounce of sunscreen and whatever money is left over (\$6 – the number drawn).

**Conduct random draws for both surveys /Compare values**

**If random draw < offer:**

Your offer is higher than the one in the envelope, which means you have bought 3 oranges or 1 ounce of sunscreen. We will pay you \$6-the number drawn (your purchase price for the item) and you will also receive a product of oranges or sunscreen. While we count out your money and get your product please fill out this short survey.

**Hand person Section 3 of survey and make sure they see it is front and back.**

**Collect survey\*. Have money and receipt ready for when the survey is completed.**

We will need you to sign a receipt for your payment so that we can account for our funds.

**Hand over money once you have the signed receipt.**

Thank you very much for participating in our study and enjoy the rest of your day.

**Make any notes needed on the survey.**

**If random draw > offer:**

Your offer is less than the one in the envelope, which means you did not purchase the oranges or sunscreen and will receive \$6 as payment for this study. While we get you your money, please fill out this short survey.

**Hand person Section 3 of survey and make sure they see it is front and back.**

**Collect survey\*. Have money and receipt ready for when the survey is completed.**

We will need you to sign a receipt for your payment so that we can account for our funds.

**Hand over money once you have the signed receipt.**

Thank you for participating in our study and enjoy the rest of your day.

**Make any notes needed on the survey.**

**If random draw = offer:**

Both offers were the same. Since the auction requires a higher subject price number to determine purchase we will just be giving you \$6. While we get your money and receipt, please fill out this short survey.

**Hand person Section 3 of survey and make sure they see it is front and back.**

**Collect survey\*. Have money and receipt ready for when the survey is completed.**

We will need you to sign a receipt for your payment so that we can account for our funds.

**Hand over money once you have the signed receipt.**

Thank you for participating in our study and enjoy the rest of your day.

**Make any notes needed on the survey.**

Here is the product you selected. Please remember to fill out the final survey question when you are done. Afterwards we will give you your money and receipt.

## Appendix C

### IRB LETTER OF VERIFICATION



RESEARCH OFFICE

210 Hullihen Hall  
University of Delaware  
Newark, Delaware 19716-1551  
Ph: 302/831-2136  
Fax: 302/831-2828

DATE: July 31, 2017

TO: Jaclyn Kramer  
FROM: University of Delaware IRB

STUDY TITLE: [1101709-1] Consumer behavior and WTP for Organic Personal Care and Food products

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
DECISION DATE: July 31, 2017

REVIEW CATEGORY: Exemption category # (2)

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or [nicolefm@udel.edu](mailto:nicolefm@udel.edu). Please include your study title and reference number in all correspondence with this office.



## **Appendix D**

### **COMMENTS**

#### Interesting

- It raised my interest in learning more about “organic” and other labels and certifications.
- Interesting to find out many personal care products have no organic certifications from government
- Really interesting and made me think about our family purchases
- Interesting and very thorough
- The information was provided clearly. It was quite interesting
- It was thought provoking. The question surveyed were actually questions and thoughts that I have had about organic products versus non-organic products and the validity of something categorized as “organic”
- This was very interesting education
- Interesting survey. I feel like most consumers are fooled by meaningless labeling
- Interesting and knowledgeable. Organic is important and better
- As someone who is very interested in organic care, I found this interesting
- Interesting to see how labeling can be misleading strictly to market
- Interesting information. Never know there was organic sunscreen. Great presentation
- It was very interesting. I think I learned some thing I didn’t know before
- Good info-interesting
- I found this information to be interesting. The questions make you stop and think how what you buy and how it can impact you and the environment
- Very interesting. Would like to know more about standards and certifications
- Interesting info. I’ll be more aware of label in the future
- Interested-never really thought about various regulations regarding organic
- Interesting-particularly the explanation of labeling
- I don’t normally buy organic products besides self care/cleaning, bit it was interesting to learn a few thing
- It was very interesting and eye-opening
- It’s interesting

- Interesting. I was not aware that “organic” label was used for non-food items. It does not make sense to me since clothing, sun-screen require the use of many steps and processes that does not include credible product, or plants, but include other “chemical” or “nonchemical” processes

#### Informative

- Informative
- Very informative
- It was very informational
- It was helpful to understand labels more
- It was informative and will make me give me more consideration to what I purchase based on just labels
- Listing other 3<sup>rd</sup> party organic certifications after survey. It was informative, thanks
- Good if it will help consumers make educated guesses
- The information was very informative about organic goods
- Didn't know about this label, so it was useful information
- Informative
- It was very informative about how products need to meet the organic certification
- The fact sheet was informative
- It was well done and informative
- Information provided well
- It was very informative, I am going to buy more organic food
- Very informative
- Informative
- It was very informative
- Very informative, will now look up and discover the labeling
- I feel as though it was very informative

#### Want to know more/ Educational

- I feel I need to educate myself on what is truly organic. I think we/society enforces the more you pay, the better quality (in general) and organic foods are more expensive (typically). But I don't know that they're actually safer/better for the environment. Thanks!
- I was truthful based on what I know, and learned body products can be certified organic
- Appreciated the information page so much that I requested a copy. Would like to learn more about organic vs. non-organic
- Informative will do a little more research based on what I have read here

- Information was good in educating me on rules and regulations that I was unaware of
- I feel like I learned more about the different types of certification for organic products, I feel a little concerned
- I feel that this was insightful and I learned a little more about organic
- Good to have educational information. I am deeply concerned about now we are destroying the planet quickly
- I feel as though I've been taught more about organics and attain qualifications or being organic
- I enjoyed learning more because I was unsure of the meaning of the different labels.
- I feel like I learned something new
- I liked learning about other organizations that regulate organic products
- I like the facts provided for me to gain more knowledge on organic products
- Very good-I feel like I need to learn more about organic products and how they are labeled
- I feel like I learned more about organic products
- I definitely learned something new and plan to tell others
- Good to learn about the different organic definitions
- Gained knowledge in regards to what organic means for food, clothes and cleaning products
- I felt I learned something about organic products. My attitudes and bellies were not changed. Know what Natrue is (non profit). Felt reinforce about opinions about organic products. Organic ≠ better (consumerism, environmentalism). Survey is ok, educational
- I learned something new about organic sunscreen. It made me think how I would tend to trust something labeled "organic" but not USDA organic if I had the opportunity to speak to the producer and/or see the farm/facility
- It gives me something to research further

#### Insightful/ Thought provoking

- Insightful – didn't know much about organic foods and products
- It makes me to think about the meaning of organic for other things except for food
- It made me think about categories I rarely think about
- I feel good. Would love to know what signifies organic and why there are so many different labels for organic. Still don't know a lot about organic product but am now aware of the diversity of organic
- Made me realize I understand little about what products and food I am consuming

- It was good, made me really think about how far I would go to get organic goods
- Quite insightful-eye opening
- 

#### Beneficial

- It was very clear. I think it would be helpful for people who care to shop for organic
- The information provided was valuable
- Helpful
- It was helpful, it educated me on organic products
- Information was very helpful, a good opportunity to learn more about organic and non-organic items
- I personally don't know much beyond organic food, so I appreciate the info page after the first auction. It definitely effected my WTP for sunscreen.
- The info was very beneficial to learn and interesting

#### Opinions

- For clothing, I am not familiar with organic labels. I feel that ethical labor practices are more important for manufactured non-food products. I am skeptical of non-USDA 'organic' certifications, but am also aware that USDA guidelines are cumbersome. I would need more information about NATRUE to judge their reliability
- Useful to help contextualize but I'd have liked more information about organic clothing and cleaning products
- Good. I've heard about hygiene products not being USDA certified and I think they ought to be
- I think information about regulations and certifications for an organic product should be easier to find and more widely known
- Some questions did not state if product was organic if it was USDA certified. Also organic refers to how product was processed not necessarily raised, also can't compare organic food to organic non-food products
- Would be helpful to include examples of ingredients in cleaning products and personal care
- I do trust the government organic certification for good but with the current administration have concerns that the ability to verify is being reduced. Therefore my trust level is likely to go down. I don't understand organic clothes-never see them. I don't care about whether my cleansing products are organic-just what they are safe
- A little confusing to me since I am not up on how the USDA certifies organic products

- It was thorough and included most of the information necessary for understanding. However a briefing on how the government and USDA define organic would have been nice.
- Organic products are important but labeling is irregular and not clear. Information on organic products is important, I am unclear about the subject and the information.
- Thank you for your experiment. More information is needed as I believe education effects on the subject are lacking

#### Miscellaneous

- Good to know
- Pretty Good
- I feel the same.
- OK
- I'm not overly familiar with organic products. I don't tend to buy them
- Well presented, easy to understand
- I am very leery of all somewhat influence on consumer products
- Somewhat helpful
- Sorry. I don't shop. I buy what I need and don't spend time to compare
- Nice to see symbol of people trying to protect the future
- OK
- The information provided allowed me to feel more confidently about my answers for pt.2
- The information provided was fine. I buy mostly organic produce, meats and some dairy (and some cleaning). I'm not sure how confident I am with other things, like household items or claims by yard care companies that their product is "organic" or "all natural" because anthrax is organic, but that doesn't mean we should put it in our yard/house/body
- Fine
- Information is OK
- I read it too quickly-which wasn't helpful
- Neutral
- Thank you for letting me help you
- Very good
- Great
- Good luck
- Excellent presented
- Great
- Clear and Concise
- Info was provided in a clear manner that helped the survey
- Ambiguous

- I would like to be able to trust them when I pay extra money for organic products especially when they go into or on my body
- I think it should be done by everyone (survey)
- Interesting study questions, will like to read the results
- Brings up a good point in whether to trust organic labels or not
- Well done survey, clear and efficient
- Fun
- I have a pretty stigmatized view on organic labels. Most of the time I think it's a marketing scheme. The info provided show light on how people think about the labels. Perhaps some labels are true to their nature but I'm not sure
- I was somewhat aware of the information provided but some I forget about it so it was a good refresher
- It was informative, but indifferent
- As an international student, the meaning of a label and certified category was not familiar to me. Reference price still relate to the supermarket price, since products in different countries have different prices. As a science major, I have some understanding of NSF and the organic industry. As a chemical engineer I am not very confident about these products. The production process still consumes energy and uses chemicals. Some industries aren't completely honest about their products. However I still might not fully understand organic.
- I am confident about oranges but never heard of organic sunscreen
- I really like the information I was given and I got to know more about organic and nonorganic.
- Open my eyes to different things that are organic
- Made me think about what I knew about organic for food compared to my lack of knowledge about other uses of the word.