KENT STATE UNIVERSITY STUDENTS’ PERCEPTION AND KNOWLEDGE REGARDING ORGANIC FOOD

A thesis submitted to the Kent State University College and Graduate School of Education, Health, and Human Services in partial fulfillment of the requirements for the degree of Master of Arts

by

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The purpose of this study was to describe the characteristics of organic food buyers among college students ($N = 980$). This study also examined perception and knowledge between organic food purchasers and non-purchasers. An anonymous electronic survey was distributed through the university’s email system. The email invitation to participate was sent to 8,927 university students. The survey consisted of five sections designed to investigate: (a) demographics, (b) purchasing, (c) availability, (d) perception, (e) knowledge.

There were significant between buyers and non-buyers of organic food as buyers had a higher mean knowledge of organic food than non-buyers. Chi-square and $t$-tests were used to run significances between buyers and non-buyers to examine perception, knowledge, and demographics. Results also indicated that as both groups perceive organic food as healthier and nutritionally superior to organic food, barriers stand in the way of purchasing such as cost. There was no significant knowledge difference between buyers and non-buyers. Data showed the most significant reasons buyers do purchase organic food is due to being health conscious (76%) and also for nutritional quality (64%). Results indicated that both groups cited websites as the highest used resource to learn about organic food. Results also indicated that gender did not have an effect on
purchasing organic food but class ranking did have a significant effect. Data also showed significance between ethnicity and purchasing organic food.
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CHAPTER I
INTRODUCTION

Organic foods and beverages are grown and raised without antibiotics, added hormones, and most pesticides (Introduction to Organic Practices, 2015; U.S. Department of Agriculture [USDA], 2015). Organic foods must meet guidelines to be coined organic and receive a seal by the USDA (Organic Labeling, n.d.; The Organic Seal, n.d.).

There are misconceptions regarding organic food and other marketing terms used to sell foods. The word “natural” and “whole” are commonly mistaken for being organic and with no clear-cut definition. “Natural” and “whole foods” are not regulated by any governing body although the term “organic” is.

In 1997, the organic food industry sales totaled $3.6 billion. Fast-forward to 2010 and these sales increased to $26.7 billion. Even with the large increase in sales, flipping land from conventional to organic agriculture takes time. The time line for a farmland to convert to growing organic food that is sellable according to USDA is 3 years (Dimitri & Oberholtzer, 2009; Greene et al., 2009; Organic Agriculture, 2015).

There have been a plethora of research studies completed looking at what motivates people to purchase organic foods. Consumers’ perception of organic food and any benefits of it have been assessed. Education, health, and income have been noted as motivating factors. Summarizing the results of research on consumers, it has been noted that education is the most consistent motivational factor in regards to chances of purchasing organic (Dimitri & Oberholtzer, 2009).
Many college students are transitioning from living with their family to living on their own. With this comes the responsibility of the students to make their own food choices (Papadaki, Hondros, Scott, & Kapsokefalou, 2007). Numerous factors affect food choices of college students. It has been seen in the literature that college students have healthier eating patterns with more knowledge of dietary guidelines (Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reynolds, 2007). Reading food labels does affect diet habits among college students (Deshpande, Basil, & Basil, 2009). No significant influence on healthy eating in regards to taste, preparation, and price was found in one study, which evaluated what variables motivate college students to eat healthy (Deshpande et al., 2009). Consensus in research summarizes that knowledge has a large influence on college students’ food habits.

**Problem Statement**

Sales of organic food have seen double-digit growth since the 1990s (Overview, 2015). According to research, the most consistent motivational factor in organic food purchasing is education (Dimitri & Oberholtzer, 2009). The more education consumers have, the higher becomes the probability of them buying organic food (Dimitri & Oberholtzer, 2009). This research finding places college students at a higher chance of organic food purchasing and a greater probability to be the future of the organic food market. However, current research is limited in regards to organic food purchasing of college students. Even though this population is limited in the research, there are numerous studies focusing on other populations’ perceptions. Therefore, further investigation is needed to understand organic food purchasing behavior in college
students and to examine their knowledge and perception of organic foods and beverages and how they believe this affects their diet and health.

**Purpose Statement**

The purpose of this study was to describe the characteristics of organic food buyers among college students. This study also examined perception and knowledge between organic food buyers and non-buyers.

**Hypothesis**

It was hypothesized that college students who purchased organic food perceived their food as healthier than college students who do not purchase organic food.

It was hypothesized that college students who purchased organic food had more knowledge regarding organic food than college students who do not purchase organic food.

**Operational Definitions**

College students: an undergraduate or graduate student enrolled full-time at Kent State University during the Spring 2016 semester.

Conventional food(s): foods and beverages that are not organic, not labeled as organic, and not raised organically.

Knowledge: understanding one acquires from education and/or experiences.

Organic foods and beverages/Organic food(s)/Organic products/Organic items: foods and beverages that are grown/produced using regulated agriculture set forth by the United States Department of Agriculture.

Perception: how one understands a topic.
CHAPTER II
LITERATURE REVIEW

Organic Food and Beverages Regulations

Organic food is coined as food without pesticides, antibiotics, hormones, and genetically modified organisms (GMO). These foods are grown and produced in ways that conserve the environment and reuse resources on the farms. No GMO seeds can be used and livestock cannot consume feed with GMO components in them. The process of overturning conventional farmland to organic farmland takes time and requires mandatory inspections. The land intended to be used for organic crops cannot have any prohibited substances and materials on it, which are listed in the Code of Federal Regulations (U.S. Department of Agriculture, 2015), for 36 months before harvesting (Can GMOs be used in Organic Products, 2013; Introduction to Organic Practices, 2015; Organic Agriculture, 2015).

Certification

There are specific regulations for the transition from farmers all the way to the table. Food handlers and organic farmers have organic standards to uphold by the USDA, who also requires mandatory certification for farmers or companies who have over $5,000 in organic sales. More than 30 foreign programs and about 50 programs in the US between state and private, have received accreditation from the USDA. When processors and farmers apply for eligibility to become certified, agents who certify programs review the applications which allows farmers and processors to label their items as organic with the USDA’s labeling regulations. Then onsite inspections are
completed annually by qualified inspectors to ensure organic operations follow protocol (Organic Agriculture, 2015; Organic Certification, 2014).

**Regulatory Laws**

There are regulations in place by multiple states and private groups, such as the Organic Foods Production Act, which was put into place by Congress in 1990 to provide a national standard for organic products (Kremen, Greene, & Hanson, n.d.). Due to the high demand and influx of organic food sales since the 1990s, the USDA was prompted in 2002 to take action to create the National Organic Program (NOP). This program introduced uniform standards to be followed by farmers and handlers. The NOP provided support for organic processors and farmers while also providing assurance for consumers (Kremen et al., n.d.; Organic Certification, 2014; Overview, 2015).

**Agriculture Regulations**

There are regulations in regards to the soil, livestock, quality of the water used, food additives, and pest control on farms which process organic products. Organic methods include using green or animal manures and/or compost to increase the quality of soil, which can also be a conventional practice. Organic regulations do not allow biosolids or sludge from sewage to be added into the soil of organic crops. Also, to protect organic crops, cover crops are required to keep away erosion from water and wind, as buffer zones are used to ensure no contact with prohibited substances (Introduction to Organic Practices, 2015; USDA, 2015).
Seed Regulation

In regards to seeds for planting organic crop, the USDA also has regulations in place. Organic seeds are purchased and used, but when organic seeds are not available for a crop, conventionally grown seeds can be substituted. There is stipulation on conventionally grown seeds in place of organic seeds; the conventionally grown seeds cannot be treated with prohibited substances like fungicides, or modified genetically (Introduction to Organic Practices, 2015; USDA, 2015).

Crop Regulation

Another requirement put forth by the USDA for organic farmers is to rotate organic crops, whether rotating the planting bed or the field. It is best to plant crops from a different family of crops each year in order to decrease diseases and insects. Crop rotation also works to balance nitrogen in the soil and to prevent erosion of the soil. It is best practice to wait a number of years before the original crop is replanted in the same area (Introduction to Organic Practices, 2015; USDA, 2015).

Pest Control

The USDA has also set regulations covering weeds, pests, and diseases. The term PAMS strategy refers to prevention, avoidance, monitoring, and suppression. Organic farmers use PAMS strategy as the approved methods to protect their crops. The first two words, prevention and avoidance, are the front line against weeds, pests, and diseases. If the need of suppression of weeds or pests arises, physical and mechanical exercises allowed include adding mulch or setting out predatory insects. If the issue continues to remain after these steps, working with their organic certifier, producers and farmers can
use natural, plant derived, insecticides, or preapproved synthetic substances, or approved pesticide (microorganisms that are naturally occurring; Introduction to Organic Practices, 2015; USDA, 2015).

**Farmland Regulations**

A farmer or producer can have both conventional and organic crops on their farmland. Separation is crucial and required. Producers and farmers or organic crops are responsible for ensuring prevention between contact of conventional and organic crops. This also includes making sure organic crops do not come into contact with prohibited substances such as fertilizers or pesticides. Boundaries and buffer areas must be marked between conventional and organic crops and to protect organic crops from roads. Producers and farmers even have to ensure that chemical sprays for conventional crops do not drift onto organic crops and their equipment (Introduction to Organic Practices, 2015; USDA, 2015).

**Livestock Regulations**

The USDA not only has standards for organic crops, they also set up regulations for organic livestock. It is required of producers of organic livestock to provide the animals living room that promotes the animals’ natural behavior and their overall health. It is required that the animals have shelter, enough room for exercise, outdoor space, shade, water to drink that is clean, direct sun, fresh air, and proper sanitation. Also, their shelter must be properly ventilated with good air circulation (Introduction to Organic Practices, 2015; USDA, 2015).
Livestock Regulations

Further regulation on organic livestock focuses on vaccinations and hormones. Preventative measures are acceptable along with vaccines. It is forbidden to use growth hormones and antibiotics on these livestock. There are also regulations on animal origin. Generally, an organic livestock animal is raised organically starting at two-thirds gestation. Birds do not have to follow this pre-birth regulation. Although, starting at the second day of their lives, birds have to be raised organically (Introduction to Organic Practices, 2015; USDA, 2015).

Summary of Regulations

There are many regulations when it comes to organic agriculture. Farmers are provided assistance through the USDA throughout the process with access to organic certifiers. The increase in demand of organic agriculture is related to the standards the USDA put forward for organic crops and organic livestock (Introduction to Organic Practices, 2015).

Labeling

The USDA was successful in developing labeling guidelines and protocols for manufacturing of organic products. The major rise in demand of organic food is partially related to what the USDA set forth. The USDA is thought to provide some of the success seen for organic products due to the standards they put in place (Kiesel & Villas-Boas, 2007; Molyneaux, 2007).
The USDA created a seal certifying organic products. This seal signifies that at least 95% of the specific product is organic (The Organic Seal, n.d.). The description of the seal (See Figure 1) includes:

On a white background with a brown outer circle and with the term, “USDA,” in green overlaying a white upper semicircle and with the term, “organic,” in white overlaying the green lower half circle; or on a white or transparent background with black outer circle and black “USDA” on a white or transparent upper half of the circle with a contrasting white or transparent “organic” on the black lower half circle. The green or black lower half circle may have four light lines running from left to right and disappearing at the point on the right horizon to resemble a cultivated field. (The Organic Seal, n.d.)

There is up to an $11,000 fine for every violation where a product is labeled “organic” when it is not organic (The Organic Seal, n.d.).

![USDA Organic Seal](image)

*Figure 1. USDA Organic Seal*

The United States also works with other countries and trades their organic food. America has contracts with European Union, Canada, and Japan to trade organically. The USDA has authorized certifying organizations around the world to ensure farms are
meeting USDA’s organic regulations. The European organic logo, Canadian organic logo, and Japanese organic logo (See Figure 2) may appear on foods and beverages that meet established requirements.

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The European organic logo

The Canadian organic logo

The Japanese organic logo

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Figure 2. Organic logos of countries with which the U.S. trades organically

The agreement between the US and Canada as well as the US and European Union is to “produce livestock without antibiotics.” European Union has to meet additional regulations in regards to wine. Japan has no regulations such as those previously mentioned of European Union and Canada. All three locations have regulations on how items are shipped into the US (Importing Organic Products to the U.S., 2013).

The NOP has the responsibility of creating agriculture standards for organic products. It is verified that these standards are met when a product bears USDA’s organic seal (National Organic Program, 2015).
There are benefits to having certified organic products. The USDA provides helpful incentives for farmers such as exceptional pricing for the products as well as providing them access to programs for technical assistance and also more funding. More benefits include natural resources protection for farmers, supporting the local economies, and providing farmers access to a larger array of markets, domestically and internationally (Benefits of Organic Certification, 2013; Organic Agriculture, 2015).

Labeling is a very important component for organic food and beverages. There are multiple ways to label products. First, a label claiming 100 Percent Organic signifies that all ingredients in the item are each organic and that it was processed meeting organic standards. With this labeling category, organic ingredients have to be identified. A product does not have to read 100 Percent Organic if it meets the standards; the term organic can be used (Labeling Organic Products, 2012).

When a product uses the term organic, it has a separate set of standards. These foods/beverages are 95% organic, 5% non-organic (not including any added salt or water). No added sulfites are allowed. The USDA organic seal can be used and/or the product can use an organic claim. The restrictions with this labeling category are that any agricultural ingredients have to be organic by certification, unless listed on the National List.

The National List of Allowed and Prohibited Substances identifies the synthetic substances that may be used and the nonsynthetic (natural) substances that may not be used in organic crop and livestock production. It also identifies a limited
number of non-organic substances that may be used in or on processed organic products. (The National List, n.d.)

When a product claims “Made With Organic (specified ingredient[s] or food group[s]),” it informs consumers that certified organic ingredients make up at least 70% of the multi-ingredient agriculture item. This does not include water and salt (Labeling Packaged Products under the National Organic Standards, 2009). Even though the remaining 30% does not have to be organic, it has to be made without excluded methods such as radiation, sludge from sewage, or genetically engineered (Organic Labeling, n.d.). Also, the remaining 30% has to be found on the National List (n.d.). No added sulfites may be contained in the product, with the exception of sulfur dioxide in wine (Labeling Packaged Products under the National Organic Standards, 2009). According to the USDA, the correct say to write organic on the labels of these items is as follows, “made with organic (insert up to three ingredients or ingredient categories).” The ingredients that are organic must be listed as “organic.” These goods are forbidden to display the USDA’s Organic seal (Labeling Organic Products, 2012; Labeling Packaged Products under the National Organic Standards, 2009).

The final category of organic labeling includes products of multiple ingredients that contain less than 70% of organic components, not including water or salt. In this situation, the products do not have to be certified. The USDA organic seal cannot be used and the term “organic” cannot be displayed. The ingredient list may include what items are certified organic ingredients and what percent is organic (Labeling Organic
In regards to alcohol, the beverage must meet USDA’s organic requirements as well as regulations put forth by the Alcohol and Tobacco Tax and Trade Bureau (TTB). Labeling of sulfites is mandatory. If any added sulfites are used in the beverage, the only labeling term allowed is “made with.” The organic seal of the USDA cannot be advertised (Labeling Organic Products, 2012).

**Sales Trend**

Sales of organic foods have remarkably increased over the last two decades (Overview, 2015). In 1997, the sales from organic food sat at $3.6 billion. Consumer demand and education triggered sales to shoot up to $21.1 billion in 2008, then to $26.7 billion in 2010, and hitting $28 billion in 2012 (Dimitri & Oberholtzer, 2009; Greene, 2013; Greene et al., 2009; Organic Trade Association, 2011). According to the USDA, “the organic industry is one of the fastest growing agricultural segments in the United States today, with sales reaching nearly $35 billion in 2012” (Benefits of Organic Certification, 2013).

As previously mentioned, the USDA is applauded for playing a role in the strong increase in sales. This happened when the USDA became the governing body of organic products in 2002 as they created the National Organic Program (Greene et al., 2009).

Organic foods and beverages, once only found in specialty shops, now are available in conventional grocery stores (Greene et al., 2009). Since the 1990s, demand from consumers over organic products has resulted in growth reaching double-digit
increases in most years due to consumer awareness. Over 4% of the US’s total food sales belong to the organic industry (Overview, 2015). Using corn as an example, even though from 2001–2010, acres of organic corn almost tripled, less than 1% of total acres of corn were certified organic in 2010 (Foreman, 2014).

From 1990 to 2002, retail sales of organic products have grown 20% or more each year. The year 2000 was a big crossover year for the organic food industry. Sales of organic food from conventional stores surpassed sales from specialty shops (Dimitri & Greene, 2002). Conventional stores still had the majority of organic sales at 54% in 2009 (Organic Trade Association, 2010).

Between 1994 and 1999, the fastest growing category of organic products was dairy, with over 500% growth in sales. The USDA estimated that certified organic cropland had doubled to 1.3 million acres from 1992 to 1997 and then also significantly increased from 1997 to 2001. In the beginning half of 2000, there were more than 800 new organic products introduced into the market (Dimitri & Greene, 2002). The majority of new organic products in 1999 were beverages and in 2000 were desserts (Myers & Rorie, 2000). It was not until February of 1999 that poultry and meat could use provisional organic labels set forth by the USDA. This is why the organic crop market was more advanced, as they were regulated by the FDA prior to 2002 (Dimitri & Greene, 2002).

**Barriers to Choosing Organic**

A major identified barrier, which may prevent consumers from purchasing organic products, is cost (Forman & Silverstein, 2012). Organic food is priced 10 to 40%
more when compared to conventional food (Forman & Silverstein, 2012). Organic foods are more expensive than conventional foods for a variety of reasons. First, it can be due to regulations in place by the USDA in regards to livestock, as the cost of feed for livestock is priced higher (Forman & Silverstein, 2012). Also, organic livestock must be given proper shelter and sanitation, clean drinking water, good air circulation, along with other living regulations which makes raising them more costly than compared to their conventional counterparts. Another reason for increased prices is related to increased demand (Organic Market Overview, 2014).

Other barriers noted in research include weak presentation such as displays of items, consumers’ lack of information regarding organic regulations, and also availability (Makatouni, 2002). Although, availability has been improving as organic food can be found in approximately 3 out of 4 conventional grocery stores (Organic Market Overview, 2014). To also increase availability, organic food can be purchased online. This method of obtaining food is not as popular as it is a fairly new addition to organic food availability.

A study done in Australia evaluated consumers’ beliefs regarding organic food (Lea & Worsley, 2005). Survey data were collected in a mall with 500 people participating. The survey asked participants about their values, socio-demographic information, as well as their beliefs on organic food. The majority response to the surveys indicated that participants believed that organic food, compared to conventional food, was environmentally better, more tasty, as well as healthier. At the same time,
participants identified barriers to purchasing organic food, which included cost and availability (Lea & Worsley, 2005).

**Nutritional Quality**

Throughout the research, studies support both sides regarding organic food being nutritionally superior or not. One Italian study evaluated conventional and organic peaches and pears (Carbonaro, Mattera, Nicoli, Bergamo, & Cappelloni, 2002). Citric acid and ascorbic acid levels, polphenoloxidase and polyphenols were assessed in each group of fruit (conventional and organic). This study found that organic peaches had higher citric acid and ascorbic acid levels than conventional peaches. Also, this study saw greater polyphenoloxidase activity and polyphenol content in organic peaches when compared to its conventional counterpart (Carbonaro et al., 2002). A study completed in Taiwan compared the nutritional parameters and the quality of organic versus conventional tomatoes over a two-year period (Juroszek, Lumpkin, Yang, Ledesma, & Ma, 2009). Appearance as well as laboratory assessments were completed assessing the two groups of tomatoes. Results concluded no difference between organic and conventional farming on parameters being evaluated (Juroszek et al., 2009). Each study evaluated different factors to determine any differences between a conventional item and its organic counterpart. This area continues to be an ongoing research topic today.

**Characteristics of Buyers**

Many studies have been conducted to determine the sole factor of why consumers choose organic products. Different motivating factors have been studied, such as
education level, income, family, health, and environment, to identify consumer motivation.

**Health**

Makatouni (2002) conducted a study to understand why consumers purchased organic food, their motivations, beliefs, and attitudes. Parents of children (4–12 years of age), who were the primary food purchaser for their household and who regularly bought organic food, were studied. Forty laddering interviews were done. All participants had to eat no less than two out of the eight organic foods asked about in the screening questions. Then participants had to rank how likely they were to buy the organic version of eight conventional foods presented to them on cards. This activity was done to measure the beliefs and attitudes of the consumer. It was determined that the participants valued the health factor of organic food, the biggest motive for purchasing organic. The importance of animal welfare and the environment were also noted. It was also concluded that these participants identified organic food as a way of accomplishing social and individual values (Makatouni, 2002).

A study done in Wisconsin wanted to look at consumer’s beliefs, knowledge, and behaviors in relation to organic foods (Zepeda, Chang, & Leviten-Reid, 2006). This study separated 43 shoppers into four groups. Two groups were organic food purchasers and the remaining two groups were conventional food purchasers. Of the conventional groups, one was made up of all African Americans and the other of all Caucasians. All these participants were either the person primarily responsible for grocery shopping in their household or they shared this duty with another household member. A
questionnaire was given prior to the focus group session to assess demographics. Each focus group session lasted two hours, with questions and discussions during this time. Results of the focus group showed that price and familiarity were the barriers to organic food purchasing. Dietary restrictions and nutrition and health concerns were suggested by the focus group of this study to be positive indicators concerning organic foods. In regards to consumer knowledge, participants were more familiar with organic produce than meat, products that are processed, and milk (Zepeda et al., 2006).

A study was done in Boston to gain more insight into consumers of organic products versus conventional products (Williams & Hammitt, 2000). A 14-page food safety questionnaire was created and distributed to 1,004 organic and conventional fresh produce consumers, with 707 surveys being completed and available to analyze. The survey looked at value of reducing health risks, beliefs and attitudes about food safety, perceived risks of food safety, and characteristics of lifestyle. The survey provided a variety of characteristic results in regards to organic and conventional consumers. Conventional purchasers were less probable to participate in an array of health and environment promoting behaviors than organic purchasers such as wearing seat belt, taking supplements, and staying away from smoking (Williams & Hammitt, 2000).

Pesticide use and levels of exposure are a concern to organic food consumers. Williams and Hammitt (2000) found that organic consumers view conventional products as having a greater risk of pesticide residue. A study was done in California to evaluate the risk of pesticides (Shelton et al., 2014). They looked at two of the most common pesticides, pyrethroids and organophosphates, and how exposure around one’s home may
cause higher prevalence of Autism Spectrum Disorder (ASD). This study saw a positive correlation of more prenatal exposure during second and third trimesters to organophosphate pesticides and ASD diagnoses. A positive link was also found with pyrethroids exposure during 3 months prior to conception and also in the third trimester. The study concluded that mothers who are exposed to certain pesticides during pregnancy might place their child at higher risk for neurodevelopmental disorders (Shelton et al., 2014).

**Availability**

In India, researchers looked at consumers’ plans to buy organic food and what impacted their behavior in regards to organic food. This study used a questionnaire administered face to face with 463 participants, aged 25 and older, to look at demographics, health aspect, why they would buy organic food, where they would buy these foods, and their satisfaction with organic food. This study found that attitudes of buyers, in regards to organic food, were influenced by food availability, health, and education. Also, buyers were more satisfied with organic food versus conventional food (Paul & Rana, 2012).

Another study was done to understand the knowledge, perception, and motivation of consumers of organic food. A means-end chain model was used in order to further identify barriers that are now preventing more organic food purchases. This study used a “hard” laddering approach questionnaire to collect data of 60 participants. Each participant was the primary person in the household who purchased the food. Then a second questionnaire, an eight-item reliable scale, looked at each participant’s knowledge
and how often he or she purchased organic food. Results from these surveys revealed what would raise organic food demand, an enhanced method of distributing and pricing the food lower. Consumers also mentioned they would want the easy-to-use food that tastes good and that does not easily perish. Consumers of organic food strive to consume healthy foods and still enjoy life’s pleasures (Zanoli & Naspetti, 2002).

**Education**

The 2008 Farm Act provides $5 million a year for data collection in the field of organic products to study price, retail, production, distribution, handling, and trends, such as patterns of consumer purchasing. According to the research, education is the consistent factor which influences the chances of consumers purchasing organic products, no matter the consumers’ age, ethnic group, and race (Dimitri & Oberholtzer, 2009). This research also stated that other factors such as income, presence of children in the house, and race do not have consistent effect on consumers purchasing organic products (Dimitri & Oberholtzer, 2009).

Dettmann and Dimitri (2007) found that not only does a higher education level increase chances of buying organic, so does total household income. The study also found that consumers who were under 30 years old were more likely to buy organic carrots and salads compared to adults ages 30–49. The final results of this study contributed that certain races, education level, and income total of the household were the only demographics that affected consumers’ chances of buying vegetables that were organic versus conventional (Dettmann & Dimitri, 2007).
College Students

Diet habits are developed early in life (Maes & Lievens, 2003). There are many influencing factors on dietary habits such as living arrangements (Papadaki et al., 2007), socioeconomic status (Johansen, Rasmussen, & Madsen, 2006), parental support (Johansen et al., 2006), and knowledge (Kolodinsky et al., 2007). College students are at the point in their lives when they have more responsibility, including the fact that they now are in charge of purchasing and preparing their food (Kelly, Mazzeo, & Bean, 2013).

For many college students, they are transitioning from living with their family to living on their own (Papadaki et al., 2007). With this comes the responsibility of making their own food choices. A study done in Greece in 2004 looked at college students’ dietary changes when starting college for students who remained living at home and students who moved away to attend college. This study suggested that when students moved away from home, they became responsible for their food purchasing and preparing, and found that students living at college developed less healthy eating habits than the students who remained living at home (Papadaki et al., 2007).

According to Kolodinsky et al. (2007), college students have healthier eating patterns when they have more knowledge of dietary guidelines. Reading food labels does affect diet habits among college students (Deshpande et al., 2009) as students self-reported decreases in fat intake (Kristal, Hedderson, Patterson, & Neuhauser, 2001). Garcia and Mann (2003) found that self-efficacy is an influencing factor of eating healthy. Deshpande et al.’s (2009) findings revealed no significant influence of healthy eating from variables such as taste, preparation, and price.
A study done in Denmark assessed how school class and socioeconomic status (SES) of family influences health behavior of adolescents (Johansen et al., 2006). Students, teachers, and the school medical doctor completed questionnaires which were analyzed, finding that students who came from the lower SES were at higher chance of having less healthy diet habits, concluding that what had the biggest effect on diet habits was family circumstances. They also found, based on the results, that health behaviors that are harmful are protected against based on academic competence. Less parental support was linked to increased soft drink consumption, with more boys drinking soft drinks. More girls were found to skip breakfast. The study found that students had decreased chances of skipping breakfast on a daily basis when they lived with both of their biological parents (Johansen et al., 2006).

A study conducted at a university in New Zealand examined 390 medical students (Devcich, Pedersen, & Petrie, 2007). Most students were in their first year of schooling, less were in their second year, and the least amount of participants were in their third year. A questionnaire was given to them, which comprised the Modern Health Worries (MHW) Scale to evaluate how much students worry about aspects that affect their health. The questionnaire also included food-related behavior, which had students report supplements and vitamin use as well as organic food in their diets. The questionnaire then had a health rating section. This part reviewed family history for specifically heart disease, as well as how these students rated their own health. The final section of the questionnaire was preference for different types of additives. Pictures of margarine or yogurt were shown and students had to match if it helped reduce disease or risk factors of
a disease as well as improving appearance with scientific compounds or vitamins. The questionnaires were evaluated and results showed that more acceptance of functional foods was found in students who had increased modern health worries, as their organic food consumption was higher. Sixty two percent of students reported their diet containing organic food. This study’s results proposed that it was important to consider how modern health worries affect thoughts regarding food (Devcich et al., 2007).

Many studies have been conducted on college students’ intake of conventional foods and what motivated them to eat healthy (Deshpande et al., 2009). Further investigation is needed to examine college students’ knowledge and perception of specifically organic food as there is limited literature on this population in the United States.

In Finland, 3,261 student participants were recruited for a study to evaluate their feelings towards organic foods and genetically modified foods (Saher, Lindeman, & Hursti, 2006). A questionnaire evaluated their attitudes towards these topics, looking at thinking methods, education, mean consumption, their values, behavior restriction, and beliefs about health and food seen as magical. When evaluated, the questionnaires revealed important attitude findings. Values and thinking methods produced positive feelings to organic foods. There were more negative feelings towards genetically modified foods, concluding that feelings about organic foods are more interconnected with personal characteristics than feelings about genetically modified foods (Saher et al., 2006).
CHAPTER III

METHODOLOGY

This study examined the characteristics of organic food buyers among college students who attended Kent State University during the Spring 2016 semester. It also examined perception and knowledge between organic food purchasers and non-purchasers. Independent variables were buyers and non-buyers of organic food. Dependent variables included knowledge and perception.

Participants

Participants were undergraduate and graduate students enrolled full time during the Spring 2016 semester at Kent State University’s Kent campus. Due to the proximity and availability of research participants, this sample can be classified as a convenience sample. The participants were at least 18 years old; there was no cap off for age. Participants were recruited randomly by their university email. The Institutional Research Department at the university provided 8,927 student emails.

Procedure

An Institutional Review Board (IRB) application was submitted and approval was obtained February 2016. Upon approval of the study by the IRB, surveys were distributed through the university email system to 8,927 randomly chosen students. The survey was available for students for 2 weeks starting March 3, 2016. A total of three reminder emails were sent out to ensure greater chance of completion. The survey closed on March 17, 2016. According to Kent State University, there were 28,993 total
undergraduate and graduate students enrolled at the Kent campus for the Spring 2016 semester.

**Instrument**

A 52-question survey (Appendix A) was distributed randomly through university email to students. The link included a consent form, exclusion questions, and a survey with five sections. The first step to entering the survey was the consent form, provided electronically as the survey was an electronic survey, explaining that participation is voluntary and confidential and that participants can withdraw from the study at any time without penalty. Two exclusion questions followed; if participants were not at least 18 years old, they could not continue onto the survey. The second exclusion question sorted out part time students or students who were not enrolled in the Spring 2016 semester as the survey was directed towards full time current students only. The survey ended if any part-time or past students answered question one.

The first section of the questionnaire had 15 questions which examined demographic information including age, gender, ethnicity, job status, marital status, height, weight, residency, university meal plan, number of children, income, and ethnicity. The second part of the survey consisted of 11 questions. This section looked at grocery shopping patterns, whether they purchase organic, reasons why, and barriers if they do not. The survey asked participants if their family members exposed them to organic foods previously. More information was obtained regarding participants’ family if they did agree that their family purchases organic food. The next section of the survey evaluated availability of organic food in two questions, focusing on how far participants
would travel to purchase organic food and where they prefer to purchase the organic food. The following 14 questions covered perception. Buyers’ and non-buyers’ perceptions of organic food were evaluated with statements regarding organic and conventional food. The final 10 questions evaluated knowledge. This is where the survey observed how much the participants knew about organic food, definition, regulations, and identifying organic food. The correct answers for these questions are located in Appendix D. The survey ended with a question asking all participants what resources they used to learn about organic food.

**Statistical Data**

All data produced from the administered survey in Qualtrics was exported into the computer software Statistical Package for Social Sciences (SPSS) version 23. A significance of $p < 0.05$ was set. Descriptive statistics were used to present demographic data such as age, gender, ethnicity, number of children, and class ranking, as well as purchasing data. A student t-test was used to compare the modified Likert scale results for perception of organic food. Chi-square was used to analyze barriers to purchasing organic food between buyers and non-buyers. T-tests were also used to compare knowledge between the 2 groups.
CHAPTER IV

JOURNAL ARTICLE

Organic foods are grown and raised without antibiotics, added hormones, most pesticides, and genetically modified organisms (GMOs; Can GMOs be used in Organic Products, 2013; Electronic Code of Federal Regulations, 2015; Introduction to Organic Practices, 2015; Organic Agriculture, 2015). There have been misconceptions with the term organic and other terms such as whole food and natural. Only the term organic is regulated by the government. Also, the USDA has specific regulation when using the term organic or “made with organic ingredients” as well as the USDA organic symbol (Labeling Organic Products, 2012).

The organic food industry has continually been growing since the 1990s (Overview, 2015). The growth has been so strong that organic food can now be found in the majority of all conventional grocery stores and not just specialty shops (Greene et al., 2009). Stores have caught on to the organic food sales influx, which is helping availability.

There have been studies done on what motivates consumers to purchase organic food. Education, income, and health have all been motivating reasons found in research studies (Makatouni, 2002; Zepeda et al., 2006). The most consistent motivational factor continuously seen in findings has been education (Dimitri & Oberholtzer, 2009). Dettmann and Dimitri (2007) found that a higher education level increase chances of buying organic.
College students are at a higher education level and are the current and future buyers in the food industry. Knowing that education is a commonly reported motivator, this study evaluated what is the motivator to purchasing organically when the consumers are at a similar education level. There have been limited studies on college students’ purchasing organic food as well as their knowledge of organic food and how they perceive it. With this population possibly being the current and future consumers of the organic market and one day possibly becoming the major decision maker in their family, it is important to know what motivates them.

**Methodology**

The purpose of this comparative, post test only design study was to analyze college students’ knowledge and perception of organic food, specifically comparing buyers of organic food to non-buyers, as well as looking at demographic characteristics of organic food buyers such as age, ethnicity, education level, gender, if they have children, in order to find any similarities or significances among demographics and purchasing organic food. The study received approval by the Institutional Review Board at Kent State University.

**Participants**

The participants who received the emailed link to the survey were randomly chosen undergraduate and graduate students at Kent State University’s Kent campus. Participants were able to continue to the survey if they agreed to the consent form. The participants also had to be at least 18 years old and a full-time student enrolled in the Spring 2016 semester to get past the exclusion section of the survey.
**Survey**

The survey was created to describe the characteristics of organic food buyers among college students. This study was also used to examine perception and knowledge between organic food purchasers and non-purchasers. The survey (Appendix A) consisted of a consent form, two exclusion questions, and five sections of questions and statements. The first step of entering the survey was the consent form explaining that participation is voluntary and confidential and that participants can withdraw from the study at any time without penalty. Two exclusion questions followed; if participants were not at least 18 years old, they could not continue onto the survey. The second exclusion question sorted out part time students or students who were not enrolled in the Spring 2016 semester as the survey was directed towards full time current students only.

Section 1 of the survey covered demographics, and section 2 went into purchasing. Section 3 evaluated availability to organic food and section 4 focused on perception of organic food among buyers and non-buyers. The final section, 5, evaluated knowledge of organic food buyers as well as non-buyers.

Demographics obtained in Section 1 included participants’ age, gender, ethnicity, class rank, financial status, height, weight, residency, marital status, and whether they have children. These characteristics were compared among buyers and non-buyers to find any significance between the groups.

Purchasing habits were looked at in Section 2. Frequencies of grocery shopping, if participants purchased organic food and/or beverages, reasons for purchasing organic, as well as from where they purchase organic food, and also what they purchase
organically. Buyers and non-buyers were classified based on self-identification when asking if they purchase organic food. This section also covered how much participants spent on organic groceries in a month. All participants were asked if there were any barriers to purchasing organically. Family purchasing habits were also evaluated to see whether family members exposed participants to organic food. If so, participants were asked who purchased organic food and that person’s highest level of education.

Participants were asked about organic food availability in Section 3. The first question asked was from where participants preferred to purchase organic food, whether from a specialty shop or conventional store. Participants were then asked how far (in miles) they would be willing to drive to buy organic produce.

Section 4 went in depth to obtain buyers’ and non-buyers’ perceptions towards organic food. All participants were given the same perception statements regarding organic food and conventional food. These statements evaluated, by use of a modified Likert scale, whether participants perceived organic food or conventional food as healthier, nutritionally superior, more tasteful, safer, and how they perceived cost.

Section 5 covered knowledge of organic food, asking all participants nine knowledge questions or statements. Participants were tested on organic food regulations set forth by the USDA, definition of organic food, and risk of food borne illness. The final question in this section obtained information from all participants regarding from what resources they get organic food information. The correct answers were scored with one point. Incorrect or I don’t know answers were given zero points.
Procedures

The survey was electronically distributed through the university’s email system to randomly chosen students. The email had a link students could click that took them to the survey. The link was active for two weeks. Three reminder emails were sent out during the two-week course.

The initial email (Appendix B) was sent out to the 8,927 student email addresses provided by the Institutional Research department to invite them to take the survey. The email informed students that their participation was confidential and voluntary. The link to the survey was also provided in the email. Three reminder emails (Appendix C) were sent out to encourage more students to take the survey.

When students clicked the survey link, they were taken to a consent form (Appendix D) that they had to answer. The consent form gave participants an overview of the survey and informed them that their participation was strictly voluntary and confidential and that they may withdraw from the survey at any time without penalty. If participants did not agree with the consent form, the survey ended. If students selected that they agreed with the consent form, they were able to continue on to the surveys’ exclusion questions.

Data Analysis

Data obtained from Qualtrics was entered into SPSS version 23. Descriptive statistics for demographic data among buyers and non-buyers were analyzed by chi-square tests. The data were then analyzed to compare perception between buyers as well as non-buyers using t-tests. Analysis was also done on knowledge of organic food
comparing mean scores among buyers and non-buyers by using t-tests. A significance of 
\( p < 0.05 \) was set.

**Results**

A total of 8,927 students were invited to take the survey. Among 980 students 
who started the survey (10.98% of total surveys sent out), 39 students were excluded 
because of age (below 18 years old) and enrollment status (not being a full time student) 
in Spring 2016. Therefore, 941 participants were eventually included in the study.

**Demographics**

The mean age of all participants was 22 ± 6. The majority of participants 
classified themselves as White. Out of all participants, 554 (59.7%) purchased organic 
food/beverages whereas 374 students (40.3%) reported not buying organic. Those who 
answered the survey question that they do purchase organic food were classified as 
buyers whereas non-buyers were the participants who selected that they do not purchase 
organic food. Table 1 shows the breakdown of demographics of buyers and non-buyers 
of organic food.
Table 1

**General Characteristics of Organic Food Buyers and Non-Buyers in College Students (N = 928)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Buyers n (%)^d</th>
<th>Non-buyers n (%)^d</th>
<th>Total n</th>
<th>p value ^a,b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22 ± 6</td>
<td>21 ± 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>180 (61.4)</td>
<td>113 (38.6)</td>
<td>293</td>
<td>0.293</td>
</tr>
<tr>
<td>Female</td>
<td>365 (58.5)</td>
<td>259 (41.5)</td>
<td>624</td>
<td></td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>384 (56.3)</td>
<td>298 (43.7)</td>
<td>682</td>
<td>0.002</td>
</tr>
<tr>
<td>Asian</td>
<td>101 (74.8)</td>
<td>34 (25.2)</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>28 (60.9)</td>
<td>18 (39.1)</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>8 (50.0)</td>
<td>8 (50.0)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian or Other</td>
<td>1 (33.3)</td>
<td>2 (66.7)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pacific Islander</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska</td>
<td>3 (100)</td>
<td>0 (0.0)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Native</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>28 (66.7)</td>
<td>14 (33.3)</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td><strong>Do you have children?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>51 (68.9)</td>
<td>23 (31.1)</td>
<td>74</td>
<td>0.089</td>
</tr>
<tr>
<td>No</td>
<td>501 (58.8)</td>
<td>351 (41.2)</td>
<td>852</td>
<td></td>
</tr>
<tr>
<td><strong>Class rank</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Freshman</td>
<td>172 (53.3)</td>
<td>151 (46.7)</td>
<td>323</td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>84 (54.5)</td>
<td>70 (45.4)</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>54 (55.1)</td>
<td>44 (44.9)</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>79 (61.2)</td>
<td>50 (38.8)</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>Master</td>
<td>132 (73.3)</td>
<td>48 (26.7)</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td>33 (75.0)</td>
<td>11 (25.0)</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

^a p values (compared between buyers and non-buyers) based on chi-square
^b significance was set at p < 0.05
^c \( X ±SD \) = Mean ± Standard Deviation
^d percentages are broken down between buyers and non-buyers in each category

Of the organic food buyers, about two-thirds were females. It was found that there was no significant gender difference in organic food purchasing \( (p = 0.293) \). When looking at class ranking, there was a statistical significance among class ranking and
purchasing organic food \((p < 0.001)\). When breaking down the class rankings, master and doctoral students had a significantly higher rate of organic food buyers than non-buyers. Out of all participants, 74 students had children and nearly two thirds of these participants were organic food buyers. There is no statistical significance when looking as to whether participants had children and their organic food purchasing behavior \((p = 0.089)\). A statistical significance was found with race/ethnicity among buyers and non-buyers \((p < 0.001)\). The majority of participants classified themselves as White and the majority of this group were organic food buyers. The percentage breakdown of buyers versus non-buyers was highest in Asian (74.8% buyers) than any other group.

**Perception**

Table 2 highlights the comparison between buyers and non-buyers regarding perception of organic food. Perception questions were based on 5 point Likert scale where 1 denotes *strongly agree*, 2 is *agree*, 3 is *neutral*, 4 represents *disagree*, and 5 reflects *strongly disagree*. Organic food buyers perceive organic foods as healthier \((p < 0.001)\), nutritionally superior \((p < 0.001)\), and tastes better \((p < 0.001)\) than conventional food. When it came to safety, buyers agreed more that organic food is safer \((p < 0.001)\) and also safer for children than non-buyers did \((p < 0.001)\) with buyers more disagreeing than non-buyers that conventional foods are safer and safer for children \((p < 0.001)\). When asked their perception of organic food costs, non-buyers agreed more than buyers that one has to have a disposable income to afford organic food \((p = 0.031)\). Non-buyers disagreed more with the statement that organic food is affordable \((p < 0.001)\) than buyers.
Table 2

Comparison of Perception Regarding Organic Food Between Buyers and Non-Buyers Among College Students (N = 892)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Buyers x±SD c</th>
<th>Non-buyers x±SD c</th>
<th>P value a,b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic food is healthier than conventional food.</td>
<td>1.85 ± .82</td>
<td>2.38 ± .94</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>There is no difference between organic food and conventional food.</td>
<td>4.05 ± .85</td>
<td>3.59 ± .91</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organic food is nutritionally superior to conventional food.</td>
<td>2.17 ± .93</td>
<td>2.78 ± 1.03</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Conventional food is nutritionally superior to organic food.</td>
<td>3.84 ± .88</td>
<td>3.57 ± .86</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organic food tastes better than conventional food.</td>
<td>2.35 ± .89</td>
<td>3.11 ± .79</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Conventional food tastes better than organic food.</td>
<td>3.40 ± .90</td>
<td>2.87 ± .77</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>It is safer to purchase organic food.</td>
<td>2.06 ± .84</td>
<td>2.75 ± .90</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>It is safer to purchase conventional food.</td>
<td>3.60 ± .87</td>
<td>3.29 ± .71</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organic foods are safer for children.</td>
<td>2.04 ± .89</td>
<td>2.61 ± .90</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Conventional foods are safer for children.</td>
<td>3.69 ± .90</td>
<td>3.41 ± .73</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>One has to have a disposable income to afford organic food.</td>
<td>2.68 ± 1.04</td>
<td>2.48 ± .98</td>
<td>0.031</td>
</tr>
<tr>
<td>Organic food is affordable.</td>
<td>3.18 ± .97</td>
<td>3.70 ± .79</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

a p values were based on t-test
b significance was set at p < 0.05
c x±SD =Mean ± Standard Deviation
d Modified Likert scale was scored with a 1 being strongly agree, 3 being neutral, and a 5 being strongly disagree.
Knowledge

The knowledge section of the survey had nine graded questions. For every answer a participant got correct, they received one point, and every incorrect answer was given a zero. All the scores were summed and the average was obtained. The comparison of knowledge scores regarding organic food between buyers and non-buyers is shown in Table 3.

Overall, the mean score for analyzing knowledge of all participants was 2.2 ± 1.5 out of nine possible points. Mean score of buyers was 2.31 ± 1.42 while non-buyers averaged 2.22 ± 1.54. The highest amount of points one participant received was 7 out of 9, meaning no one answered all 9 knowledge questions correctly. Sixty-four percent of participants were able to identify the correct USDA organic logo. More than two-thirds of students correctly identified the USDA’s definition of organic. Twenty percent of participants were able to answer the question correctly regarding length of time an animal has to be treated organically to be sold organically, making it the most missed question as 20% of all participants got the answer correct.

The breakdown of means for each knowledge question among buyers and non-buyers separately can be seen in Table 3. Significance was found in relation to knowledge and purchasing status within 3 knowledge statements: Identify the symbol for if a food/beverage is certified correctly as 95% or more organic in the U.S. \((p = 0.02)\); Do you know what organic means \((p = 0.026)\); Land has to be treated by organic standards for 3 years before selling organic crops \((p = 0.065)\); No pesticides are permitted for use on organic crops \((p = 0.006)\).
Table 3

*Comparison of Knowledge Score of Organic Food Among Buyers and Non-Buyers In College Students (N = 928)*

<table>
<thead>
<tr>
<th>Knowledge questions</th>
<th>Buyers</th>
<th>Non-buyers</th>
<th>P value&lt;sup&gt;a,b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x±SD&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Correct</td>
<td>Incorrect</td>
</tr>
<tr>
<td>Identify who the governing body for organic food/beverages is in the United States.</td>
<td>.78 ± .42</td>
<td>311</td>
<td>90</td>
</tr>
<tr>
<td>Identify the symbol for if a food/beverage is certified correctly as 95% or more organic in the U.S.</td>
<td>.68 ± .47</td>
<td>318</td>
<td>153</td>
</tr>
<tr>
<td>Do you know what organic means?</td>
<td>.81 ± .39</td>
<td>435</td>
<td>100</td>
</tr>
<tr>
<td>Land has to be treated by organic standards for 3 years before selling organic crops.</td>
<td>.43 ± .50</td>
<td>238</td>
<td>316</td>
</tr>
<tr>
<td>The term “Organic” and “Natural” can be interchangeable on food labels.</td>
<td>.61 ± .49</td>
<td>339</td>
<td>179</td>
</tr>
<tr>
<td>To be sold organically, an animal has to be treated organically for half their life.</td>
<td>.18 ± .38</td>
<td>97</td>
<td>422</td>
</tr>
<tr>
<td>Organic foods don’t have any risk of food borne illness.</td>
<td>.65 ± .48</td>
<td>358</td>
<td>161</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 3 (continued)

Comparison of Knowledge Score of Organic Food Among Buyers and Non-Buyers In College Students (N = 928)

<table>
<thead>
<tr>
<th>Knowledge questions</th>
<th>Buyers</th>
<th></th>
<th></th>
<th>Non-buyers</th>
<th></th>
<th></th>
<th>P value(^a,b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\bar{x} \pm SD)^c</td>
<td>Correct</td>
<td>Incorrect</td>
<td>(\bar{x} \pm SD)^c</td>
<td>Correct</td>
<td>Incorrect</td>
<td></td>
</tr>
<tr>
<td>A farm can only grow conventional or organic crops.</td>
<td>.34 ± .47</td>
<td>188</td>
<td>330</td>
<td>.31 ± .46</td>
<td>116</td>
<td>236</td>
<td>0.353</td>
</tr>
<tr>
<td>No pesticides are permitted for use on organic crops.</td>
<td>.23 ± .42</td>
<td>128</td>
<td>389</td>
<td>.16 ± .37</td>
<td>59</td>
<td>292</td>
<td>0.006</td>
</tr>
<tr>
<td>Total score</td>
<td>2.31 ± 1.42</td>
<td>22.22 ± 1.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) p values based on \(t\)-tests
\(^b\) significance was set at \(p < 0.05\)
\(^c\) \(\bar{x} \pm SD\) = Mean ± Standard Deviation

Barriers for Purchasing Organic Foods

Overall, when asked about barriers (See Table 4) to purchasing organic food, cost was the major barrier selected by of all participants. The second most chosen barrier was availability to organic food (69.4% of buyers and 30.8% of non-buyers). Next, the third most selected barrier was the longevity of organic food chosen by 71.6% of buyers and 28.4% of non-buyers. Following longevity came no barrier, then transportation, organic food does not taste good or taste any different than conventional food; next came organic food is not as fresh as conventional food, and the final least chosen barrier was other. Most commonly mentioned other barriers include: no regulation by FDA, limited availability in the winter season from farmers markets and community supported
agriculture (CSA), lack of knowledge, no benefits, pesticides, bugs, no healthier than conventional.

Table 4

*Barriers to Purchasing Organic Food Between Buyers and Non-Buyers Among College Student*

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Buyers</th>
<th>Non-Buyers</th>
<th>Total participants who selected each barrier</th>
<th>P value $^a, b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too expensive</td>
<td>370 (59.8)</td>
<td>249 (40.2)</td>
<td>619</td>
<td>0.941</td>
</tr>
<tr>
<td>Availability</td>
<td>249 (69.4)</td>
<td>111 (30.8)</td>
<td>360</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Longevity</td>
<td>116 (71.6)</td>
<td>46 (28.4)</td>
<td>162</td>
<td>0.001</td>
</tr>
<tr>
<td>No barriers</td>
<td>46 (48.0)</td>
<td>53 (52.0)</td>
<td>102</td>
<td>0.011</td>
</tr>
<tr>
<td>Transportation</td>
<td>63 (68.5)</td>
<td>29 (31.5)</td>
<td>92</td>
<td>0.70</td>
</tr>
<tr>
<td>Does not taste good or any different</td>
<td>25 (29.8)</td>
<td>59 (70.2)</td>
<td>84</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Freshness</td>
<td>36 (65.5)</td>
<td>19 (34.5)</td>
<td>55</td>
<td>0.370</td>
</tr>
<tr>
<td>Other</td>
<td>6 (24.0)</td>
<td>19 (76.0)</td>
<td>25</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

$^a$ p values (compared between buyers and non-buyers) based on Chi-square

$^b$ significance was set at $p < 0.05$

$^c$ participants were able to select as many barriers that applied

When comparing the breakdown of barriers chosen by buyers and non-buyers, more buyers chose cost, availability, longevity, transportation, and freshness than non-buyers, although, more non-buyers chose no barriers, does not taste good or any different, and other.
Between two groups, there were statistical significances identified between buyers and non-buyers regarding barriers to purchasing organic food. When looking at taste as a barrier, more non-buyers cited this as a reason for not purchasing organic food ($p < 0.001$). There were statistical significances found between buyers and non-buyers for the barriers of availability ($p < 0.001$) and longevity ($p < 0.05$) as more buyers cited these as barriers while more non-buyers cited no barriers ($p < 0.05$) and other ($p < 0.001$) than buyers. There were no significances found for the barriers of freshness, transportation, and cost among buyers and non-buyers.

**Distance**

Analysis of how far participants would be willing to travel to purchase organic food is shown in Table 5. According to the data, majority of buyers and non-buyers (66.8%) are willing to drive up to 11 miles away to obtain organic food with a larger number of these students willing to drive up to five miles (35.4%).
Table 5

*Miles Willing to Travel to Purchase Organic Food Among College Student Buyers and Non-Buyers (N = 894)*

<table>
<thead>
<tr>
<th>Miles</th>
<th>Buyers (N = 526)</th>
<th>Non-buyers (N = 367)</th>
<th>Total</th>
<th>P value^{a, b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 miles</td>
<td>167 (52.8)</td>
<td>149 (47.2)</td>
<td>316 (35.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>6-11 miles</td>
<td>174 (62.1)</td>
<td>106 (37.9)</td>
<td>280 (31.4)</td>
<td></td>
</tr>
<tr>
<td>12-17 miles</td>
<td>90 (83.3)</td>
<td>18 (16.7)</td>
<td>108 (12.1)</td>
<td></td>
</tr>
<tr>
<td>18 or more miles</td>
<td>48 (88.9)</td>
<td>6 (11.1)</td>
<td>54 (6.0)</td>
<td></td>
</tr>
<tr>
<td>I don’t know</td>
<td>47 (34.8)</td>
<td>88 (65.2)</td>
<td>135 (15.1)</td>
<td></td>
</tr>
</tbody>
</table>

^{a} p values based on Chi-square  
^{b} significance was set at \( p < 0.05 \)  
^{c} percentages were totaled among buyers and non-buyers in each category  
^{d} percentages were totaled among all mileage options

**Resources Used for Organic Food Information**

Buyers and non-buyers gave insight on what available resources they use to get information about organic food. Participants were able to select as many resources that apply. Figures 3 and 4 display many options participants noted using, websites being the most frequent resource among buyers and non-buyers at 67.2%. Other commonly cited resources, after websites, among all participants include social media, friends, and then family. A common resource cited when students selected other resources was class. After websites, buyers most commonly reported using friends, family, and social media
as resources while non-buyers cited social media, TV, and friends as resources to learn about organic foods.

Figure 3. Resources college student buyers use to learn about organic food
Figure 4. Resources college student non-buyers use to learn about organic food

Reasons for Organic Food Purchasing

Figure 5 demonstrates the motivators for buyers to purchase organic food. Buyers were able to select more than one reason. The strongest reasoning was being health conscious (76%). The next commonly cited reason was nutritional quality (64%) followed by freshness (52.3%) then taste (44.2%). Taste and freshness are seen in Figure 5 as motivators for organic food purchases while they were also seen in Table 4 as barriers to purchasing organic food. The fifth commonly selected barrier chosen was limited exposure to pesticides, then limited exposure to hormones (38.4%) followed, next barrier was ethical issues (20.0%), followed by availability (18.6%), and finally 3.1% of buyers chose other.
Organic Food Purchasing Among Buyers

Organic food buyers were asked what foods they purchase organically and their responses are displayed in Table 6. Participants were able to limitlessly choose any foods in any food groups to accurately represent their organic food purchases. Also, participants were able to write in other foods that they purchase organically that they felt did not fall into a category listed.

The most common form of food purchased as organic reported by participants was fresh fruit; the second most reported category was fresh vegetables. Rice was the most reported organic starch purchased with organic bread as the second most reported.

Figure 5. Reasons college student buyers purchase organic food (N = 554)
Eggs and peanut butter were the two top protein food items and milk was reported to be the most commonly purchased dairy product. Under snacks, nutrition/granola bars were the most commonly reported category, with juice/juice drinks being the largest item selected for organic beverages. The complete list of food items frequently purchased by organic food buyers can be seen in Table 6.

Table 6

**Organic Foods Purchased by College Student Buyers (N = 554)**

<table>
<thead>
<tr>
<th>Foods</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>756</td>
</tr>
<tr>
<td>Fresh</td>
<td>457 (82.5)</td>
</tr>
<tr>
<td>Frozen</td>
<td>126 (22.7)</td>
</tr>
<tr>
<td>Dried</td>
<td>114 (20.6)</td>
</tr>
<tr>
<td>Canned</td>
<td>56 (10.1)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (0.5)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>690</td>
</tr>
<tr>
<td>Fresh</td>
<td>451 (81.4)</td>
</tr>
<tr>
<td>Frozen</td>
<td>141 (25.5)</td>
</tr>
<tr>
<td>Canned</td>
<td>71 (12.8)</td>
</tr>
<tr>
<td>Dried</td>
<td>22 (4.0)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (0.9)</td>
</tr>
<tr>
<td>Starches</td>
<td>1,409</td>
</tr>
<tr>
<td>Rice</td>
<td>247 (44.6)</td>
</tr>
<tr>
<td>Bread</td>
<td>231 (41.7)</td>
</tr>
<tr>
<td>Pasta</td>
<td>195 (35.2)</td>
</tr>
<tr>
<td>Oatmeal</td>
<td>155 (28.0)</td>
</tr>
<tr>
<td>Cereal</td>
<td>151 (27.3)</td>
</tr>
<tr>
<td>Quinoa</td>
<td>144 (30.0)</td>
</tr>
<tr>
<td>Popcorn</td>
<td>113 (20.4)</td>
</tr>
<tr>
<td>Seeds</td>
<td>72 (13.0)</td>
</tr>
<tr>
<td>Waffles/Pancakes</td>
<td>68 (12.3)</td>
</tr>
<tr>
<td>Millet</td>
<td>14 (2.5)</td>
</tr>
<tr>
<td>Bulgur</td>
<td>13 (2.3)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (1.1)</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 6 (continued)

*Organic Foods Purchased by College Student Buyers (N = 554)*

<table>
<thead>
<tr>
<th>Foods</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protein</strong></td>
<td>1,291</td>
</tr>
<tr>
<td>Egg</td>
<td>322 (58.1)</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>248 (44.8)</td>
</tr>
<tr>
<td>Poultry</td>
<td>184 (33.2)</td>
</tr>
<tr>
<td>Beef</td>
<td>134 (24.2)</td>
</tr>
<tr>
<td>Turkey</td>
<td>122 (22.0)</td>
</tr>
<tr>
<td>Fish</td>
<td>119 (21.5)</td>
</tr>
<tr>
<td>Pork</td>
<td>79 (14.3)</td>
</tr>
<tr>
<td>Tofu</td>
<td>76 (13.7)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (1.3)</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>687</td>
</tr>
<tr>
<td>Milk</td>
<td>293 (52.9)</td>
</tr>
<tr>
<td>Yogurt</td>
<td>211 (38.1)</td>
</tr>
<tr>
<td>Cheese</td>
<td>166 (30.0)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (3.1)</td>
</tr>
<tr>
<td><strong>Snacks</strong></td>
<td>992</td>
</tr>
<tr>
<td>Nutrition/granola bars</td>
<td>254 (45.8)</td>
</tr>
<tr>
<td>Chips</td>
<td>176 (31.8)</td>
</tr>
<tr>
<td>Salsa</td>
<td>122 (22.0)</td>
</tr>
<tr>
<td>Fruit snacks</td>
<td>109 (19.7)</td>
</tr>
<tr>
<td>Crackers</td>
<td>108 (19.5)</td>
</tr>
<tr>
<td>Desserts</td>
<td>100 (18.1)</td>
</tr>
<tr>
<td>Candy</td>
<td>82 (14.8)</td>
</tr>
<tr>
<td>Olives</td>
<td>34 (6.1)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (1.3)</td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td>821</td>
</tr>
<tr>
<td>Juice/ juice drinks</td>
<td>231 (41.7)</td>
</tr>
<tr>
<td>Tea</td>
<td>219 (39.5)</td>
</tr>
<tr>
<td>Coffee</td>
<td>141 (25.5)</td>
</tr>
<tr>
<td>Coconut milk</td>
<td>72 (13.0)</td>
</tr>
<tr>
<td>Sports drink</td>
<td>53 (9.6)</td>
</tr>
<tr>
<td>Wine</td>
<td>48 (8.7)</td>
</tr>
<tr>
<td>Pop</td>
<td>39 (7.0)</td>
</tr>
<tr>
<td>Other</td>
<td>18 (3.2)</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 6 (continued)

*Organic Foods Purchased by College Student Buyers (N = 554)*

<table>
<thead>
<tr>
<th>Foods</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscellaneous</td>
<td>159</td>
</tr>
<tr>
<td>Soup</td>
<td>151 (27.3)</td>
</tr>
<tr>
<td>Other</td>
<td>8 (1.4)</td>
</tr>
</tbody>
</table>

a participants were able to select as many barriers that applied

**Discussion**

The purpose of this study was to examine perception and knowledge between organic food purchasers and non-purchasers as well as describe the characteristics of organic food buyers among college students. The major results of this study supported the hypotheses that were set. The results showed that organic food buyers have more knowledge about organic food than non-buyers. The study also found that organic food buyers perceived organic food as healthier and more nutritionally superior compared to non-buyers.

**Demographics**

In the current investigation, more organic buyers (59.7% of participants) responded to the study invitation than non-buyers (40.3% of participants) did. This could be because buyers are more interested in organic foods and related issues to organic foods. The results of chi-square tests showed that there was no significance in regards to gender in relation to purchasing organic food.
More females participated in this study; and among organic food buyers, two-thirds were females. Similar breakdowns have been seen in previous studies (Sahe, Lindeman, & Hursti, 2006; Williams & Hammitt, 2000; Zepeda et al., 2006). A reason for this could possibly be due to women primarily taking on the role of the primary food shopper. Along with this study, the majority of research concluded there was no affect on organic food purchasing based on gender (Zepeda et al., 2006). The reason this current study did not show any gender affect was due to the percentage breakdown of buyers and non-buyers among males and females being very similar.

In addition, having children was not related to organic purchase in the current study. Dimitri and Oberholtzer (2009) reported that the presence of children in the house did not have consistent effect on consumers purchasing organic products. On the other hand, Makatouni (2002) studied parents of children to see why they purchase organic. It was found that parents valued the health factor of organic food as the biggest motive for purchasing organically. The findings of the current study were similar to some of the past research as the breakdown of status of children among buyers and non-buyers was not a significant difference.

However, significance was found with class rank in relation to purchasing organic food. The majority of participants in each class ranking were organic food purchasers. There were 3 times the amount of doctoral buyers than doctoral non-buyers with a similar breakdown among master students. The greater difference among buyers and non-buyers in these two class rankings agree with past research that the more education one has the better the chances are that they will purchase organic food (Dettmann & Dimitri, 2007).
According to the research, education is the consistent factor which influences the chances of consumers purchasing organic products (Dimitri & Oberholtzer, 2009).

In regards to ethnicity, this study’s results showed significance with organic food purchasing. This type of result has not been seen in past literature. Past studies either did not look into ethnicity affecting organic food purchasing or the study divided participants based on ethnicity then on whether they purchase organic or conventional food (Saher et al., 2006; Zepeda et al., 2006). Williams and Hammitt (2000) examined the race of their participants and found that 89% of organic food buyers and 87% of non-buyers identified themselves as White, although no calculated significance was presented to determine a relationship. This current study split participants into buyers and non-buyers of organic food then examined their ethnicity such as Williams and Hammitt (2000); however significance was calculated in this study. This could be the reason why significance was found between ethnicity and purchasing organic food in this study and not in past studies. When looking further into ethnicity in the current study, more Caucasians participated in the study. The highest breakdown among an ethnic group between buyers (74.8%) and non-buyers (25.2%) was Asian (American Indian or Alaskan Native had the highest percent of buyers [100%] for an ethnic group; however there were no non-buyers of the same ethnicity to compare to). The second highest breakdown included participants who chose Other for their ethnic group. Following came African Americans who had 60.9% of buyers and 39.1% of non-buyers. In Zepeda et al.’s study (2006), the minority group used was African Americans and their knowledge and attitudes towards organic food was
compared with their caucasian counterparts, whereas, Williams and Hammitt (2000) had a majority of Whites in their study.

**Perception**

Participants’ thoughts and beliefs regarding organic food were examined in this section of the survey between buyers and non-buyers. Majority of buyers (79%) and non-buyers (59%) agreed that organic food is healthier than conventional food, and a similar breakdown of respondents disagreed that there is no difference between organic food and conventional food. Past studies have found that consumers purchase organic food due to health concerns (Makatouni, 2002; Zepeda et al., 2006). These past findings support this current study’s results that organic food is perceived as being healthier.

On the other hand, two-thirds of buyers agreed with the statement that organic food is nutritionally superior to conventional food while non-buyers were split between agreeing with this statement and being neutral. Although there have been studies testing the nutritional quality of certain foods when comparing organic to conventional such as citric acid and ascorbic acid levels, polphenoloxidase and polyphenols (Carbonaro et al., 2002), no study has concluded that being organic makes the food nutritionally superior to its conventional counterpart as some studies did not find any nutritional differences in appearance and laboratory tests (Juroszek et al., 2009).

Buyers and non-buyers more often agreed that organic food is healthier than conventional food, as well as that one has to have a disposable income to afford organic food. This was the extent of their similarities among perceptions. More buyers agreed
than disagreed that it is safer to purchase organic food and organic food is safer for children, while non-buyers were more neutral in their perceptions of these statements.

In regards to cost, buyers and non-buyers had a similar view: one has to have a disposable income to afford organic food; about half of all participants agreed. This finding indicates that buyers still purchase organic food in spite of their views regarding cost, meaning that buyers’ perception of organic food being safer, healthier, and nutritionally superior than conventional drives buyers to purchase organically.

**Knowledge**

According to Zepeda et al. (2006) organic food buyers had more knowledge of organic food than their non-buyer counterparts. This current study did not have the same overall findings, however. Among buyers, 81.3% correctly identified the definition of organic food, whereas 90% of non-buyers were able to identify the correct definition, which was significant. Although, there was no difference in overall knowledge when looking at purchasing status.

The overall mean knowledge score for buyers (2.31 ± 1.42) and non-buyers (2.22 ± 1.54) were very similar meaning purchasing status does not have a significant affect on knowledge in this study’s population. Buyers scored 25.7% on the knowledge section of the survey and non-buyers scored 24.7%, reflecting that neither group even had 50% knowledge on organic food and regulation, as well as emphasizing that purchasing status has no affect on knowledge. This result was different from other researchers’ findings that showed buyers had more knowledge than non-buyers (Zepeda et al., 2006). This indicated that being a buyer of organic food, when buyers and non-buyers are at the same
education level, does not mean that you have more knowledge of the organic industry and its regulations. It showed that buyers’ perception of the benefits of organic must be greater than non-buyers’ perception. Also, non-buyers could be aware of the organic industry and have an understanding of it but decide it is not worth the cost, for example.

The most correctly answered knowledge statement among buyers and non-buyers was the definition of organic food. While the most commonly missed knowledge statement among buyers was related to how long an animal has to be treated organically to be sold as organic, more non-buyers missed the statement that no pesticides are used on organic crops. This finding reflected that although one may have a general knowledge of what organic means, they may not know what regulations are in place making something certified organic.

Zanoli and Naspetti’s study (2002) on consumer knowledge of organic food found that all consumers who were interviewed had a general organic product knowledge. However, not all participants of this current study were able to correctly identify the definition of organic food, although a majority (83.6%) of all participants chose the correct definition. When asked about pesticide use on organic crops, 24.8% of buyers and 16.8% of non-buyers were able to correctly answer the question. In regards to identifying if an item is organic, a little less than half of non-buyers were not able to select the correct organic seal, whereas about two-thirds of buyers were able to correctly identify the USDA’s organic seal. Among buyers, more of them did not know that land has to be treated by organic standards for 3 years before selling organic crops.
These results showed that although people are buyers of organic food, they may not know what organic regulations consist of. Of buyers, 76.2% did not know that organic food may contain pesticides. About one-third of buyers not being able to identify the correct organic seal reflects that those participants may think that they are purchasing organic but they could be purchasing conventional. This result suggests that it is possible that not all of the participants who stated they purchased organic food are truly buyers.

Literature has shown that higher education increases purchasing chances (Zepeda et al., 2006). Since this population is at the same education level, this could be the explanation as to why knowledge scores among buyers and non-buyers were very similar. The same can be said for perception as well. There is no significance among those with the same education level. If another study examined high school graduates to college graduates, they may be able to better analyze how education affects purchasing and compare the knowledge between both populations.

**Barriers for Purchasing Organic Food**

Cost has been sited as a barrier to purchasing organic food in many past research studies (Forman & Silverstein, 2012; Lea & Worsley, 2005). In a similar way, in this investigation, organic food being too expensive was cited as the biggest barrier to purchasing organic food among both buyers and non-buyers. College students spend a large amount of money on their tuition and some may not have extra money to spend on organic food. An interesting finding of this study showed that buyers and non-buyers perceived organic food to be healthier than conventional food yet it appeared that it is the
cost that is preventing the non-buyers from purchasing. Such as in past findings, although there is a cost barrier, people continue to purchase organically.

Availability was the second most cited barrier. In market research studies we have seen that availability of organic food has improved and can now be found in about 3 out of every 4 conventional store (Organic Market Overview, 2014). This result may indicate that all consumers may not realize what items are organic. For example, an item may not advertise being organic in wording although the packaging contains the USDA organic logo. Findings from this study have shown that half of non-buyer and one-third of buyers were not able to identify the correct organic seal, meaning that they do not know how to tell by the seal that an item is organic. They may look for the packaging to advertise in words that this product is organic. If more were aware of the USDA’s organic seal, there is a possibility that availability would not be as much a barrier as it is perceived to be.

Other barriers mentioned by all participants included longevity, no barriers, transportation, taste, freshness, and other. Studies need to be done to examine if organic food decreases its longevity due to the limited pesticide use. No barriers being cited may reflect how availability has improved. Transportation appears to go along with availability and how far one is willing to travel to purchase organic. Along with this barrier, this study’s findings regarding how some participants were not able to correctly identify an organic item based in the approved seal may reflect that organic food is closer to all consumers than they may realize. Citing taste as a barrier is a personal preference.
Freshness being a barrier plays into longevity. Studies still need to be done to truly examine any difference in these aspects among conventional and organic food.

**Distance**

In regards to traveling to purchase organic food, two-thirds of all participants were willing to travel up to 11 miles, with 35% of those willing to travel up to 5 miles. This informs us that the more available organic food is to a person, the greater the chance that they may purchase it.

**Resources Used for Organic Food Information**

The most commonly chosen resource buyers and non-buyers cited to learning about organic food was websites. There were differences in resources cited by buyers and non-buyers. After websites, buyers ranked social media, friends, family, TV, magazines, books, newsletters, government documents, and other in this order; whereas non-buyers cited social media, TV, friends, family, magazines, books, newsletters, government documents, and other. The more easily accessible resources were mentioned first in each group, although non-buyers cited TV third. The reason for this breakdown could be that websites are easily accessible when compared to books, newsletters, and government documents. Websites can be accessed while at the store if the consumer has a question. It may also be easier to call up a friend or family member to ask them a question about organic food while at the grocery store. One may hear about organic food on TV and spark their interest which may lead them to an online search to learn more or they may ask friends and family if they know anything about organic food. Government documents, which are typically the most accurate, were the second least chosen resource
among buyers and non-buyers, although more buyers cited using it. Print such as magazines, books, and newsletters are less accessible and may be harder to refer to if a question comes up which could explain why it was not cited as much as the other resources.

**Reasons for Organic Food Purchasing**

The most cited reason buyers purchase organic food was health consciousness and the second most reported reason was nutritional quality. As previously noted, cost is a barrier for organic food buyers yet they continue to buy organic food. These results show that the perceived health benefits and nutritional quality appear to outweigh the cost barrier. Past studies have suggested that people purchase organic food mainly for health and nutritional concerns (Makatouni, 2002; Zepeda et al., 2006).

**Organic Food Purchasing Among Buyers**

This section of the survey was different from past research as it went in depth about what foods are purchased organically by buyers giving insight on what foods buyers perceived important to purchase organically. Among buyers, fresh fruits are the most commonly cited food purchased organically with fresh vegetables being the second cited. Organic eggs, organic milk, and organic nutrition/ granola bars were also commonly cited items reported by buyers. Pop (soft drinks), olives, dried vegetables, millet, and bulgur were among the least cited to be purchased organically. A reason why fresh produce was most cited could be that it can be eaten raw so consumers could want the produce to be as clean and healthful as possible.
Overall

The data indicate that college students do not have much knowledge on organic food, yet a larger amount of those surveyed purchase organic food. This reflects that college students are buying into the marketing of the organic industry. The most common forms of food purchased organically were fresh fruits and vegetables. As Registered Dietitians, it is our job to better educate this population to assist them in getting good food dollar value.

Implications

Data suggest that organic food is still a growing topic among college students. They may have access to resources to learn about organic food especially being on a college campus. It takes time and an interest to study organic food and its laws and regulations to make a decision on whether one wants to be a buyer or non-buyer. Non-buyers could possibly be buyers of organic food but do not perceive themselves as buyers since they do not purchase organic food often. Data also suggest that buyers and non-buyers perceive organic food as being nutritionally superior which may be something to consider by the university whether adding organic food into dining options would be worth the cost as all participants agreed that the added cost of organic is a barrier.

Limitations

Although the survey was randomly distributed among university students, a limitation to consider is that students, especially non-buyers, who took the survey may be more interested in the topic, which could have skewed the results of this study. Another
limitation was that we were unable to analyze the percent of participants who bought food in each food category due to the way the question was set up. Also, when looking at foods purchased organically, it may have been helpful to have participants tell us how often they purchased the organic food item, such as if they buy organic fresh fruit every time they grocery shop or only every other time. Participants self-identified as buyers or non-buyers when answering a survey question asking if they purchase organic food. Non-buyers could possibly be buyers of organic food but do not perceive themselves as buyers since they do not purchase organic food often. This could have skewed the knowledge score and played an affect into finding no significance in knowledge score between both groups.

**Conclusion**

Organic food continues to be a growing industry. Buyers and non-buyers perceive organic food as healthier than conventional. They also perceive organic food to not be affordable and report cost as a barrier to purchasing it. Buyers still continue to purchase organic food after all. With health conscious as the most reported reason for purchasing organic food, buyers must perceive the health benefits of organic food as worth the extra cost. Knowledge regarding organic food is an area of improvement as previously discussed based on the knowledge score analyzed from the survey data. Additionally, future studies are needed to further focus on college students and organic food as data is limited and as the industry continues to rapidly grow and this population is the current and future buyers.
APPENDIX A

ORGANIC FOOD SURVEY
Appendix A

Organic Food Survey

Demographics
1. Are you currently enrolled as a full-time undergraduate (12 or more credit hours) or graduate student (9 or more credit hours)?
   a. Yes
   b. No
2. Please indicate your age. ____________ years old
3. What class standing do you fall under based on credits?
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Masters
   f. Doctoral
4. Which gender do you identify with?
   a. Female
   b. Male
   c. Other (Please Specify) ____________
5. Please indicate your ethnicity.
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Hispanic
   e. Native Hawaiian or Other Pacific Islander
   f. White
   g. Other (Please Specify) ____________
6. Do you have a job?
   a. I work full-time (36 or more hours a week) (redirect to question 7)
   b. I work part-time (Less than 36 hours a week) (redirect to question 7)
   c. I do not have a job (redirect to question 8).
7. What is your annual income? Ex: $7,000 $_______________
8. Financially, are you dependent or self supported?
   a. Dependent
   b. Self supported
9. Please enter how much you weigh in pounds. ________________ pounds
10. Please enter how tall you are. Example: 5’4.” _____ feet _____ inches
11. What is your residency?
   a. On campus
   b. Off campus alone
   c. Off campus with family
   d. Off campus with roommates
12. Are you on a university meal plan?
   a. Yes
   b. No
13. Do you have children?
   a. Yes (redirect to 14)
   b. No (redirect to 15)
14. How many children do you have? ____________ children
15. Please indicate your marital status.
   a. Single
   b. Married
   c. Widowed
   d. Divorced
Purchasing

16. How often do you go to the grocery store?
   a. Once a week
   b. More than once a week
   c. Biweekly
   d. Monthly
   e. Other (Please Specify) ________________

17. Do you purchase organic foods and/or beverages?
   a. Yes (redirect to 18)
   b. No (redirect to 22)

18. What reason(s) do you purchase organic foods/beverages? Select all that apply.
   a. Health conscious
   b. To limit exposure to hormones
   c. To limit exposure to pesticides
   d. Nutritional Quality
   e. Availability
   f. Taste
   g. Freshness
   h. Ethical issues
   i. Other (Please Specify) ________________

19. From where do you purchase organic food? Select all that apply.
   a. Organic store, health store, natural food store (i.e., Whole Foods, Earth Fare)
   b. Conventional grocery store (i.e., IGA, Buehler’s, Walmart)
   c. Online
   d. Farmers Market
   e. Farm or Community Supported Agriculture (CSA)
   f. Other (Please Specify) ________________
20. What foods/beverages do you purchase organic? Select all that apply.

a. Fruit
   a. Fresh Fruit
   b. Canned Fruit
   c. Dried Fruit
   d. Frozen Fruit
   e. Other (Please Specify) ______________________

b. Vegetables
   a. Fresh Vegetables
   b. Canned Vegetables
   c. Dried Vegetables
   d. Frozen Vegetables
   e. Other (Please Specify) ______________________

c. Starches
   a. Rice
   b. Bread
   c. Cereal
   d. Oatmeal
   e. Waffles, Pancakes
   f. Pasta
   g. Quinoa
   h. Bulgar
   i. Millet
   j. Seeds
   k. Popcorn
   l. Other (Please Specify) ______________________

d. Protein
   a. Peanut butter
   b. Egg
c. Poultry

d. Turkey

e. Pork

f. Beef

g. Tofu

h. Fish

i. Dairy
  a. Milk
  b. Cheese
  c. Yogurt

j. Other (Please Specify) ________________

e. Snacks
  a. Candy
  b. Crackers
  c. Nutrition bars/granola bars
  d. Desserts (ex: Ice cream)
  e. Fruit snacks
  f. Salsa
  g. Olives
  h. Chips
  i. Other (Please Specify) ________________

f. Beverages
  a. Tea
  b. Pop
  c. Juice/Juice drinks
  d. Coffee
  e. Coconut milk
  f. Sport drinks
  g. Wine
21. How much money do you spend on organic food/beverages per month?
   a. Less than $50
   b. $50-$100
   c. $101-$150
   d. $151-$200
   e. $201-$250
   f. $251-$300
   g. Over $301

22. Are there any barriers to purchasing organic foods/beverages?
   a. Too expensive
   b. Availability of organic food to you
   c. Transportation
   d. Does not taste good or taste any different
   e. Longevity (how long the item lasts before it rots)
   f. Freshness (is not as fresh as conventional foods)
   g. No barriers
   h. Other (Please Specify) ________________

23. Does your family purchase organic foods/beverages?
   a. Yes (redirect to question 24)
   b. No (redirect to question 29)
   c. I don’t know (redirect to question 27)

24. What is your family’s total household income? Please go on to the next question if unknown. Ex: $65,000 $________________
25. Who purchases organic food in your family?
   a. Mother
   b. Father
   c. Sister
   d. Brother
   e. Grandma
   f. Grandpa
   g. Spouse
   h. Domestic partner
   i. Self
   j. Other (Please Specify) ________________

26. What is the highest education level completed of the person in your family who purchases organic foods/beverages?
   a. Less than high school
   b. High school
   c. Associates degree
   d. Undergraduate degree
   e. Masters degree
   f. PhD degree
   g. I don’t know

**Availability**

27. Are you willing to drive to a specialty shop for organic food or do you prefer to purchase organic food at a conventional store?
   a. Specialty shop
   b. Conventional store
   c. I don’t know

28. How far are you willing to travel to purchase organic food?
   a. 1-5 miles
   b. 6-11 miles
c. 12-17 miles

d. 18 or more miles

e. I don’t know

**Perception**

29. Organic food is healthier than conventional food.

a. Strongly agree

b. Agree

c. Neutral

d. Disagree

e. Strongly disagree

30. There is no difference in organic food and conventional food.

a. Strongly agree

b. Agree

c. Neutral

d. Disagree

e. Strongly disagree

31. Organic food is nutritionally superior to conventional food.

a. Strongly agree

b. Agree

c. Neutral

d. Disagree

e. Strongly disagree

32. Conventional food is nutritionally superior to organic food.

a. Strongly agree

b. Agree

c. Neutral

d. Disagree

e. Strongly disagree
33. Organic food tastes better than conventional food.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

34. Conventional food tastes better than organic food.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

35. It is safer to purchase organic food.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

36. It is safer to purchase conventional food.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

37. Organic foods are safer for children.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
38. Conventional foods are safer for children.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

39. One has to have a disposable income to afford organic food.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

40. Organic food is affordable.
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

Knowledge

41. Identify who the governing body for organic food/beverages is in The United States.
   a. United States Department of Agriculture
   b. United States Department of Organic Agriculture
   c. Congress
   d. I don’t know
42. Identify the symbol for if a food/beverage is certified correctly as 95% or more organic in the U.S.

a.  

b.  

c.  

d. I don’t know

43. Do you know what organic means? Check the best answer.

a. A food/beverage is free from most pesticides, antibiotics, added hormones, and GMOs  
b. A food/beverage is whole  
c. A food/beverage is natural  
d. A food/beverage is real food, natural, and whole  
e. I don’t know

44. Land has to be treated by organic standards for 3 years before selling organic crops.

a. Yes  
b. No  
c. I don’t know

45. The term “Organic” and “Natural” can be interchangeable on food labels.

a. Yes  
b. No  
c. I don’t know
46. To be sold organically, an animal has to be treated organically for half of their life.
   a. Yes
   b. No
   c. I don’t know

47. Organic foods don’t have any risk of food borne illness.
   a. Yes
   b. No
   c. I don’t know

48. A farm can only grow conventional or organic crops.
   a. Yes
   b. No
   c. I don’t know

49. No pesticides are permitted for use on organic crops.
   a. Yes
   b. No
   c. I don’t know

50. What resources do you use to get information about organic food? Select all that apply.
   a. Websites
   b. Books
   c. Newsletters
   d. Magazines
   e. T.V.
   f. Family
   g. Friends
   h. Government documents
   i. Social media
   j. Other (Please Specify) ________________
APPENDIX B

INITIAL E-MAIL
Appendix B

Initial E-Mail

Dear Student,
You have received this email as you have been randomly chosen to participate in a brief survey regarding organic food. Congratulations! We would greatly appreciate if you would take some time and complete this survey. Participation is completely voluntary and confidential. No personal identifiable information will be obtained with your responses. Your responses will be very helpful for understanding knowledge and perception of the organic food industry. Your time and cooperation are greatly appreciated.
You may click on the link below or copy it into the web address bar.
(LinkId)

Thank you for your time and cooperation.

Kindly,
Sereen Zawahri Krasuna RD, LD
APPENDIX C

FOLLOW UP E-MAIL
Dear Student,
This follow-up email is being sent to you as a reminder to take a brief survey regarding organic food. It will be very helpful to our research if you are able to take the survey. With the deadline approaching for the survey, we do not want to miss out on getting your input on this increasing popular topic. Please click on this link to be taken to the survey or copy it into the web address bar. (Link)

Remember, all of your information is confidential. We apologize if you are getting this email and have already taken the survey.

Thank you for your time and cooperation.

Kindly,
Sereen Zawahri Krasuna RD, LD
Appendix D

Key for Knowledge Test

The following is the knowledge section from the survey. The bolded responses are the correct responses.

Knowledge

41. Identify who the governing body for organic food/beverages is in The United States.
   a. United States Department of Agriculture
   b. United States Department of Organic Agriculture
   c. Congress
   d. I don’t know

42. Identify the symbol for if a food/beverage is certified correctly as 95% or more organic in the U.S.
   a. [Image of USDA Organic symbol]
   b. [Image of 100% Organic symbol]
   c. [Image of Certified Organic symbol]
   d. I don’t know

43. Do you know what organic means? Check the best answer.
   a. A food/beverage is free from most pesticides, antibiotics, added hormones, and GMOs
   b. A food/beverage is whole
   c. A food/beverage is natural
   d. A food/beverage is real food, natural, and whole
44. Land has to be treated by organic standards for 3 years before selling organic crops.
   a. Yes
   b. No
   c. I don’t know

45. The term “Organic” and “Natural” can be interchangeable on food labels.
   a. Yes
   b. No
   c. I don’t know

46. To be sold organically, an animal has to be treated organically for half of their life.
   a. Yes
   b. No
   c. I don’t know

47. Organic foods don’t have any risk of food borne illness.
   a. Yes
   b. No
   c. I don’t know

48. A farm can only grow conventional or organic crops.
   a. Yes
   b. No
   c. I don’t know

49. No pesticides are permitted for use on organic crops.
   a. Yes
   b. No
   c. I don’t know
APPENDIX E

CONSENT FORM
Appendix E

Consent Form

Knowledge and Perception of Organic Food

Welcome to "Knowledge and Perception of Organic Food," a web-based survey that examines college students’ perception and knowledge of organic food. Before taking part in this study, please read the consent form below and click on the "I Agree" button at the bottom of the page if you understand the statements and freely consent to participate in the study.

Consent Form

This study involves a web-based survey designed to understand perception and knowledge of college students regarding organic food. The study is being conducted by Dr. Eun-jeong (Angie) Ha of Kent State University, and it has been approved by the Kent State University Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life).

Participation in the study typically takes less than 10 minutes and is strictly anonymous. Participants begin by answering a series of questions about their demographics, after which they answer more questions regarding purchasing habits. The survey will then ask questions regarding availability and willingness to travel. Perception of organic food will cover the next set of questions. The final set of questions will evaluate knowledge.

All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a "secure" https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorized third parties (e.g., computer hackers).

Many individuals find participation in this study enjoyable, and no adverse reactions have been reported thus far. There will be no credit or monetary compensation for taking the survey. Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

If participants have further questions about this study or their rights, or if they wish to lodge a complaint or concern, they may contact the principal investigator, Dr. Eun-Jeong (Angie) Ha, at (330) 672-2701; or the Kent State University Institutional Review Board, at (330) 672-2704.

If you are 18 years of age or older, understand the statements above, and freely consent to participate in the study, click on the "I Agree" button to begin the experiment.

I Agree  I Do Not Agree
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