

**EXAMINING STUDENTS' KNOWLEDGE AND ATTITUDES OF ORGANICALLY
AND CONVENTIONALLY GROWN PRODUCE**

by

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THESIS ABSTRACT

EXAMINING STUDENTS' KNOWLEDGE AND ATTITUDES OF ORGANICALLY AND
CONVENTIONALLY GROWN PRODUCE

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The purpose of this study was to determine what the average Auburn University student's knowledge and attitude was towards USDA organic and conventionally grown produce and if there was a difference between Auburn students enrolled in a horticulture course (Food for Thought) which examines the history of food plants, their production systems, and their impact on society and those not enrolled in the course. This study also aimed to determine if there was a relationship between knowledge and attitude of USDA organic and conventional production and buying habits. The population produced significant scores in relation to their organic and conventional attitudes with $p = .000$ for both tests to reveal that the population had moderately positive attitudes toward both organic and conventional production. This study also revealed a significant difference between male and female knowledge scores and attitudes relative to organically grown produce with $p = .014$ which revealed that females have higher knowledge

scores of these two different production methods and have more favorable attitudes toward organic production than males.

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CHAPTER I

INTRODUCTION

With the continued urbanization of our society, students are less informed about the agriculture industry, specifically how their food is produced. Because of a limited knowledge, students have poor perceptions of different methods of food production. A study conducted in 1995 by Frick et al. revealed that with continued urbanization, high school students knew less about the Agriculture industry than in previous years. This study was undertaken to assess current college students' knowledge and attitudes of the industry at a land grant university to assess whether student knowledge would be appreciable in regard to agriculture, in particular, with regard to USDA organic and conventional production.

A visit to most any grocery or health food store will yield numerous products labeled with terms like "Natural," "Organic," or "Locally Grown." These labels can be used because there is no regulation as to what constitutes "Natural" or "Locally Grown." Even "Organic" can be problematic because there can be discrepancies between United States Department of Agriculture (USDA) "organic" and non-certified "organic" products. In order to be USDA Organic, one must go through a certification process through the USDA. This involves applying, paying certification fees, review by a certifying agent who subsequently approves denies the application. The USDA standards for organic certification state that the operation must, "demonstrate that they are protecting natural resources, conserving biodiversity, and using only approved substances" (USDA, 2019). For further information on what those substances are or how to protect natural resources or conserve biodiversity one must read and adhere to the USDA's organic regulations handbook. To be non-certified organic there is no ruling agency or

board to ensure that someone adheres to these standards but there are also no fees to pay which is why many smaller operations choose to be non-certified organic.

Today with many students growing up in more urban settings versus rural settings, there is less exposure to agriculture terminology or its proper usage. With the lack of regulation of how these labels can be used it is no surprise that high school students twenty years ago knew little about agriculture, let alone adults today with so many resources at their fingertips.

This study sought to evaluate if students currently understand organic and conventional food production and in turn how that affects their attitudes towards purchasing these products.

Research Questions

1. What is the average Auburn University student's knowledge of the production of organically and conventionally grown food versus the knowledge of a student in a horticulture class?
2. What is the average Auburn University student's attitude about the production of organically and conventionally grown food versus the attitudes of an average Auburn University student currently enrolled in a horticulture class as an indication of interest in horticulture?
3. Is there a relationship between Auburn University students' knowledge and attitude of organic and conventional production methods?
4. Is there a relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce?

Hypotheses

The first hypothesis of this research is that participants in a "Food for Thought" horticulture class will have greater knowledge of organic and conventional food production than general Auburn students due to the subject matter covered in the class by the instructors.

The second hypothesis is that participants in the “Food for Thought” class will have more favorable attitudes towards organic food production than Auburn students because of knowledge gained from the course material.

The third hypothesis of this study is that there will be a relationship between knowledge and attitude for participants in the “Food for Thought” class and for the general Auburn University student.

The fourth final hypothesis is that there will be a relationship between Auburn University students’ attitude and preferences of buying USDA organic and conventionally grown produce.

Basic Assumptions

It was assumed that all respondents answered the survey honestly and to the best of their understanding and knowledge. It was assumed that the survey was presented to the students impartially.

Limitations

Sampling was not entirely random because two intact groups were surveyed, Resident Assistants (RAs) and students enrolled in “Food for Thought” (HORT 2050/2053). RAs were thought to be representative of Auburn’s non-agricultural student population because there are many different majors and student classification (a requirement of an RA at Auburn is classification as a sophomore or higher) represented in this group. Students enrolled in the “Food for Thought” class were expected to have a greater awareness of this subject matter because some course material covers this topic. It is also possible that students interested in this course had an interest in the course because of predisposed knowledge and background, therefore they may have some bias. For that matter, because Auburn University is a land grant university it is possible that many Auburn students have a bias towards organic or conventionally grown

produce. The study was also limited to students who voluntarily participated by completing the survey.

CHAPTER II

LITERATURE REVIEW

There has been much speculation as to why people purchase USDA organic versus conventional production and what their knowledge or attitude is toward these two different production methods. The following literature will examine individual's reasons for buying organic versus conventional produce, consumer understanding of organic production, the forming of consumer's attitudes toward organic or conventional produce and examining consumer's ethical values in relation to the production of the food they purchase.

Organic production of food crops has increased in the United States by 13% as of 2016 according to the USDA Agricultural Marketing Service (USDA-AMS) (2017). According to the AMS, "the organic industry continues to grow domestically and globally, with 24,650 certified organic operations in the United States, and 37,032 around the world" (2017). To be USDA organic certified it is necessary to follow a series of steps required to gain the certification of "USDA Organic" as opposed to more traditional, conventional production in which there is no label certifying the product as "Conventionally Grown." The USDA defines conventional farming as "the use of seeds that have been genetically altered using a variety of traditional breeding method, excluding biotechnology, and are not certified as organic" (2015). The USDA Coexistence Fact Sheet states that "market demands on U.S.-grown crops are increasing, and it will take products from the organic, conventional and biotechnology sectors to meet those demands" (2015). As the industry for organic production has grown do consumers' have a better understanding of what they are purchasing?

Researchers Conner & Christy conducted a study in 2004 to gauge consumer's reasons for buying organic products; their willingness to pay for organic products; and their understanding of the definition of organic, specifically, what should and should not be included in the definition. The researchers found that when consumers were asked the difference between organic and free of genetically modified organisms only 53% of the participants understood that GMO-free is organic. This study supports a lack of knowledge concerning consumers who buy organic products. When participants were asked why they buy organic products many cited health reasons. Participants also cited reasons such as supporting sustainable agriculture and supporting local farmers. The problem with these reasons is that the organic label does not ensure that the product was grown sustainably or that it necessarily supports local farmers. Because there is a lack of knowledge about food production, many consumers do not realize that for a product to be sustainable, it must intersect three different spheres of sustainability: it must be socially, financially, and environmentally sustainable. This does not account for the carbon footprint (the amount of carbon emitted due to fossil fuel consumption) (Berners-Lee & Clark, 2010) organic products can exert if they were grown across the country and then shipped to where they are being purchased. If something that has been conventionally produced is bought locally, then it may be more sustainable for the environment. Buying fresh products from a retail supermarket is not typically going to support local farmers. Consumers can buy products directly from the farmer to ensure that it will support the local economy.

A meta-analysis conducted by Gomiero et al. (2011) compared the different cultural practices of conventional and organic farming. The study specifically examined and compared soil erosion and compaction, soil chemical properties, and nitrogen leaching from past research done on over 10 studies performed in different states and countries. The study concluded "that in

most cases organic farming systems perform better environmentally than conventional or integrated farming systems, (but that) does not directly imply that they are sustainable when compared to the intrinsic carrying capacity and resilience of a given ecosystem.” In other words, organic production may not be sustainable for the surrounding environment or ecosystem.

Hughner et al. (2007) found in their meta-analysis of 52 studies that consumers do not have a basic understanding of what ‘organic’ means and the definition is not universal. “If consumers cannot distinguish organic from conventional food on reasonable criteria, it is not surprising that they do not purchase organics at greater rates” (Hughner et al., 2007). Another meta-analysis conducted by Shafie & Rennie (2012) examined 45 studies evaluating consumers’ diverse attitudes towards organic foods and found that “consumer perceptions about organic are highly subjective”. Without a basic universal understanding of what organic production means, it is no wonder that consumers’ perceptions of organically and conventionally grown food are highly subjective. Because there is not a basic understanding, consumers only have their past personal experiences to rely on to determine which products to buy.

Conner & Christy (2004) concluded from their previously mentioned study that the industry needs to change the organic label. They suggested putting production methods on the label or a toll-free number that consumers can call and have their questions answered. With the advancements in technology today, producers could put QR codes on the labels so that consumers could read how the item was produced, where it was produced, and benefits and drawbacks from both organic and conventional so that they may make more informed buying decisions. The sentiment to change the way that consumers are educated is echoed by others. Hughner et al. (2007) concluded that we need to develop “appropriate educational materials” (2007). Appropriate educational materials will look very different today than 12 years ago.

Based off the findings of Conner and Christy (2004) and Hughner et al. (2007) various industries may need to rethink how they target their audiences. The generation entering college in 2019 identified as Generation Z, “those loosely born from 1995-2010” (Francis & Hoefel, 2018). A study conducted by Hidvegi and Kelemen-Erdos (2016) to assess the online purchasing habits of Generation Z found that 82.1% of participants responded that the internet was their primary source of information. This study suggested that the nature of marketing products has greatly changed and how people decide to make a purchase has changed. Two studies conducted by Dettmann and Dimitri (2009) & Dimitri and Dettmann (2012) found that consumers’ education level has “a strong effect on the likelihood of buying organic products.” Consumers who want to buy these products want to know how they are produced. Producers need to rethink their marketing strategies in order to inform consumers and educate them on different production methods and the pros and cons of those methods.

Stolz et al. (2011) determined that consumer’s form their attitudes over long periods of time, therefore short-term advertising is not sufficient to change attitudes. They suggested more extensive education and developing different communication strategies. This statement was made in regard to organic food production but the same could be said for conventional production, as well. Many consumers hear buzz words such as “Sustainable,” “Locally Grown,” and “Non-GMO” but very few consumers actually understand what those words mean and their implications. This study echoes the findings of Conner and Christy (2004) and Hughner et al. (2007) that the current advertising methods are not clearly informing consumers.

A study conducted at a university in the Southeast sampled an introductory mandatory political science class (Dahm et al., 2009). The sample group of students were asked questions to ascertain their knowledge of organic foods, their attitudes towards organic foods, and their eating

habits. The study found a positive relationship between knowledge of the term organic and attitude regarding organic foods. Students who had positive attitudes towards organics tended to practice other eco-friendly behaviors. If they felt positively about organics they were more likely to purchase organics (Dahm et al., 2009).

A study was conducted on a sample of Italian consumers of organic food. The consumers were randomly approached in the supermarket and asked to fill out a survey asking about their buying frequency, attitude, self-identity, and food safety (Pino et al., 2012). Results showed that regular consumers of organics were aware of moral and ethical considerations concerning the food they consume and were willing to buy in a way that reflects their own values. For regular consumers, the linkage between ethical self-identity and the intention to buy organic food is mediated only in part by the attitude toward such products. This indicates that these consumers' ethical commitment results in a favorable disposition toward organic food products, but also affects their intention to buy these products. A study conducted by Yazdanpanah & Forouzani (2015) in Iran asked similar questions of its participants. The main purpose of this study was to test the Theory of Planned Behavior- whether or not beliefs and actions align with each other. This study revealed that attitude is a strong predictor of intention in buying organic food. This study also found that participants experienced internal satisfaction because they felt purchasing organic foods was the morally right thing to do.

In the meta-analysis conducted by Shafie & Rennie (2012) they concluded that consumer perceptions may not reflect their actual behavior in purchasing. In a self-administered study conducted in Belgium on higher education students, participants were asked questions pertaining to the consumer's attitude towards purchasing organic food, social norms, perceived consumer effectiveness, and perceived availability (Vermeir & Verbeke 2007). The study found

that consumers' behavioral intention in the marketplace is apparently not consistent with their reported attitude towards products with an ethical dimension. A study performed in Scotland asked participants about their health consciousness, ethical self-identity (a consumer who buys products that are environmentally friendly), food safety concern, and attitude and intention (Michaelidou & Hassan, 2008). The study found food safety concern to be one of the most important predictors of attitude, but not intention. This indicated that respondents' favorable attitude towards organic produce is critically formed from their concern over the safety of foods, particularly over residues in food from fertilizers, artificial additives, preservatives and chemical sprays. However, food safety concern did not directly make an impact on consumers' intention to purchase organic produce over and above the influence of attitude.

Briggerman & Lusk conducted two studies that were relevant to this research. The first study conducted in 2009 sent surveys out to 2,000 households (Lusk & Briggerman, 2009). The study asked questions regarding the participant's food values and found that food safety was the number one food value preferred with nutrition, taste, and price behind it. The second study was conducted in 2011 and asked the participants to complete a set of decision tasks aimed to determine preferences for producers in the food supply chain (Briggerman & Lusk, 2011). Participants were told to answer according to their own preferences, not what they thought was socially acceptable. Participants preferred buying from small scale farms rather than large scale farms with the assumption that buying at a small-scale operation meant buying local. "The challenge going forward for organic retailers is maintaining that buying organic supports small, family farms. With the demand for organic products, organic agriculture looks increasingly more like conventional agriculture" (Briggerman & Lusk, 2011).

Some current research has suggested that attitude and perception predict buying habits. Other research has shown that while these factors are important, they are not the driving force in determining food purchases. The research has also shown that there is a disparity in knowledge among consumers. Consumers not only lack knowledge, but also have misconceptions about organic and conventional farming and what each entail. Because of these findings, this study was implemented to evaluate what the average Auburn University student's knowledge and attitude is of organically and conventionally grown produce.

CHAPTER III

METHODOLOGY

This study was designed to evaluate students' knowledge and attitudes towards USDA organic and conventionally grown produce. Survey creation and administration will be discussed, as well as sample group composition. Auburn University Institutional Review Board approval was granted before the project began in the fall of 2018.

Objectives

The purpose of this study was to determine what the average Auburn University student's knowledge and attitude was towards USDA organic and conventionally grown produce and if there was a difference in those students when compared to students enrolled in a "Food for Thought" horticulture class. This study also aimed to determine if there was a relationship between knowledge and attitude of USDA organic and conventional production and buying habits.

Population

The study's population is Auburn University students ranging from ages 19-23. Because the study took place in Alabama, students that were below age 19 could not participate without parental consent. This study surveyed both males and females. The population varied in environment of upbringing, ethnicity, and college majors.

Sample

The sample groups for this study were the "Food for Thought" class (HORT 2050/2053) which was comprised of one seated and one online section and Auburn University Housing's Resident Assistants (RAs). The RAs were thought to be representative of the general Auburn student because they have various majors across campus, are comprised of different ages, class

standings, and environmental upbringings, such as urban, suburban, and rural areas. This survey was originally sent to the “Organic Gardening” class (HORT 2040) but due to insufficient data the “Food for Thought” class was surveyed instead.

Data Collection

An email containing a script was sent to the instructors of the “Food for Thought” classes and the supervisor of the RAs explaining the study and the survey. The instructors and supervisor were asked to sign a form agreeing to send the survey out to their students and employees to ensure no contact between the administrator and participants (Appendix A). The students in the “Food for Thought” classes and the group of RAs’ received an email from their instructors or employer containing a script explaining the study and survey and were asked to participate in this self-report survey (Appendix B). The email also contained a link to the survey that could be completed using Qualtrics. Students were assured that the survey would have no impact on their grade or employment but that it would be used to measure student’s knowledge of organic and conventional food production. The survey did not collect the participant’s name, but it did collect their age, class standing, gender, and their scaled response to the statement “I grew up in an urban area” (Appendix E).

Survey Instrument

The survey instrument for this study was designed by the researcher and faculty advisors in order to evaluate what students’ knowledge and attitude were toward USDA organic and conventionally grown produce. The survey consisted of statements that participants would rate such as, “USDA organic is more healthful than conventional production,” “Conventional production is necessary to feed the population,” “USDA organic food produce tastes better than conventionally grown produce.” The Likert scale options consisted of a range from 1-5. With 5

being “Strongly Disagree,” 4 as “Disagree,” 3 as “Neutral,” 2 as “Agree,” and 1 as “Strongly Agree” (Appendix D). By using Qualtrics, the survey first collected demographic information by asking six questions to determine class standing, age, gender, enrollment in “Food for Thought” or employment with Auburn housing and the type of environment in which they were raised. The following twenty-eight statements concerned knowledge, attitude, preferences, and behaviors of USDA organic and conventionally grown produce. After participants agreed by clicking the arrow on the right corner of the survey that they were 19 years or older and volunteered to participate, the survey displayed three questions at a time for participants to answer.

Table 1. The Knowledge and Attitude of Organic & Conventionally Grown Produce Survey

Scale	Item #	Statement
Organic Attitude	3	USDA Organic produce is more healthful than conventional produce.
	4	USDA Organic food production is sustainable.
	7	USDA Organic food production is more natural than conventional production.
	8	Food should only be produced using USDA organic standards.
	10	USDA Organic food produce taste better than conventionally grown produce.
	11	USDA Organic food production is less harmful to the environment than conventional food production.
Conventional Attitude	5	Conventional production is sustainable.
	9	Conventional production is necessary to feed the world population.
	16	Fresh produce should only be produced using conventional farming methods.
Organic Knowledge	6	USDA Organic farmers use pesticides.
	12	I understand what USDA Organic production is and what it entails.
Conventional Knowledge	13	I understand what conventional production is and what it entails.
General Knowledge	17	It is practical to produce food using both USDA Organic and conventional methods.
Organic Behavior	14	I tend to buy more USDA Organic fresh produce than conventionally-produced fresh produce.
	28	I buy only USDA Organic food products.
Conventional Behavior	15	I tend to buy more conventionally-produced food products than USDA Organic food.
General Behavior	29	I buy a mixture of conventional and USDA Organic produce.
	30	When purchasing fresh produce, I buy whatever looks best regardless of how it was produced.
Preferences	18	I like having options between purchasing USDA Organic and conventional fresh produce.
	20	If money was not an obstacle, I would buy a mixture of conventional and USDA Organic fresh produce.
	21	If money was not an obstacle I would buy whatever produce looked best, regardless of how it was produced.
Organic Preferences	19	If money was not an obstacle, I would only buy USDA Organic fresh produce.
Organic Attitude	3	USDA Organic produce is more healthful than conventional produce.
Demographics	24	Please select your class standing below.
	25	Please write your age below.
	26	Select your gender.

Data Analysis

After participants had completed the survey the data was uploaded into SPSS 26 directly from Qualtrics. The data was then reverse coded in order for responses of a high score to correlate a high level of agreement and responses of a low score to correlate a low level of agreement. The survey results were analyzed using SPSS 26. The SPSS procedures “One Sample T-test,” “Independent Samples T-test,” “One-way ANOVA,” Bivariate Correlation,” were conducted to determine participants’ organic and conventional attitudes, overall knowledge, buying preferences.

CHAPTER IV

FINDINGS AND DISCUSSION

This chapter contains data results in regard to the knowledge and attitude of organic and conventionally grown produce survey. The objective of this study was to determine what the average Auburn University student's knowledge and attitude was towards USDA organic and conventionally grown produce and if there was a difference in those students when compared to students enrolled in a "Food for Thought" horticulture class. This study also aimed to determine if there was a relationship between knowledge and attitude of USDA organic and conventional production and buying habits.

A total of 143 participants were sent the survey, 68 students in the "Food for Thought" class and 77 RAs. There was a response rate of 56% with a total of 80 participants.

Students were asked to self-select into each of these groups in tables 2-4. There was a total of 46 participants from Auburn University Housing and a total of 34 participants from the "Food for Thought" class. The following table illustrates the gender breakdown between the two groups:

Table 2. Sample demographics: Gender of participants.

Group	Gender	N	Percent of Sub-Sample	Percent of Total Sample
Auburn University Housing	Male	11	23.9	13.6
	Female	35	76.1	43.2
Food for Thought	Male	15	44.1	18.5
	Female	19	55.9	23.4

The majority of respondents were females who worked for Auburn University Housing, accounting for 43% of the total sample.

Participants were also asked their class standing. The majority of respondents from Auburn University Housing were junior accounting for 25.9% of the total sample. In “food for Thought” the majority of respondents were seniors accounting for 29.6% of the total sample.

Table 3. Sample demographics: Class standing of participants

Group	Class	N	Percent of Sub-Sample	Percent of Total Sample
Auburn University Housing	Sophomore	15	32.6	18.5
	Junior	21	45.7	25.9
	Senior	8	17.4	9.9
Food for Thought	Sophomore	1	2.9	1.2
	Junior	8	23.5	9.9
	Senior	24	70.6	29.6

The majority of participants self-selected into the urban group accounting for a total of 61.7% of the total sample.

Table 4. Sample demographics: Environmental upbringing of participants.

Group	Class	N	Percent of Sub-Sample	Percent of Total Sample
Auburn University Housing	Urban	28	60.9	34.6
	Suburban	13	28.3	16
	Rural	5	10.9	6.1
Food for Thought	Urban	22	64.7	27.1
	Suburban	5	14.7	6.2
	Rural	7	20.6	8.6

Many students self-selected into the ‘urban’ group (Table 4). Auburn University’s population is comprised of 60.4% of in-state students (College Factual). In the state of Alabama there are very few urban cities. More students likely live in suburban areas outside an urban area, for example, Birmingham; there are many suburbs of Birmingham which most residents of the area live in instead of the actual city of Birmingham.

Findings Related to Research Question 1

Analysis and Results

A One-way ANOVA was used to test the first research question: What is the average Auburn University student's knowledge of the production of organically and conventionally grown food versus the knowledge of a student in a horticulture class? Four questions in the survey instrumentation were used to evaluate knowledge, including questions six, twelve, thirteen, and seventeen.

The knowledge score breakdown can be seen in Table 5. A normal distribution curve was used to determine high, moderate, and low scores. High scores are greater than one standard deviation above the mean. Moderate scores are -1 to 1 standard deviation within the mean. Low scores are any scores less than one standard deviation from the mean. With a total of four questions to evaluate knowledge the highest possible score would be twenty points and the lowest possible score would be four.

Table 5. Organic and conventional knowledge scoring breakdown of "Food for Thought" and Auburn University Housing respondents.

Knowledge Level	N	Point Range	Score Percentage
High Understanding	27	16-20	80-100%
Moderate Understanding	28	12-15	60-75%
Low Understanding	26	4-11	20-55%

Knowledge scores were fairly equal across the high, moderate, and low knowledge score levels.

Table 6. One-Way ANOVA comparing organic and conventional knowledge scores of Auburn University Housing and "Food for Thought" students.

Group	N	Mean	Std. Dev	df	F	Sig.
Auburn University Housing	46	11.4	3.2	1	13.5	.000
Food for Thought	35	8.8	2.9			

Students employed by Auburn University Housing yielded a mean score of 11.4, whereas those enrolled in “Food for Thought” produced a mean score of 8.8. Using a significance of $p < 0.1$ the scores were significant with $p = 0.000$.

A One-Way ANOVA was used to determine if there was any difference in scores between males and females.

Table 7. One-Way ANOVA comparing organic and conventional knowledge scores of male and female participants.

Group	N	Mean Score	Standard Deviation	df	F	Sig.
Males	26	9.0	3.3	1	6.3	.014
Females	55	10.9	3.1			

The scores were statistically significant between groups with $p = .014$. Female respondents produced a higher knowledge score of USDA organic and conventionally grown produce than male respondents.

A One-Way ANOVA was run to evaluate if there were any differences in knowledge scores between students who grew up in urban, suburban, or rural areas.

Table 8. One-Way ANOVA comparing organic and conventional knowledge scores of participants who grew up in urban, suburban, and rural areas.

Group	N	Mean Score	Standard Deviation	df	F	Sig.
Urban	51	10.9	3.1			
Suburban	18	10.1	3.2	2	4.7	.011
Rural	12	7.8	3.1			

The scores were statistically significant between groups with $p = .011$. The participants who self-selected into the rural group had lower knowledge scores than respondents who self-selected into the urban or suburban groups.

Discussion

The hypothesis for this question was based on the assumption that participants in a “Food for Thought” class would have greater knowledge of organic and conventional food production

than general Auburn University students due to the subject matter covered in the class by the instructors. However, students enrolled in “Food for Thought” yielded lower knowledge scores than students employed by Auburn University Housing, so the hypothesis was not supported with these findings. One reason that may explain students enrolled in “Food for Thought” having lower scores is that the subject matter of the class is not specifically related to organic food production. Initial research effort originally polled students in the “Organic Gardening” course (HORT 2040/2043) but there was insufficient data due to low response rate so students in the “Food for Thought” class were polled instead. It is also possible that as the course progressed students realized the vastness of this subject matter and felt they still needed more information on organic production to confidently answer.

Females scored higher in knowledge than males. This may be supported by the findings of Beardsworth et al. (2002) that women felt more familiar with the official dietary guidelines than men. Simply put, females may have higher knowledge scores because they have greater understanding of the dietary guidelines than males. This study also found that “women express more ethical concerns in relation to food...and are more sympathetic to novel food items and dietary change.”

Respondents who self-selected that they grew up in more rural areas produced lower scores for knowledge. According to the State Agriculture Overview of Alabama provided by the USDA there were 8,500,000 farms acres in operation in 2018. One possible explanation for lower scores in knowledge is that these students are surrounded by more conventional production and therefore do not have as much knowledge concerning USDA organic produce. It is also possible that they may have a bias toward conventional production because they are more

familiar with it. However, no data was found to quantify what percent of farm acres used conventional or USDA organic production methods in Alabama.

Findings Related to Research Question 2

Analysis and Results

A One-Sample T-test was used to test the second research question: What is the average Auburn University student's attitude about the production of organically and conventionally grown food versus the attitudes of an average Auburn University student currently enrolled in a horticulture class as an indication of interest in horticulture?

A normal distribution curve was used to determine high, moderate, and low scores. High scores are greater than one standard deviation above the mean. Moderate scores are -1 to 1 standard deviation within the mean. Low scores are any scores less than one standard deviation from the mean. The highest score participants could have made for organic attitude was thirty points, while the lowest possible score would have been six points. With a mean score of 20.272, over half of the participants (54.3%) fell within the range of a moderate pro organic attitude. Respondents in the high pro organic attitude accounted for 24.7% of the population, while respondents with low pro organic attitudes comprised 21.0% of the population.

Table 9. Organic attitude scoring breakdown of "Food for Thought" and Auburn University Housing respondents.

Attitude Level	N	Point Range	Score Percentage
Highly Positive	20	24-30	80-100%
Moderately Positive	44	18-23	60-76%
Lowly Positive	17	6-17	20-56%

A total of nine questions were used to evaluate overall attitude. Questions three, four, seven, eight, ten, and eleven were geared toward evaluating organic attitudes, while questions five, nine, and sixteen were used to evaluate conventional attitudes. A One-Sample T-test was

used to evaluate organic and conventional attitude scores. Organic attitude and conventional attitude both had a significance of $p = .000$.

Table 10. One-Sample T-test evaluating organic and conventional attitude scores.

Variable	N	Mean Score	Standard Deviation	Mean Difference	df	t	2-tailed Sig.
Organic Positive	81	20.2	4.8	20.2	80	37.7	.000
Conventional Positive	81	9.9	2.3	9.9			

A similar breakdown was used for conventional attitude using a normal distribution curve to determine high, moderate, and low scores. High scores are greater than one standard deviation above the mean. Moderate scores are -1 to 1 standard deviation within the mean. Low scores are any scores less than one standard deviation from the mean. With a total of three conventional attitude questions the highest possible score would have been a total of fifteen points with the lowest possible score being three points. With a mean score of 9.900, most participants had a moderate attitude towards conventional produce.

Table 11. Conventional attitude scoring breakdown of “Food for Thought” and Auburn University Housing respondents.

Attitude Level	N	Point Range	Percentage
Highly Positive	17	12-15	80-100%
Moderately Positive	42	9-11	60-73%
Lowly Positive	22	3-8	20-53%

An Independent Samples T-test was conducted to evaluate if there were any differences between male and female attitudes towards organic and conventional produce.

Table 12. Independent samples T-test of organic attitudes of males and females.

Group	N	Mean Score	Standard Deviation	Mean Difference	df	t	2-tailed Sig.
Males	26	18.5	4.9	-2.4	79	-2.2	.029
Females	55	21.0	4.6				

Equal variances were assumed with a significance of $p = .029$. Thus, there was no significant difference between males and females with respect to conventional attitudes. Males and females differed significantly in organic attitudes, but not in conventional attitudes.

A One-Way ANOVA was conducted to evaluate if there were any differences in organic and conventional attitudes between participants who were raised in urban, suburban, and rural areas.

Table 13. One-Way ANOVA comparing organic attitude scores of participants who grew up in urban, suburban, and rural areas.

Group	N	Mean Score	Standard Deviation	df	F	Sig.
Urban	51	20.6	4.5	2	4.4	.015
Suburban	18	21.5	4.5			
Rural	12	16.6	4.9			

There was significance between groups ($p = .015$). Based on the mean score of 16.6 participants who grew up in more rural areas had less favorable organic attitudes than those with urban or suburban backgrounds. There was no significant difference of conventional attitudes between urban, suburban, and rural groups.

Discussion

The hypothesis for this research question was that participants in a “Food for Thought” class would have more favorable attitudes towards organic food production than the other Auburn University students because of their greater knowledge from the course material. Overall, the whole population had moderate attitudes towards both organic and conventional produce, so the hypothesis is not supported with these findings. These results may be due in part to those similarly observed by Hidvegi and Kelemen-Erdos (2016), in which the current college generation, Generation Z, primarily uses the internet as their source of information and therefore

have more access to information on USDA organic and conventional produce thus having a more defined attitude on these products.

Females having a higher organic attitude than males may be explained by the findings of Beardsworth et al. (2002). These investigators found that women expressed more ethical concerns in relation to food. Which in turn, can affect attitude.

The participants who self-selected as having grown up in a more rural area yielded less favorable attitudes toward organic produce than those from urban or suburban backgrounds. This may be due in part to more probable exposure to conventional production therefore less exposure to organic production, and less knowledge and less favorable attitudes toward organic produce. There may also be a bias against organic production because of more exposure to conventional production. However, there was no data found to support a bias against organic produce in students who grew up in more rural areas.

Findings Related to Research Question 3

Analysis and Results

Bivariate Correlations were run to determine if the variables in the third research question were related to each other: is there a relationship between Auburn University students' knowledge and attitude of organic and conventional production methods? A total of thirteen questions were used to evaluate organic and conventional knowledge and attitude.

Overall, there was no significant correlation between production knowledge and conventional production attitudes or organic production attitudes for the sample of Auburn University students. However, there was some correlation revealed between knowledge of conventional and organic production, and organic production attitudes between the “Food for Thought” and Rural sub-samples. For both the “Food for Thought” and Rural sub-samples in Table 14, as knowledge decreases, scores for organic attitude increase. There were no significant correlations found between Auburn University Housing RAs knowledge in comparison with organic or conventional attitudes.

Table 14. Bivariate Correlations comparing production knowledge and organic attitudes of two sub-samples.

Sub-sample	N	Knowledge M Score	Organic Attitude M Score	Pearson's
Food for Thought	34	8.8	19.9	-.379**
Rural	12	7.8	16.6	-.695**

*p < .10. **p < .05. ***p < .01.

For Juniors, as their knowledge scored increased their conventional attitude also increased. There were no differences with the Sophomores and Seniors.

Table 15. Bivariate Correlation comparing knowledge and conventional attitudes for the sub-sample Juniors.

Sub-sample	N	Knowledge M Score	Conventional Attitude M Score	Pearson's
Juniors	29	12.8	9.7	.441**

*p < .10. **p < .05. ***p < .01.

Discussion

The hypothesis for the third research questions was that there would be a relationship between knowledge and attitude for participants in the “Food for Thought” class and for the general Auburn University student. Overall, the population did not manifest a correlation between knowledge and attitude of organic or conventional produce, so the hypothesis is not supported with these findings. However, three sample groups within the population did show a correlation: “Food for Thought,” Rural, and Juniors.

For the groups “Food for Thought” and Rural, knowledge scores decreased as organic attitude increased. For the group “Food for Thought,” this may be due to the structure of the class. A “Food for Thought” syllabus from 2017 lists one lecture entitled, “Sustainability, Organic, Natural, Buy Fresh-Buy Local.” Students are not learning about in-depth USDA organic or conventional production. This is not the intent of the class; therefore, knowledge scores should not expect to be high and they are not. The increase in organic attitude scores may be in part due to instructor bias or presentation.

As for the Junior group, their knowledge score increased as their organic attitude increased. This may also be explained by instructor bias or presentation.

Findings Related to Research Question 4

Analysis and Results

Bivariate Correlations were run to test the fourth research question: is there a relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce? A total of thirteen questions were asked in regard to organic attitudes, conventional attitudes, and purchasing preferences of organic or conventional produce. For the overall population there was no relationship between attitude and preferences of buying organic and conventional produce. There were, however, some sub-samples in which this interaction did occur.

For the group Juniors, as organic attitude decreased the preference for having an option between buying organic or conventional produce increased (Table 16).

Table 16. Bivariate Correlation comparing organic attitudes and preferences for purchasing between organic and conventional produce for the sub-sample Juniors.

Sub-sample	N	Preference for Choosing M Score	Organic Attitude M Score	Pearson's
Juniors	29	10.8	19.4	-.441**

*p < .10. **p < .05. ***p < .01.

When preference for buying only organic produce and organic attitudes were compared significant positive correlations were identified in the subsamples (Table 17). For each of the nine sub-samples, as their organic attitude score increased their preference for purchasing organics only increased.

Table 17. Bivariate Correlations comparing preferences for buying only organic produce and organic attitudes of nine sub-samples within the sample.

Sub-sample	N	Organic Only Preference M Score	Organic Attitude M Score	Pearson's
Males	26	3.0	18.5	.603***
Females	55	3.7	21.0	.651***
Juniors	29	3.1	19.4	.671***
Seniors	32	3.6	20.4	.748***
Urban	51	3.6	20.6	.723***
Suburban	18	3.6	21.5	.415*
Rural	12	2.6	16.6	.524*
AUH	46	3.4	20.5	.631***
FforT	35	3.5	19.9	.680***

*p < .10. **p < .05. ***p < .01.

For Junior, Urban, and Rural sub-samples, conventional attitude scores increased as the preference for having an option between buying organic or conventional produce increased.

Table 18. Bivariate Correlations comparing conventional attitudes and preferences for purchasing between organic and conventional produce of three sub-samples within the sample.

Sub-sample	N	Preference M Score	Conventional Attitude M Score	Pearson's
Juniors	29	10.8	9.7	.542***
Urban	50	11.0	10.0	.372***
Rural	12	12.5	10.0	.507*

*p < .10. **p < .05. ***p < .01.

For the Junior sub-sample, as conventional attitude scores increased the preference to buy only organic produce decreased.

Table 19. Bivariate Correlation comparing preferences for buying only organic produce and conventional attitudes for the sub-sample Juniors.

Sub-sample	N	Organic Only Preference M Score	Conventional Attitude M Score	Pearson's
Juniors	29	3.1	9.7	-.339*

*p < .10. **p < .05. ***p < .01.

Discussion

The fourth hypothesis was that there would be a relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce.

Overall, there was no relationship, so the hypothesis is not supported with these findings. However, there were select sub-samples in which there was a relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce.

For the Junior sub-sample, as organic attitude decreased, preference to have an option between buying USDA organic or conventional increased. This may be confirmed by Lusk and Briggerman (2009) in which they found that food safety is the number one value in purchasing with price and taste following consecutively behind it. As Junior's attitude of organic changed they preferred having options in purchasing based off other factors, such as, price and taste.

For all sub-samples compared in the Table 17 preference to buy only organic produce increased as their organic attitude increased. This is consistent with the research of Pino et al. (2012) in which regular consumers of organics are aware of the moral considerations and ethics in the food they consume and are willing to buy in a way that reflects their own values.

For the three sub-samples Juniors, Urban, and Rural, their score for conventional attitude increased and as such, their score for options in purchasing between organics and conventional produce increased. The Junior sub-sample's score for conventional attitude increased while their preference for buying only organic produce decreased. One possible reason for this could be that as Juniors learn more about conventional production they feel more comfortable buying conventional products instead of spending more money on more expensive organic produce.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

As our society has grown it has become more urbanized. Less students are growing up farming in rural areas and in turn know less about how their food is produced. This has led to poor and misinformed perceptions of different food production methods. This study sought to evaluate if students currently understand organic and conventional food production and in turn how that affects their attitudes towards purchasing these products. The following conclusions are based upon the research and results presented in the previous chapters.

Research Question 1

What is the average Auburn University student's knowledge of the production of organically and conventionally grown food versus the knowledge of a student in a horticulture class?

There was no significant difference between the "Food for Thought" class having greater knowledge of organic and conventional food production than RAs. Students employed by Auburn University Housing yielded a mean score of 11.4, whereas those enrolled in "Food for Thought" produced a mean score of 8.8. Using a significance of $p < 0.1$ the scores were significant with $p = 0.000$. This may be explained by the fact that "Food for Thought" is not an organic gardening class and therefore do not study in-depth production methods of organic and conventionally grown produce therefore do not have the knowledge to distinguish themselves from the general student population.

A One-Way ANOVA was used to determine if there was any difference in scores between males and females. The scores were statistically significant between groups with $p = .014$. Female respondents produced a higher knowledge score of USDA organic and conventionally grown produce than male respondents. A One-Way ANOVA was also run to

evaluate if there were any differences in knowledge scores between students who grew up in urban, suburban, or rural areas. The scores were statistically significant between groups with $p = .011$. The participants who self-selected into the rural group had lower knowledge scores than respondents who self-selected into the urban or suburban groups

Research Question 2

What is the average Auburn University student's attitude about the production of organically and conventionally grown food versus the attitudes of an average Auburn University student currently enrolled in a horticulture class as an indication of interest in horticulture?

There was no significant difference in more favorable attitudes towards organics from the "Food for Thought" class when compared to RAs. Overall, the whole population had moderate attitudes towards both USDA organic and conventional produce. This may be supported by the findings of Hidvegi and Kelemen-Erdos (2016) in which they find that Generation Z uses the internet as their primary source of information and therefore have more access to information on USDA organic and conventional produce.

A One-Sample T-test was used to evaluate organic and conventional attitude scores. Organic attitude and conventional attitude both had a significance of $p = .000$ finding that most respondents had moderately favorable attitudes toward the production of organic and conventional produce. An Independent Samples T-test was conducted to evaluate if there were any differences between male and female attitudes towards organic and conventional produce. Equal variances were assumed with a significance of $p = .029$. Thus, there was no significant difference between males and females with respect to conventional attitudes. Males and females differed significantly in organic attitudes, but not in conventional attitudes.

A One-Way ANOVA was conducted to evaluate if there were any differences in organic and conventional attitudes between participants who were raised in urban, suburban, and rural areas. There was significance between groups ($p = .015$). Based on the mean score of 16.6 participants who grew up in more rural areas had less favorable organic attitudes than those with urban or suburban backgrounds.

Research Question 3

Is there a relationship between Auburn University students' knowledge and attitude of organic and conventional production methods?

There was no significant correlation in relationship between knowledge and attitude for participants in a "Food for Thought" class and the RAs. This may be due to the aforementioned fact that "Food for Thought" is not an organic gardening class and therefore knowledge may not increase on the subject matter. Using a Bivariate Correlation there was some correlation revealed between knowledge of conventional and organic production, and organic production attitudes between the "Food for Thought" and Rural sub-samples ($p < .05$). For both the "Food for Thought" and Rural sub-samples in Table 14, as knowledge decreases, scores for organic attitude increase. There was also a significant correlation for Juniors ($p < .05$), as their knowledge scored increased their conventional attitude also increased.

Research Question 4

Is there a relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce?

There was no significant correlation between relationship between Auburn University students' attitude and preferences of buying USDA organic and conventionally grown produce. However, there were some sub-samples in which there was a relationship. Using a Bivariate

Correlation for the group Juniors, a significance of $p < .05$ showed that as organic attitude decreased the preference for having an option between buying organic or conventional produce increased (Table 16). Positive correlations between organic attitudes and preference of buying organic in Table 17 with levels of significance $p < .10$ and $p < .01$ be may be explained by the research of Pino et al. (2012) in which regular consumers of organics are aware of the moral considerations and ethics in the food they consume and are willing to buy in a way that reflects their own values. In contrast, results from Table 18 with significance levels of $p < .10$ and $p < .01$, in which scores for conventional attitude increased as options in purchasing between organics and conventional produce increased, may be supported by Conner and Christy (2004) in which they find that consumers want to buy in order to support local farming and that organic produce does not equate local farming. For the Junior sub-sample (Table 19), as conventional attitude scores increased the preference to buy only organic produce decreased ($p < .10$).

Recommendations for Future Research

The following recommendations are based on the findings of this study.

1. It is recommended that this study be conducted using an Organic Gardening class in place of a Food for Thought class to see how results differ.
2. It is recommended that this study use a pre and post-test when conducted on an Organic Gardening class to see how results differ from the beginning of the semester to the end.
3. It is recommended that this study be conducted improving upon the current survey used, asking more questions that will ascertain knowledge on USDA organic and conventional produce.

4. It is recommended that the Agriculture industry target the current college generation, Generation Z, in an internet media platform that allows them to learn the most about what is being produced and how, so that they might buy in a way that reflects their own moral considerations.
5. It is recommended that the Agriculture industry target urban, suburban, and rural environments with production methods they seem to be less familiar or knowledgeable about because of environmental restrictions or norms.
6. It is recommended that land grant universities conduct similar surveys to ascertain what the knowledge and attitudes of organic and conventional production are of their student population and if this varies regionally.
7. It is recommended that land grant universities incorporate more information on both organic and conventional production, including benefits and drawbacks of both production types, in their “Organic Gardening” classes or classes of a similar nature.

LITERATURE CITED

- Beardsworth, A., A. Bryman, T. Keil, J. Goode, C. Haslam, and E. Lancashire. 2002. Women, men, and food: the significance of gender for nutritional attitudes and choices. 1 August 2002. *Brit. Food J.* 104 (7): 470-491.
- Berners-Lee, M. and D. Clark. 2010. What is a carbon footprint? 31 May 2019. <<https://urlzs.com/EBSox>>.
- Briggerman, B.C. and J.L. Lusk. 2011. Preferences for fairness and equity in the food system. *Euro. Rev. Agr. Econ.* 38(1):1-29.
- College Factual. 2019. Auburn student population stats. August 2019. <<https://bit.ly/2YD1Gqz>>.
- Conner, D. and R. Christy. 2004. The organic label: how to reconcile its meaning with consumer preferences. *J. Food. Distrib. Res.* 35(1):40-43.
- Dahm, M.J., A.V. Samonte, and A.R. Shows. 2009. Organic foods: do eco-friendly attitudes predict eco-friendly behaviors. *J. Am. Coll. Health* 58(3):195-202.
- Dettmann, R.L. and C. Dimitri. 2009. Who's buying organic vegetables? Demographic characteristics of U.S. consumers. *J. Food Prod. Mktg.* 16(1): 79-91.
- Dimitri, C. and R.L. Dettmann. 2012. Organic food consumers: what do we really know about them? *Brit. Food J.* 114(8):1157-1183.
- Francis, T. and F. Hoefel. 2018. 'True gen': generation z and its implications for companies. McKinsey & Co. November 2018. <<https://urlzs.com/NQ9Jd>>.
- Frick, M.J., R.J. Birkenholz, H. Gardner, and K. Machtmes. 1995. Rural and urban inner-city high school student knowledge and perception of agriculture. *J. Agr. Educ.* 36(4):1-9.

- Gomiero, T., D. Pimentel, and M.G. Paoletti. 2011. Environmental impact of different agricultural management practices: conventional vs. organic agriculture. *Critical Rev. Plant Sci.* 30:1-2, 95-124.
- Hidevegi, A. and A. Kelemen-Erdos. 2016. Assessing the online purchasing decisions of generation z. *Obuda Univ.* 173-181
- Hughner, R.S., P. McDonagh, A. Prothero, C.J. Shultz II, and J. Stanton. 2007. Who are organic food consumers? A compilation and review of why people purchase organic food. *J. Consumer Behavior* 6:94-110.
- Lusk, J. and B.C. Briggerman. 2009. Food Values. *Amer. J. Agr. Econ.* 91(1):184-196.
- Michaelido, N. and L.M. Hassan. 2008. The role of health consciousness, food safety concern and ethical identity and intentions towards organic food. *Intl. J. Consumer Studies.* 32(2):163-170.
- Pino, G., A.M., Peluso, and G. Guido. 2012. Determinants of regular and occasional consumers' intentions to buy organic food. *J. Consumer Affairs* 46(1):157-169.
- Shafie, F.A. and D. Rennie. 2012. Consumer perceptions towards organic food. *Social Behavioral Sci.* 49:306-367.
- Stolz, H., M. Stolze, U. Hamm, M. Janssen, and E. Ruto. 2011. Consumer attitudes towards organic versus conventional food with specific quality attributes. *Wageningen J. Life Sci.* 58(3-4):67-72.
- USDA. Organic Standards. Agriculture Marketing Service. 31 May 2019. < <https://www.ams.usda.gov/grades-standards/organic-standards>>.
- USDA. 2016 count of certified organic operations shows continued growth in U.S. market. Agriculture Marketing Service. 19 April 2017. < <https://bit.ly/2o7sVa8>>.

USDA. 2018 state agriculture overview, Alabama. 2018. <<https://bit.ly/2LIWQXm>>.

USDA. USDA coexistence fact sheets. February 2015. <<https://bit.ly/2uV95R6>>.

Vermier, I. and W. Verbeke. 2007. Sustainable food consumption among young adults in Belgium: theory of planned behavior and the role of confidence and values. *Ecol. Econ.* 64(3):542-553.

Yazdanpanah, M. and M. Forouzani. 2015. Application of the theory of planned behavior to predict Iranian students' intention to purchase organic food. *J. Cleaner Prod.* 107:342-352.

APPENDICES

APPENDIX A

Instructor and Employer Approvals

Micah Toles
305 W Samford Ave.
Auburn, AL 36849

October 15, 2018

Dear Mrs. Young,

I am working to complete my survey for my thesis and would like to survey your Resident Assistants of the 2018-2019 school year. The survey asks questions in regards to their attitudes and knowledge of Organic and Conventional produce. This survey will take no more than 5 minutes of their time. By giving me permission to survey your Resident Assistants I would ask that you would send a group email to them containing my script explaining the purpose behind the study and a link to the survey. By signing below you are giving me permission to survey the Resident Assistants of the 2018-2019 school year and agreeing to send the script and survey to them in a group email. Thank you!

Signature  _____

Print Maurice Yang _____

Date 10/22/18 _____

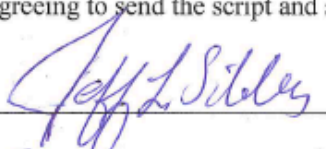
Micah Toles
305 W Samford Ave.
Auburn, AL 36849

February 2, 2018

Dear Dr. Sibley,

I am working to complete my survey for my thesis and would like to survey your Food for Thought (HORT 2050) class. The survey asks questions in regards to their attitudes and knowledge of Organic and Conventional produce. This survey will take no more than 5 minutes of their time. By giving me permission to survey your students I would ask that you would send a class email to them containing my script explaining the purpose behind the study and a link to the survey. By signing below you are giving me permission to survey the students in HORT 2050 and agreeing to send the script and survey to them in a class email. Thank you!

Signature



Print

JEFF L SIBLEY

Date

2/4/2019

Micah Toles
305 W Samford Ave.
Auburn, AL 36849

February 2, 2018

Dear Dr. Robinson,

I am working to complete my survey for my thesis and would like to survey your Food for Thought (HORT 2053) class. The survey asks questions in regards to their attitudes and knowledge of Organic and Conventional produce. This survey will take no more than 5 minutes of their time. By giving me permission to survey your students I would ask that you would send a class email to them containing my script explaining the purpose behind the study and a link to the survey. By signing below you are giving me permission to survey the students in HORT 2053 and agreeing to send the script and survey to them in a class email. Thank you!

Signature 

Print Carolyn W. Robinson

Date 2-13-19

APPENDIX B

Recruitment Script Emailed to Students

Hi, my name is Micah Toles. I am a master's student here in the Department of Horticulture, and I am conducting a survey to evaluate what Auburn students' knowledge and attitudes are towards USDA Organic fresh produce and conventionally grown fresh produce. This survey is for undergraduate students who are 19 years of age or older. The survey should only take about 5 minutes of your time. Whether or not you take the survey will not impact your grades in this course or your employment status. No identifying information will be gathered, so we will not be able to track your individual responses. You will not be paid, incur costs, or benefit directly from participating in this survey. If you have further questions you can contact the Institutional Review Board (IRB) at irbadmin@auburn.edu or at (334) 844-5966. I would really appreciate it if you would take the survey. It means a lot to my research program and graduation. Thank you for your participation!

APPENDIX C

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS REQUEST FOR EXEMPT CATEGORY RESEARCH

For Information or help completing this form, contact: THE OFFICE OF RESEARCH COMPLIANCE, 115 Ramsay Hall
Phone: 334-844-5966 e-mail: IRBAdmin@auburn.edu Web Address: <http://www.auburn.edu/research/vpr/ohs/index.htm>

Revised 2/1/2014 Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

Project activities may not begin until you have received approval from the Auburn University IRB.

1. PROJECT PERSONNEL & TRAINING

PRINCIPAL INVESTIGATOR (PI):

Name Micah Toles Title Graduate Student Dept./School Horticulture/Agriculture
 Address 305 W. Samford Ave. Auburn, AL 36849 AU Email mrt0013@auburn.edu
 Phone 256-541-7999 Dept. Head Dr. Desmond Layne

FACULTY ADVISOR (if applicable):

Name Carolyn Robinson Title Professor Dept./School Horticulture/Agriculture
 Address 101 Funchess Hall
 Phone 334-844-3031 AU Email cwr001@auburn.edu

KEY PERSONNEL: List Key Personnel (other than PI and FA). Additional personnel may be listed in an attachment.

Name	Title	Institution	Responsibilities
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

KEY PERSONNEL TRAINING: Have all Key Personnel completed CITI Human Research Training (including elective modules related to this research) within the last 3 years? YES NO

TRAINING CERTIFICATES: Please attach CITI completion certificates for all Key Personnel.

2. PROJECT INFORMATION

Title: Examining Student's Knowledge and Attitude of Organically and Conventionally Grown Produce

Source of Funding: Investigator Internal External

List External Agency & Grant Number: _____

List any contractors, sub-contractors, or other entities associate with this project.

List any other IRBs associated with this project (including those involved with reviewing, deferring, or determinations).

FOR ORC OFFICE USE ONLY			
DATE RECEIVED IN ORC:	_____ by _____	APPRO	<div style="border: 2px solid blue; padding: 5px;"> <p>The Auburn University Institutional Review Board has approved this Document for use from <u>11/02/2018</u> to <u>-----</u> Protocol # <u>18-385 EX 1809</u></p> </div>
DATE OF IRB REVIEW:	_____ by _____	APPRO	
DATE OF ORC REVIEW:	_____ by _____	INTER	
DATE OF APPROVAL:	_____ by _____		
COMMENTS:			

APPENDIX D


AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS REQUEST for MODIFICATION

For help, contact: THE OFFICE OF RESEARCH COMPLIANCE (ORC), 115 Ramsay Hall, Auburn University
Phone: 334-844-5866 e-mail: IRBAdmin@auburn.edu Web Address: <http://www.auburn.edu/research/protocols>

Revised 2.1.2014 Submit completed form to IRBAdmin@auburn.edu or 115 Ramsay Hall, Auburn University 36849.

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

1. Protocol Number: 18-385 EX 1809
2. Current IRB Approval Dates: From: 11/02/2018 To: 11/01/2019
3. Project Title: Examining Students' Knowledge and Attitude of Organically and Conventionally Grown Produce

<u>Micah Toles</u>	<u>GRA</u>	<u>Horticulture</u>		<u>mrt0013@auburn.edu</u>
Principal Investigator	Title	Department	Phone	AU E-Mail (primary)
		<u>101 Funchess Hall</u>		
PI Signature		Mailing Address		Alternate E-Mail
<u>Carolyn W. Robinson</u>		<u>Horticulture</u>	<u>844-3031</u>	<u>cwr0001@auburn.edu</u>
Faculty Advisor	FA Signature	Department	Phone	AU E-Mail
Name of Current Department Head: <u>Desmond Layne</u>				AU E-Mail: <u>dr0021@auburn.edu</u>

5. Current External Funding Agency and Grant number: N/A
6. a. List any contractors, sub-contractors, other entities associated with this project:
N/A

b. List any other IRBs associated with this project: N/A

7. Nature of change in protocol: (Mark all that apply)
 - Change in Key Personnel ([attach](#) CITI forms for new personnel)
 - Change in Sites ([attach](#) permission forms for new sites)
 - Change in methods for data storage/protection or location of data/consent documents
 - Change in project purpose or questions
 - Change in population or recruitment ([attach](#) new or revised recruitment materials as needed)
 - Change in consent procedures ([attach](#) new or revised consent documents as needed)
 - Change in data collection methods or procedures ([attach](#) new data collection forms as needed)
 - Other (explain): _____

FOR ORC OFFICE USE ONLY			
DATE RECEIVED IN ORC:	_____ by _____	MODIFICATION #	_____
DATE OF IRB REVIEW:	_____ by _____	PROTOCOL APPROVAL CATEGORY:	_____
DATE OF IRB APPROVAL:	_____ by _____	MODIFICATION APPROVAL CATEGORY:	_____
COMMENTS:	INTERVAL FOR CONTINUING REVIEW: _____		

The Auburn University Institutional Review Board has approved this document for use from 08/1/2018 to 07/31/2019 Protocol # 18-385 EX 1809

APPENDIX E

Survey sent to Food for Thought class and RAs

Examining Students' Knowledge and Attitudes of Organically and Conventionally Grown Food


The objective of this study is to measure what student's understanding is of USDA organic and conventional production. This study is only 28 questions long and should not take more than 5 minutes of your time.

By clicking the arrow below, you are agreeing to participate in this study and that you are of 19 years of age or older.

1. Please select your class standing below.

- Sophomore
- Junior
- Senior
- Other

2. Please write your age below.

	19	22	24	27	29	32
Click to write Choice 1 ()						

3. Select your gender.

- Male
- Female

4. I grew up in an urban area.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

5. I am currently enrolled in Food for Thought (Hort 2050/2053).

- Agree
- Disagree

6. I am currently employed by Auburn University Housing.

- Agree
- Disagree

7. USDA Organic produce is more healthful than conventional produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

8. USDA Organic food production is sustainable.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

9. Conventional production is sustainable.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

10. USDA Organic farmers use pesticides.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

11. USDA Organic food production is more natural than conventional production.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

12. Food should only be produced using USDA organic standards.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

13. Conventional production is necessary to feed the world population.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

14. USDA Organic food produce taste better than conventionally grown produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

15. USDA Organic food production is less harmful to the environment than conventional food production.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

16. I understand what USDA Organic production is and what it entails.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

17. I understand what conventional production is and what it entails.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

18. I tend to buy more USDA Organic fresh produce than conventionally-produced fresh produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

19. I tend to buy more conventionally-produced food products than USDA Organic food.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

20. Fresh produce should only be produced using conventional farming methods.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

21. It is practical to produce food using both USDA Organic and conventional methods.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

22. I like having options between purchasing USDA Organic and conventional fresh produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

23. I buy only USDA Organic food products.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

24. If money was not an obstacle, I would only buy USDA Organic fresh produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

25. I buy a mixture of conventional and USDA Organic produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

26. If money was not an obstacle, I would buy a mixture of conventional and USDA Organic fresh produce.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

27. When purchasing fresh produce, I buy whatever looks best regardless of how it was produced.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

28. If money was not an obstacle I would buy whatever produce looked best, regardless of how it was produced.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Thank you for participating in this study. If you are unsure of what some of these terms meant you can look below to learn about them.

USDA Organic- USDA organic is a labeling term that indicates that the food or other agricultural product has been produced through approved methods. The organic standards describe the specific requirements that must be verified by a USDA-accredited certifying agent before products can be labeled USDA organic.

Conventional- There is no standard definition for this term, but conventional produce use products (fertilizer, pesticides, etc.) which will yield a larger crop but may contain synthetic

chemicals or the produce may be genetically modified in order to give it greater resistance to disease and pest damage.

Sustainable- There is no set definition for this term, but sustainable agriculture seeks to use production methods that are environmentally friendly and will preserve the ecological balance.