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# Local Food and Agriculture Awareness: The Literacy of Local Produce and Agriculture in Northwest Arkansas

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LOCAL FOOD AND AGRICULTURE AWARENESS:  
THE LITERACY OF LOCAL PRODUCE AND AGRICULTURE IN NORTHWEST  
ARKANSAS

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ARKANSAS

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts in Geography

By

Kyle Colton Flynn  
University of Arkansas  
Bachelor of Science in Earth Science, 2010

May 2013  
University of Arkansas

## **ABSTRACT**

The Center for Disease Control and Prevention (CDC) suggests that adolescents and children, both male and female, are failing to meet the daily fruit and vegetable consumption requirements (Kim et al., 2011; Upton et al., 2012; Harris et al., 2012). Other studies have shown that with increased exposure and availability of produce, students (K-5) tend to consume more fruits and vegetables (Cullen et al., 2009; Evans et al., 2012). The purpose of this study is to identify whether Northwest Arkansas eleventh grade high school students possess experience and knowledge of local produce and agriculture. Out of 1054 students enrolled at the three high schools that participated (Bentonville, Farmington, and Lincoln) 50 students were surveyed. Thus the results are presented as a case study to inform future work.

In this case study, the following results were found:

1. Most students (less than 25%) did not meet the daily fruit and/or vegetable consumptions recommended by the CDC.
2. Students lacked knowledge of where to purchase local produce (38% had proficient knowledge) and how far their food travels (32% of students were aware).
3. Students displayed a strong ability to identify most of the six types of produce and four fast foods depicted in the survey. Students' ability to identify these fruits and vegetables were not affected by most of the experiences, except for the school in which they attended and their gardening experiences.
4. Increased fast food consumption decreased the students' ability to identify places offering local produce for sale.
5. Increased fast food consumption decreased students' awareness of Arkansas' most grown crop.

6. Gender was not found to have a major effect on local produce and agriculture experience, knowledge, and perceptions. However, it was found that male students were more likely to enroll in high school agricultural classes and know how far produce travels on average from the farm to the dinner table. While female students believed that local produce had lesser disadvantages.

This case study is a start to a better understanding of the amount of experience and knowledge of local produce and agriculture within Northwest Arkansas high school students.

This thesis is approved for recommendation

To the Graduate Council.

Thesis Director:

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Dr. Sonja Hausmann

Thesis Committee:

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Dr. Jennie Popp

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Dr. Fiona Davidson

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## **I. Introduction**

Do eleventh grade students possess experience and knowledge of locally grown produce and agriculture? This research was conducted to examine the extent of experience and knowledge students in Northwest Arkansas (NWA) hold regarding local produce and agriculture. For this study, NWA is defined as Benton and Washington counties in Arkansas.

The Center for Disease Control and Prevention (CDC) suggests that adolescents and children, both male and female, are failing to meet the daily fruit and vegetable consumption requirements (Kim et al., 2011; Upton et al., 2012; Harris et al., 2012). Other studies have shown that with increased exposure and availability of produce, students (K-5) tend to consume more fruits and vegetables (Cullen et al., 2009; Evans et al., 2012). Therefore, the amount of experience and knowledge of local produce and agriculture may have an effect on the amount of fruit and vegetable consumption of NWA students. The purpose of this study is to identify whether Northwest Arkansas eleventh grade high school students possess experience and knowledge of local produce and agriculture having the potential to create healthier food decisions.

### **A. Daily Fruit and Vegetable Intake in Adolescents**

According to the CDC (2010) active adolescent females should be consuming at least 1.5 servings of fruit and 2.5 servings of vegetables and active adolescent males should be consuming two servings of fruit and three servings of vegetables. It was found by the CDC (2010) that 16.8 percent of students nationwide consumed greater than or equal to four servings of fruit daily and 11.2 percent of students consumed greater than or equal to four servings of vegetables daily. While no information was found regarding Arkansas adolescents' consumption of fruit and

vegetables, it was found that Arkansas adults fall below the national average in fruit consumption with 24.5 percent meeting fruit recommendation (compared to 32.5 percent nationally), but exceed the national average in meeting vegetable consumption recommendations at 26.9 percent (compared to 26.3 percent nationally) (CDC, 2010).

By offering the opportunity to be more educated in locally grown produce and agriculture, students could develop a stronger potential to make healthier decisions (Cullen et al., 2009; Desmond, 2004; Graham et al., 2005; Heneman, 2008). However, studies have shown that incorporating nutritional lessons alone is not alone sufficient to improving students' health in the long term (Morris et al., 2002; Nolan, 2005). Through a combination of agricultural and nutritional lessons, studies have shown that an increase in students' preferences of more vegetables becomes apparent (Morris et al., 2002; Nolan, 2005), resulting in the promotion of more healthy diets for the students.

## **B. Knowledge of Where to Buy Local Produce**

In order for students to consume more local fruits and vegetables, thus improving their healthier eating decisions, they need to be informed of the places they are available (Anderson, 2008). Gaps in knowledge of where to buy local foods exist, even in populations outside of students. For example, in a study performed by Selfa and Qazi (2005) in Washington State, 6.5% producers of the fruits and vegetables in Chelan county and eight percent of fruit and vegetable producers in Grant county were unaware of the location of the local markets in their regions. Local produce is often known to be available at farmers' markets and road side stands (Keeling-Bond et al., 2006; Cranfield et al., 2012). However, though still in the developmental phase, many are unaware that larger retailers, such as Wal-Mart, are beginning to support local markets

too (Chambers et al., 2007; Guptill and Wilkins, 2002; Selfa and Qazi 2005; Cranfield et al., 2012). Dunne et al. (2011) suggests that it is the local markets, such as farmer's markets, that are essential to the personnel connections existing between the consumer and the producer. However, Dunne et al. (2011) also suggests that it is the job of these large retailers, such as Walmart, to improve the marketing of their local foods because they have the capability to sell larger volumes of local produce.

A possible means of informing the public of places that offer local produce is the internet. Arkansas Grown is a website ([arkansasgrown.org](http://arkansasgrown.org)) that has been developed by the Arkansas Agriculture Department (AAD) to promote the awareness and sale of locally grown products within Arkansas. One of the main goals of the website is to provide a venue for Arkansas farmers to promote themselves and their products. Anyone who produces an agricultural product within the state can submit their marketing information to the site, which is then put into a searchable database so that consumers can locate growers and vendors of local produce. The AAD has also trademarked the "Arkansas Grown" label, which in-state producers can apply to their locally-grown products in order to differentiate them from competing out-of-state brands (Arkansas Agriculture Department, 2012).

### **C. Knowledge of Distance Traveled**

The acquisition of out-of-state fruit and vegetable brands often requires an increase in food miles traveled over locally available produce. The term food miles has been used to describe the distance food has traveled from where it is grown to where it is purchased or consumed (NRDC, 2007). Three studies (NRDC, 2007; Norberg-Hodge, 2012; Pirog and Benjamin, 2005) suggest that most foods today travel on an average of 1500-2500 miles from



where it is grown to our dinner plates. One study explains that one reason for the increase in food mileage is that on average an American meal is prepared with ingredients that have been produced from at least five different countries other than the United States (NRDC, 2007). A recent study in the United Kingdom found that only 19 percent of surveyed grocery shoppers were able to identify the country in which their food was produced (Kemp et al., 2010).

Research by Blackburn (1999) and Birkenholz (1995) has shown that most Americans, no matter their age, have a limited awareness of agriculture and food production. Further observations have shown that a lack of agricultural knowledge has resulted in a population failing to understand not only where their food comes from but the importance of ecosystems, land usage, and the plants that produce food as well (California Department of Education, 2002; Heneman et al., 2008). It was found that a majority of American citizens believe food production consists of only farming and ranching, ignoring stages such as processing and transportation (Blackburn, 1999; Birkenholz, 1995).

#### **D. Experience and Knowledge of Fruits and Vegetables**

Though processing and transportation are often forgotten by the average American citizen, the fruits and vegetables one consumes or produces may have an effect on their ability to identify those fruits and vegetables. Fruit and vegetable consumption is often found to be affected by parental and psychosocial influences (Gibson et al., 1998; Edwards and Hartwell, 2002; Murashima et al., 2011), sensory characteristics (i.e. flavor and texture) (Baxter et al., 1998; Edwards and Hartwell, 2002), and socio-economic backgrounds (Baxter et al., 1999; Edwards and Hartwell, 2002). When it comes to students' socio-economic backgrounds, studies performed in Scotland found that the socio-economic status of students significantly ( $p < 0.0500$ )

describe the relationship of some preferences of produce (Baster et al., 1999). Further, the lower the socio-economic status of the participants the less likely they preferred the produce (Baxter et al., 1999). Recent studies (Miller, 2010; Bendern, 2012) have stated that households with higher socio-economic status in the U.S. are more likely to buy local produce. According to Noble et al. (2000) primary school children demonstrate a basic knowledge of fruits and vegetables and their nutrients; however, there seemed to be a concerning absence of the knowledge about the vitamins and nutrients within foods that are “good for you.” Students’ ability to identify fruits and vegetables can also be strengthened in the classroom. Since most students take part in a school setting, the classroom becomes a prime environment for students to learn more about agriculture and nutrition (Nolan, 2005). According to Anupama et al. (2008) agricultural education can easily be integrated into states’ curriculum and should be integrated to possibly improve the students’ appreciation of food and ecosystems. Therefore, by integrating and making agricultural education available in the classroom, students have a stronger possibility of being influenced to make better food choices and possibly change their life-styles over time (Graham et al., 2004). Research suggests that agricultural education may be needed at an early age to improve eating habits and to build healthy eating preferences (Kirby et al., 1995; Baranowski et al., 1997; Carter, 2002; Nolan 2005). Furthermore, Evans et al. (2012) found that including experiences such as growing a garden or farmers’ visits can have an effective increase on the amount of fruit and vegetable knowledge and consumption of students. The establishment of food preferences and dietary habits are formed during childhood (Kirby et al., 1995) and by targeting the students during childhood long-term healthier eating choices become more apparent (Carter, 2002; Nolan, 2005).

Some studies (Williams, 2000; Birkenholz, 1995; Terry and Lawver, 1995) suggested that both high school and college students also struggle in the area of basic knowledge of agriculture. A lack of agricultural experiences (i.e. farming or growing gardens) may be part of the explanation for a lack of basic agricultural knowledge. Today, with the vast urbanization of the US and the loss of 95 percent of US farmers since 1900 (Ikerd, 2008), students have fewer opportunities to experience agricultural processes (Terry and Lawyer, 1995, Bagdonis, 2009; Berlin, 2002).

#### **E. Fast Food Versus Produce Exposure**

As stated earlier in the chapter, students are failing to consume the proper amount of fruits and vegetables. The failure to consume fruits and vegetables may be a result, in part, of students existing within a society that is effectively marketing less nutritious fast food items and failing to market the more healthy locally grown items (Kish, 2008). According to Anderson and Butcher (2005) and Briefel et al. (2009) the rise in the availability of foods low in nutrients but high in energy (i.e. junk foods, fast foods) could account for one fifth of the adolescents affected by an increase in body mass index throughout the past 10 years. Of recent program evaluations it has been shown that with an increased awareness of agriculture and the importance of eating fresh fruits and vegetables, an increased consumption of fruits and vegetables has been the result (Kish, 2008).

#### **F. Differences by Gender**

Except for outlooks and their willingness to purchase local food, the literature on the amount experiences and knowledge with local produce and agriculture by gender is limited. However, according to research (Gallons et al., 1997; Jekanowski, Williams II, and Schiek,

2000; Kezis et al., 1998; Weatherell et al., 2003, Gracia, Magistris, and Nayga, 2012) females tend to have more positive attitudes in the purchasing of local foods than their male counterparts. It was found in a study by Gracia, Magistris, and Nayga (2012) that females are more sensitive to the social dimensions of local products. Furthermore, it was found by Emanuel et al. (2012) that females are more likely to consume fruits and vegetables. Therefore, in this research, female experience, knowledge, and perceptions of local foods and agriculture are expected to be greater than their male counterparts.

### **G. Survey Methodology**

In order to determine the amount of experience and knowledge NWA students possessed with regards to local produce and agriculture, a survey tool was developed. There is a vast array of literature that has been written to support the development of survey tools (Dillman et al., 2009; Dillman, 2000; James and Bolstein, 1992). The framework needed for the construction of the survey tool was based upon these documents. According to Dillman (2002), one of the earliest processes, the designing of the questions to be asked with the tool, is the most important in producing strong survey research. It is important to keep in mind the questions you are trying to answer with your results and to keep the questions as clear as possible at all times (Rea and Parker, 1992). Dillman et al. (2009) suggest that the complexity of the questions should be kept to a minimum and the language used should be consistent, as well. Finally, when the survey is constructed, a pre-test should be implemented to identify errors within the questions, as well as any wording of the questions that may be confusing to the participants (Dillman et al., 2009). The survey instrument and the questions used for this study were based on other survey instruments from previous research projects that were also looking at agriculturally based knowledge and experience (Williams, 2000; Birkenholz, 1995; Terry and Lawver, 1995).

## **H. Hypotheses**

My general hypothesis is that students lack experience and knowledge with local produce and agriculture. A better understanding of students' experience and knowledge with local produce and agriculture may help explain the students' health choices and the support of local farmers. The objective of this study was to examine the students' extent of knowledge and experience of local produce and agriculture within NWA. For this study I developed seven null hypotheses:

- 1) At least 10% of NWA 11<sup>th</sup> grade students are meeting CDC guidelines for the weekly intake requirements of fruits and vegetables.
- 2) Less than half of NWA students have proficient knowledge of where to buy local produce in NWA.
- 3) At least 50% of NWA students are aware of how far their food travels, on average, from the farm to their plates.
- 4) At least 91% of NWA students are capable of visually identifying a sample of fruits and at least 78% of NWA students are capable of visually identifying a sample of vegetables that are grown in Arkansas.
- 5) There is no significant difference in a student's ability to identify fruits and vegetables based on eight experiences: 1) lived on a farm, 2) grew a garden, 3) been to a farmer's market, 4) took an agricultural class in high school, 5) consumption of fruit, 6) consumption of vegetables, 7) consumption of fast food and 8) where the student attends high school.
- 6) The number of fast food servings the students consume will not significantly explain the knowledge and perceptions of local foods.

- 7) There is no significant difference by gender in experiences, knowledge and perceptions of local foods.

This thesis is organized as follows. Chapter Two presents the survey methods and the methods used to test the hypotheses. Chapter Three provides results. Chapter Four provides discussions about the results. Conclusions are found in Chapter Four.

## **II. Methodology**

As discussed in the last chapter, the purpose of this research was to conduct a case study (small sample) analysis that examines whether students in NWA possess experience and knowledge with respect to local produce and agriculture. To address this issue a survey instrument titled “Local Produce Survey” was created and implemented to determine eleventh grade students’ experience and knowledge with local produce and agriculture. The following will describe the methods and procedures used to perform the research for this study by addressing the NWA Student Population, the “Local Produce Survey”, and data analysis.

### **A. NWA Student Population**

The population of this study included participating eleventh grade students attending three different high schools in Washington and Benton Counties in Arkansas. Washington and Benton Counties were home to 19 high schools at the time of this study. Ten of them were in Washington County and nine of them were in Benton County (Benton County Arkansas, 2012; Washington County Arkansas, 2012). Three school districts were chosen in an attempt to capture the diversity in eleventh grade of both rural and urban populations. The populations of the city and the eleventh grade enrollment population at the school districts surveyed are shown in Table 2.1 (U.S. Census Bureau, 2011; Population Statistics, 2012). Another critical factor in targeting the surveyed schools was the school districts’ ability and willingness to participate in the survey.

**Table 2.1: City Population and Eleventh Grade High School Enrollment for Three Northwest Arkansas Cities**

School City	City Population	Eleventh Grade High School Enrollment
Lincoln	2,249	82
Farmington	5,974	141
Bentonville	35,301	831

Sources: (U.S. Census Bureau, 2011); (Christine Spears, Lisa Stevens, and Laurie Watts, Personal Communication, February 8, 2011).

Eleventh grade students were chosen for three reasons. First, the study goal was to understand the experiences and knowledge that a student possesses before graduating high school. As only 18.9% of Arkansans receive a degree beyond a high school diploma (U.S. Census Bureau, 2011), high school may be the student participants' final chance to learn about local produce and agriculture in an educational setting. Second, eleventh grade students were also chosen because they are close to the age of moving out and making their own food choices. Finally, when the participants were surveyed all students in Arkansas were required to enroll in 11<sup>th</sup> grade English thus improving the opportunity for the research to focus on a specific age group. Because the age of students that were required for this study was so specific and a diverse population within each school was required, choosing a class that all students were required to enroll in was needed.

### **B. Local Produce Survey**

Methods proven by a vast array of literature were implemented to produce a strong, reliable, and unbiased survey permitting the opportunity for the most reliable results (Dillman et al., 2009; Dillman, 2000; Rea and Parker, 1992; Thibault and Kelly, 1952; James and Bolstein, 1992). For this study an analysis of other articles' procedures as well as their surveys were used



to examine the experience, knowledge, and perception of high school students with agricultural practices was viewed to construct the survey instrument.

The constructed survey instrument (Appendix A) along with the survey supplemental (Appendix B) consisted of 26 questions within five sections, which include: “General Information,” “Experiences,” “Knowledge,” “About You,” and “Classification.” Each section was built to analyze the students’ knowledge and/or experiences with local produce and agriculture.

### **C. General Information**

The “General Information” section consisted of two questions, “Do you like any vegetables?” and “Do you like any fruits?” Each of these questions were “Yes” or “No” answers. If the students’ answer was yes, then there was a follow-up question which was “Which vegetable/fruit is your favorite?” These simple questions served three purposes. The first was to begin the survey with the least intimidating questions to allow the students to feel comfortable answering the questions on the survey. Second, was to allow for the grouping of students based upon their preferences of fruits and/or vegetable. Finally, dependent upon the responses of the students, this section could help with the understanding of the amount of fruits and vegetables students are consuming and whether they are meeting the CDC’s standards.

### **D. Circumstances of the Students**

Both the “Experience” and “About You” portions of the survey were implemented to better understand the students’ personal circumstances. The “Experience” portion consisted of 13 questions, regarding students’ experiences with farming and/or gardening, agricultural course

enrollment, produce shopping, fast food consumption and Farm to School Programs participation. These questions were used to group students based upon their experiences, and to compare the students' circumstances with the knowledge he/she possessed about local produce and agriculture.

When it comes to developing circumstances for each student, the "About You" portion of the survey was used to separate the students by gender as well as the school in which they attended. The "About You" portion consisted of five questions regarding gender, age, high school, grade, and zip code. The answers to these questions were used to confirm that responding students fit the high school, expected age, and grade requirements for participation in the study. This section also allowed for differences in gender to be analyzed.

#### **E. Student Knowledge About Local Produce**

The "Knowledge" and "Classification" portions of the survey instrument contained questions to identify the amount of knowledge the eleventh grade students possessed about local produce. These sections quizzed the students on: 1) Where they could buy local produce, 2) the benefits and disadvantages of local produce, 3) local produce facts, and 4) the identification of fast food and produce grown in Arkansas.

The first of the "Knowledge" questions asked the students to choose the places a consumer could buy local produce in Northwest Arkansas. For this survey, local was defined as grown in the state of Arkansas. The survey question provided 12 places among which a student could choose including farmers markets, supermarkets, local restaurants, and fast food places. This question was used to recognize the students' awareness of the places that sell local foods within their region.

The following two questions gave insight into the student's perspective of benefits and/or disadvantages of buying local produce. The students had the choice to answer: there are no benefits and/or disadvantages. Analyzing these questions helped create a better understanding of the students' beliefs of whether local produce plays a positive or negative role in our society.

The next question was a multiple choice question that tested the students' ability to identify which crop (corn, rice, soybeans, and wheat) that Arkansas produces in larger quantities than any other state. These crops were picked because all four choices are major crops within the United States (United States Department of Agriculture, 2012) and all four are grown in Arkansas. This question gave insight into the students' awareness of the importance of different types of agriculture production that takes place in Arkansas.

The topic of the next question, in the "Knowledge" section, dealt with food miles. It was a multiple choice question asking "Today, on average, how far does produce travel from a farm to your home? (In miles)" The students had four answers from which to choose: 0 to 1000, 1500 to 2500, 3000 to 4000, and 4500 to 5500. These numbers were an arbitrary selection created at an equal interval to minimize the confusion of the participants. This question gave insight into the students' awareness of the distance their food travels to reach their homes.

In the "Knowledge" portion the students were asked to identify the name of the Arkansas state program that promotes the sale of meats and produce grown in Arkansas. This was a fill-in-the-blank question which allowed the researcher to identify whether eleventh grade students are aware of the existence of a program in Arkansas promoting the sales of local produce.

## **F. Identification of Fast Foods and Produce**

The “Classification” section allowed the researcher to analyze how well students can identify, visually, images of foods grown locally and images of fast foods. This section consisted of ten photos the students had to identify using visual experiences and/or knowledge of produce grown locally and fast foods, consisting of: Blueberries, sweet potatoes, blackberries, cucumbers, corn, strawberries, taco, Big Mac/hamburger, French fries, and pizza. These produce and fast foods were chosen for many reason. First, they all are available within Arkansas. Blueberries and blackberries are native to Arkansas and can often be found growing in the wild (United States Department of Agriculture, 2012). Sweet potatoes are considered to be one of the most important vegetables to consume because of their nutritional content (Center for Science in the Public Interest, 2009). Both corn and cucumbers are common in gardens. Strawberries were chosen because of one of the participating schools (Farmington) because the city of Farmington used to operate a major strawberry farm (City of Farmington, 2012). Finally, the fast food items were chosen because they are common fast food items that are readily available in NWA. Knowing the students ability to identify the fruits, vegetables, and fast food allowed the research to find what students are being exposed to in day-to-day life. I hypothesize, the more experience the students had with a particular product, the greater their ability to classify it should have been.

## **G. Survey Pre-test**

Following the initial construction of the survey a group, as suggested by the study of Dillman et al. (2009), 80 college undergraduates were asked to participate in a pre-test of the survey. Students were given two tasks. First, students were instructed to identify any questions on the survey that were unclear and to give possible corrections. Second, they were asked to

complete the survey to be sure that the likely potential answers to the survey would provide the researcher with the information needed to address the research questions. The survey was revised to address student insights. The final survey instrument was submitted to the University of Arkansas Institutional Review Board (IRB) and received approval number 12-01-425 (Appendix C).

### **H. School and Parental Consent Requirements**

Upon approval of the survey from University of Arkansas, the survey was sent to each of the participating high schools' principals for approval. The schools provided written consent to conduct the survey in eleventh grade English classes (Appendix D). Next, meetings with the teachers were scheduled to inform teachers of the survey's purpose and important as well as to confirm the dates and times in which the surveys would be administered, and how the surveys would be conducted.

Per University of Arkansas IRB policies, because the individual participants in the survey were expected to be under the age of 18, a consent form signed by a parent or legal guardian was needed before the student could participate in the survey (Appendix E). Forms were delivered to the schools for distribution two weeks (10 business days) before the survey was scheduled to take place. Once forms were collected from the schools, the survey was implemented directly to the students by me. I spent one day at each of the three schools. In the classrooms, I first briefly introduced the students to the purpose of the survey, provided directions for completing the survey and then conducted the survey. Given the 11<sup>th</sup> grade population in each school, 247 completed surveys were needed to provide survey results to have a 95% confidence in representativeness of a response with a plus or minus margin of error of 5% (Raosoft, 2004).

## **I. Data Analysis and Hypothesis Testing**

When all the surveys had been conducted at each school, the survey responses were entered into an Excel database. The data from each survey were entered twice, by two different individuals and then compared to check for human data entry error. The final data sheet was comprised of 74 different variables representing information collected from each question. Summary statistics were generated for each of the 74 variables. Additional analyses were conducted as part of the hypotheses testing. These hypotheses and analyses are described below.

*H<sub>0</sub> 1: At least 10% of NWA 11<sup>th</sup> grade students are meeting CDC guidelines for the weekly intake requirements of fruits and vegetables.*

The choice of 10% was based on the study by CDC (2010) that showed that only 16.8% and 11.2% of students were exceeding CDC requirements for weekly fruit and vegetable consumption, respectively. Because their recommendations for men and women are different, this hypothesis was tested individually not only for fruits and vegetables but also for males and females. This null hypothesis was tested using responses to questions 12 and 13 regarding the amount of fruit and vegetable consumption weekly at each meal. First, total weekly consumption of fruit and vegetables were calculated for each respondent. These totals were then compared to CDC recommendations to calculate the percentage of students meeting the recommendations. This null hypothesis was rejected if less than 10% students met those requirements.

*H<sub>0</sub> 2: Less than half of NWA students have proficient knowledge of where to buy local produce in NWA.*

This null hypothesis was tested using information gleaned from question 16, regarding a set of 12 potential vendors (restaurants, grocery stores, and a farmers market) of local foods. First, counts of correct responses were made for each respondent. Then based on the percentage

correct, students were assigned grades of A through F (rounded to whole numbers) where A = 90-100%, B = 80-89, C = 70-79, D = 60-69 and F < 60. A proficient grade was assigned as a B or better. This null hypothesis was rejected if more than 50 percent of students received a score of B or better.

*H<sub>0</sub> 3: At least 50% of NWA students are aware of how far their food travels, on average, from the farm to their plates.*

This null hypothesis was tested using information from question 20. Students had to choose among four options for the number of miles (0 to 1000, 1500 to 2500, 3000 to 4000, and 4500 to 5500) that their food travels on average. The percentage of students who chose each option was calculated. The null hypothesis was rejected if the percentage of students who chose the correct answer (1500 to 2500) was less than 50 percent.

*H<sub>0</sub> 4: At least 91% of NWA students are capable of visually identifying a sample of fruits and at least 78% of NWA students are capable of visually identifying a sample of vegetables that are grown in Arkansas.*

This null hypothesis was tested using question number 27 and the percentages used to base the rejection or acceptance of the null hypothesis was based on the study by Edwards and Hartwell (2002) where students were asked to identify fruits and vegetables. In their study, the students' lowest ability to identify a fruit as a whole was at 91%, while for vegetables it was at 78%. Therefore, this study based its rejection on the lowest percentages of the identification of fruits and vegetables from the previous study. Students' responses to each picture were recorded and the percentage of students who wrote the correct answer was calculated. The null hypothesis was rejected if the percentage of students who indicated the right answer for fruits and vegetables was less than 91% and 78%, respectively.

*H<sub>0</sub>5: There is no significant difference in a student's ability to identify fruits and vegetables based on eight experiences: 1) lived on a farm, 2) grew a garden, 3) been to a farmer's market, 4) took an agricultural class in high school, 5) consumption of fruit, 6) consumption of vegetables, 7) consumption of fast food and 8) where the student attends high school.*

This hypothesis encompasses the testing of students' ability to identify fruits and vegetables against their range of experiences. These eight variables were chosen prior to conducting of the survey based on the experiences that the students possessed in which they were asked to respond within the local produce survey. The distribution of responses for one variable (lived on a farm) did not allow for the use of chi-square or fisher exact testing. Therefore, only seven sub-hypotheses were tested. The hypothesis was rejected if significant differences ( $p < 0.0500$ ) in ability to visually recognize these fruits, vegetables and fast food items were found between those with an experience and those without.

*H<sub>0</sub>6: The number of fast food servings the students consume will not significantly explain the knowledge and perceptions of local foods.*

In order to test this null hypothesis two statistical tests were run within the program Canoco (ter Braak and Šmilauer, 2002) to perform multivariate statistical analyses using the survey results. First, to analyze which independent variables explain significantly the knowledge about local produce and agriculture (dependent variables as a whole) Monte Carlo Permutations were performed using the program Canoco. Second, to explore the relation between the experience of the students (independent variables) and the knowledge and perception of the students about foods (dependent variables; see Table 2.2) a canonical correspondence analysis (CCA) (Jongman et al., 1995) using again Canoco was performed with the use of the statistically



significant variables. The null hypothesis will be rejected if the number of fast food servings significantly ( $p < 0.0500$ ) describes the variance of all the dependent variables.

**Table 2.2: Monte Carlo and CCA Variables**

<b>Independent Variables</b>	<b>Dependent Variables</b>
Gender	Fayetteville Farmer's Market (Offer local produce?)
Name of School	Chik-Fil-A (Offer local produce?)
Lincoln vs. Farmington and Bentonville	Walmart (Offer local produce?)
Zip Code	Greenhouse Grill (Offer local produce?)
Has student ever lived on a farm?	Ozark Natural Foods (Offer local produce?)
Has student ever grown a garden with family?	Taco Bell (Offer local produce?)
Has student been to a farmer's market?	McDonald's (Offer local produce?)
Did student take an agriculture class in junior high school?	Pizza Hut (Offer local produce?)
Did student take an agriculture class in high school?	Burger King (Offer local produce?)
Servings of fast food per week	Does student think there are benefits to local produce?
Servings of vegetables per week	Does student think there are disadvantages to local produce?
Servings of fruit per week	Correct/Incorrect (Arkansas Produce)
Has student participated in a farm to school program?	Correct/Incorrect (Food Miles)
	Percentage Correct of Fruits and Vegetables (not fast food)
	Percentage Correct (Knowledge of local produce)

*H<sub>0</sub> 7: There is no significant difference by gender in experiences, knowledge and perceptions of local foods.*

This null hypothesis was tested using information gathered from the Experience, Knowledge and Classification sections of the survey (see Appendix A). Following the conduction of the survey the set of experiences, knowledge and perceptions to be tested were identified and placed in Table 2.3 below. However, the distribution of responses sometimes did not allow for a chi-square or fisher test to be conducted for some variables because students either answered the questions correctly or incorrectly in all cases. Those variables are marked with an \* in Table 2.3. Canonical correspondence analysis (CCA) and Monte Carlo statistical

tests were also run using the program Conaco to test whether the independent variable of gender explained statistically significantly the variance of the knowledge and perception of foods, which are dependent variables (see Table 2.2). The null hypothesis regarding that gender is irrelevant for the experience, knowledge or perception, as well as, the dependent variables as a whole were rejected if significant differences ( $p < 0.0500$ ) were found in the responses of men and women.

**Table 2.3 Chi-Square and Fisher’s Exact Test Variables Used to Find Variance of Gender**

<b>Experience</b>	<b>Knowledge</b>	<b>Perceptions</b>
Lived on a farm	The locations where one can purchase local food	Benefits of local foods
Grew a garden	The crop that Arkansas grows more of than any other state	Disadvantages of local foods
Been to a farmer’s market	How far produce travels	
Took an agricultural class in junior high	State program that promotes the sale of meats and produce grown in Arkansas*	
Took an agricultural class in high school	Visualization of fruits, vegetables and fast foods*	
Consumption of fruit		
Consumption of vegetables		
Consumption of fast food		

### **III. Results**

This chapter presents the results “Local Produce Survey” administered to the eleventh grade students within Northwest Arkansas. In the first part of the chapter, response rates of the student participants and summary statistics of variables important to the study are presented. Results of the hypothesis testing follow.

#### **A. Survey Response Rate and Representativeness of NWA Student Population**

The total number of students in the eleventh grade English classes from Bentonville High School (831), Farmington (141) and Lincoln (82) was 1054. However, the total participation group surveyed consisted of only 50 students. As discussed earlier, completed waiver forms were required before any student could participate in the survey. The participating high schools may not have had sufficient opportunity or allowed sufficient time for the distribution and collection of consent forms which could explain the small participation rate.

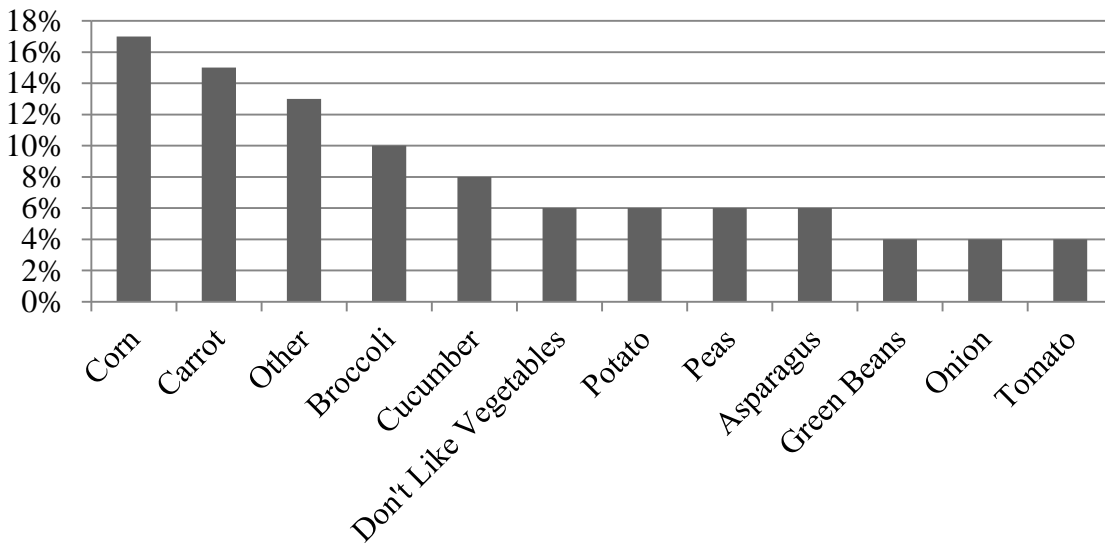
#### **B. Respondent Demographics**

The demographic information was drawn from the “About You” section of the survey. Survey respondents consisted of 11<sup>th</sup> grade students and with the exception of one student, all of the participants were between the ages of 16-17. Of the respondents, 20 were male and 30 were female. Student respondents attended one of three area High Schools Bentonville (6 students), Farmington (16 students), and Lincoln (28 students). The students all lived in the town of their school.

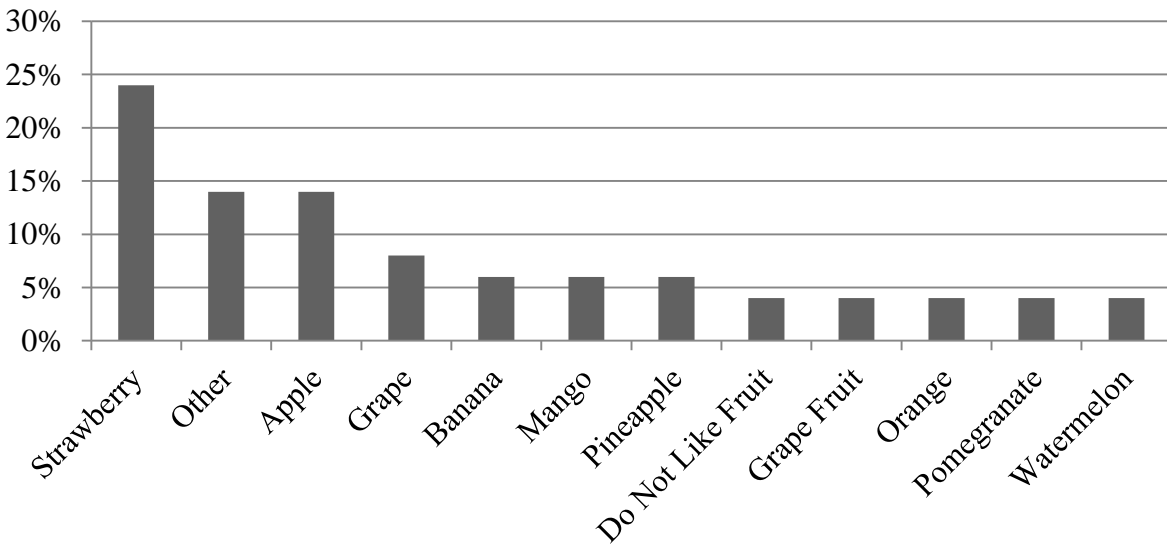
### C. Preferences for Fruits and Vegetables

Of the students that participated in this study, 94% stated that they liked vegetables. Of the students who enjoyed vegetables, corn (17%), carrots (15%) and broccoli (11%) were most commonly reported. When it came to fruit, 96% of the students indicated that they liked fruit. Of the students that enjoyed fruit, strawberries (26%) strawberries, apples (15%) and grapes (9%) grapes were most commonly reported. The ranges of responses for both vegetables and fruit are presented in figure 3.1 and 3.2.

**Figure 3.1 Preferences for Vegetables Across All Respondents**



**Figure 3.2 Preferences for Fruits Across All Respondents**



#### **D. Agricultural and Produce Purchasing/Consumption Experience**

Agriculturally related experiences include whether the student: 1) has lived on a farm, 2) has grown a garden, 3) has been to a farmers’ market and 4) has taken an agricultural course in junior high and/or high school. Produce experiences include 1) where their families purchase produce, 2) the amount of fast food, fruits and vegetables each student consumes in a week and 3) whether the student has participated in a Farm to School Program.

Sixteen percent of the students had lived on a farm that grew vegetables and/or fruit. Of these students, 57% (four students) grew corn. Sixty-eight percent of the students had grown a family garden that produced fruits and/or vegetables. Of fruits and vegetables grown in the garden, tomatoes were mentioned most often.

A majority (82%) of the students had been to a farmer’s market.

Eighteen percent of the students had taken an agriculture class while in junior high, while 54% enrolled in an agricultural course in high school.

In two separate questions, students were asked where their families bought produce – one question about fruits, the other about vegetables. For both questions, 72% of students said they

buy produce at Wal-Mart and Sam’s Club. Individually, for fruits and vegetables a more in-depth representation for the results of this question can be found in Table 3.1.

**Table 3.1 Locations in which Students’ Families Purchase Fruits and Vegetables**

Locations	Fruit Purchased (%)	Vegetables Purchased (%)
Walmart	66	66
Grocery/Store	14	16
Sam’s Club	6	6
Harps	2	4
Mi Tienda	2	2
Natural Foods Store	2	2
Neighborhood Market	2	0
The Mexican Store	2	2
No Response	4	2

Students were asked how many times a week they eat fast food, fruits, and vegetables for breakfast, lunch, and dinner. Tables 3.2, 3.3, and 3.4 show the range of servings of fast food, fruits, and vegetables students consumed per week. While 72% of students have at least one serving of fast food in a week, 98% of the students had less than 9 servings of fast food and 76% had 3 servings or less of fast food in a week. However, in terms of fruits and vegetables 64% of students had more than 3 servings of fruit and 80% of students had more than 3 servings of vegetables. Only 12% of the students suggested that they did not consume any servings of fruits and only 8% suggested they did not consume any servings of vegetables. Students that suggested they eat fast food, fruits, and/or vegetables for every meal of the week were minimal: for fast food only 2% eat fast food for every meal, 4% eat fruit for every meal, and 2% eat vegetables for every meal.

**Table 3.2 Servings of Fast Food per Week per Respondent**

Servings of Fast Food	Frequency	Percentage
0	14	28
1	12	24
2	8	16
3	4	8
4	5	10
5	4	8
9	2	4
21	1	2

**Table 3.3 Servings of Fruit per Week per Respondent**

Servings of Fruit	Frequency	Percentage
0	6	12
1	2	4
2	5	10
3	5	10
4	3	6
5	2	4
6	3	6
7	4	8
8	4	8
9	5	10
10	1	2
11	1	2
12	1	2
13	2	4
14	2	4
15	1	2
19	1	2
21	2	4

**Table 3.4 Servings of Vegetables per Week per Respondent**

Servings of Vegetables	Frequency	Percentage
0	4	8
2	1	2
3	5	10
4	3	6
5	4	8
6	4	8
7	6	12
8	3	6
10	1	2
11	3	6
12	5	10
13	4	8
14	4	8
19	2	4
21	1	2

The final question within this section asked the students if they had ever participated in a Farm to School Program. In this study, only two of the students suggested that they had participated in a Farm to School program. However, when asked what event it was that they participated in one answered “petting zoo” while the other answered FFA (Future Farmers of America).

### **E. Students’ Knowledge About Local Produce**

Students were first asked to identify from a list of sixteen businesses, which of them sold local produce (see Table 3.5). Of the 16 businesses, students most often stated that Fayetteville Farmer’s Market, Ozark Natural Foods, and Harps sold local produce. Students least often reported Pizza Hut, Taco Bell, and Burger King as places that sold local produce. The places that actually sell local produce are Wal-Mart, Sam’s, Ozark Natural Foods, Marvin’s IGA,



Harps, Green House Grill, and Fayetteville Farmer’s Market. This information will be revisited in the hypothesis testing section.

**Table 3.5 Student “Yes” Response to Local Produce Availability by Vendor**

Business	Frequency	Percentage
Fayetteville Farmer’s Market	43	86
Ozark Natural Foods	36	72
Harps	32	64
Walmart	30	60
Marvin’s IGA	25	50
Sam’s Club	21	42
Greenhouse Grill	4	8
Chik-Fil-A	3	6
McDonald’s	3	6
Pizza Hut	3	6
Taco Bell	2	4
Burger King	2	4

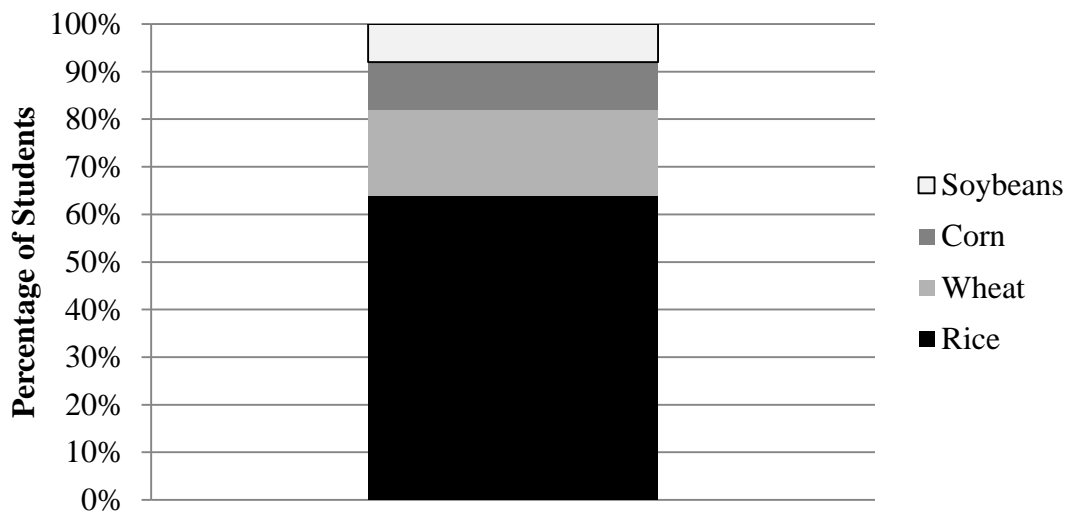
This next section of the survey also asked students whether benefits or disadvantages existed in purchasing local fruits and vegetables. Of the survey participants, 94% believed that purchasing local produce has benefits. The benefits that were listed by the students included: fresher products, sales benefits local farmer/economy, the produce is healthy, the consumer knows where it was grown, the produce is cheaper, better taste/better quality, it contains less preservatives/chemicals, and incurs less travel. Of these, the most reoccurring answers were fresher products (34 percent of students) and the benefits to the local farmers/economy (32 percent of students).

Some participants (39%) indicated that there are disadvantages to the purchasing of local produce. The disadvantages that were listed by the students included: the produce is unhealthy or it is of poor quality/not fresh, the local products have limited availability due to growing seasons, as well as lower crop yields, the consumer does not know the growing process, and

more expensive. The most prominent concern students had with local produce was that local produce is sometimes poor in quality and often not as fresh as the supermarkets (14 percent of students).

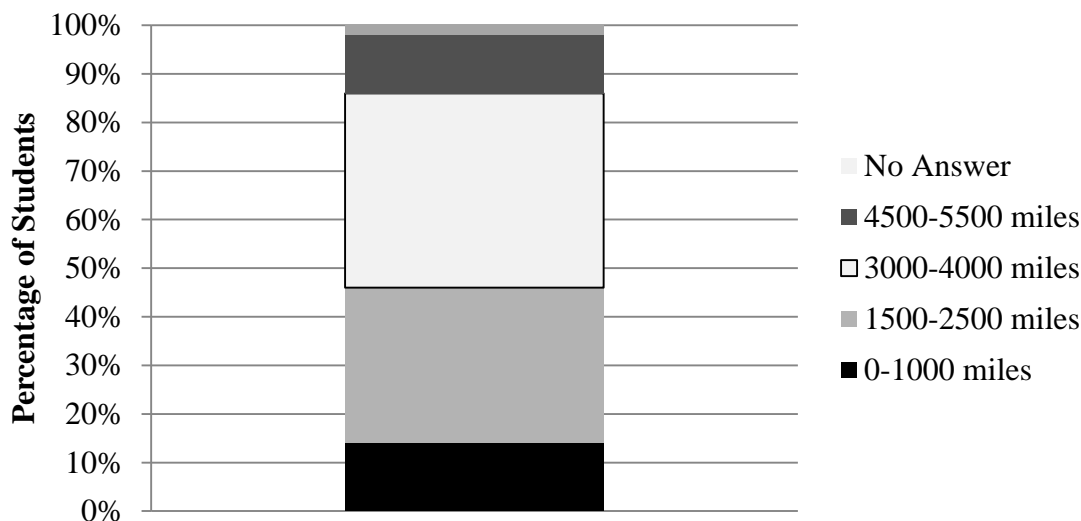
Students were asked to determine which of four commodities (soybean rice, corn and wheat) Arkansas produces more of than any other state (see Figure 3.3). Sixty-four percent answered correctly by choosing rice. Arkansas produces more rice than any other state; in 2012 Arkansas produced around 50% of all the rice grown in the United States, harvesting 2,677,000 acres of rice (Arkansas Ag Statistics, 2012). Of the 36% who answered incorrectly, half of them selected corn.

**Figure 3.3 Respondent’s Answers for Arkansas’ Highest Crop Yield**



Students were asked among four ranges of values given, how far on average their food travels. The range of student responses is found in Figure 3.4. Of the respondents, 14% percent of students chose the shortest distance of 0-1,000 miles while only 8% chose the longest difference of 4,500-5,500 miles. Food miles are further discussed in the hypothesis section below.

**Figure 3.4 Responses to Distance from Farm to Table**



The final question in the “Knowledge” section of the survey asked the students to identify the name of the state program that promotes the sale of meats and produce grown in Arkansas. None of fifty students got this question correct; however 21% of the students that answered indicated that Tyson promotes the sale of meats and produce grown in Arkansas.

#### **F. Identification of Fast Foods and Produce**

Students were asked to classify pictures of food that were shown to them on a projector screen. The pictures consisted of four fast food items (taco, Big Mac/burger, French fries, and pizza) and six fruits and vegetables (strawberries, blueberries, blackberries, sweet potato, corn, and cucumbers). Table 3.6 shows the responses of the students. Students correctly identified strawberries and corn most often (100%), then blueberries (96%), cucumbers (86%), blackberries (66%), and sweet potatoes (64%). Overall, 64% of the students that participate in this study

incorrectly identified at least one fruit or vegetable. This is further discussed in the hypothesis section.

**Table 3.6 Percentage of Students’ Ability to Correctly Identify Fast Foods and Produce**

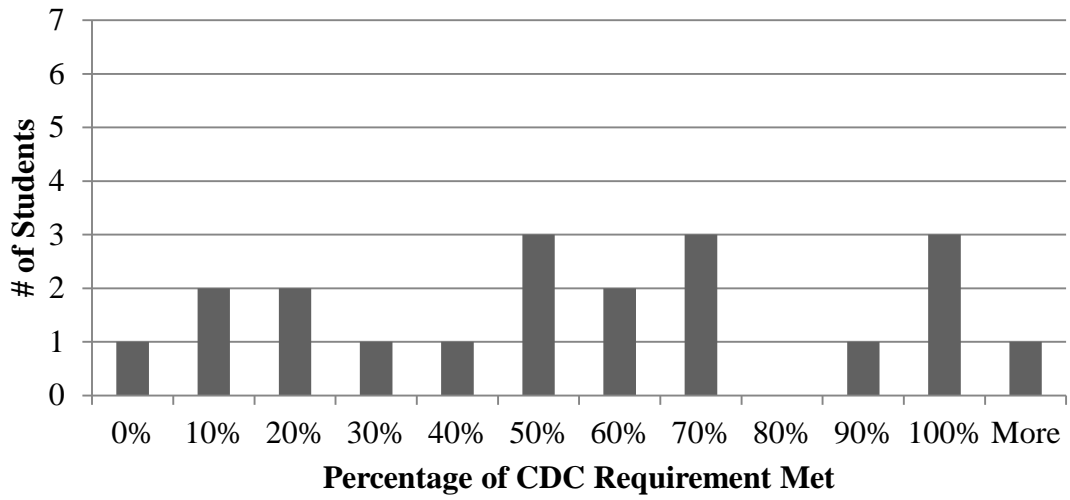
<b>Fast Foods and Produce</b>	<b>Correct (%)</b>
Taco	100
Burger	100
French Fries	100
Pizza	100
Strawberries	100
Corn	100
Blueberries	96
Cucumber	86
Blackberries	66
Sweet Potatoes	64

### **G. Hypothesis Testing**

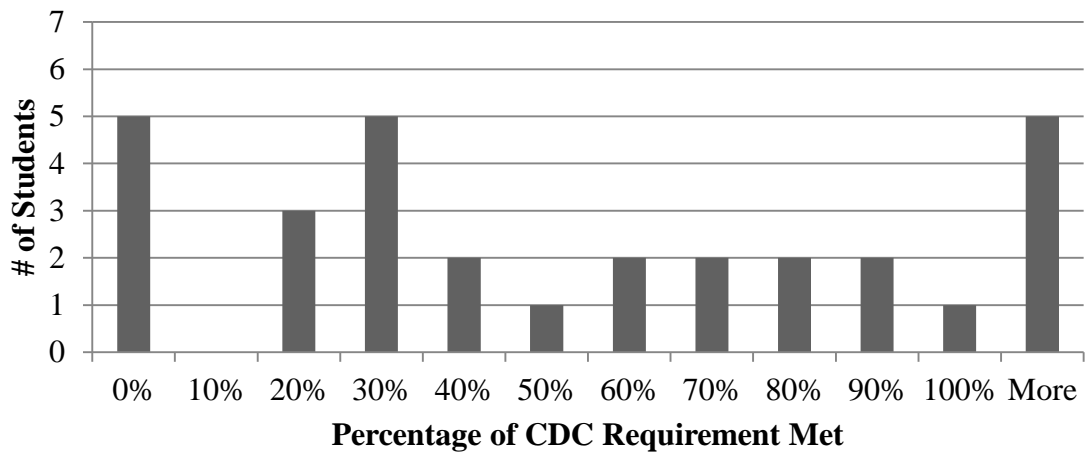
*H<sub>0</sub> 1: At least 10% of NWA 11th grade students are meeting CDC guidelines for the weekly intake requirements of fruits and vegetables.*

The CDC recommends a number of daily servings of fruit (2 for males, 1.5 for females) and vegetables (3 for males and 2.5 for females) (Center for Disease Control and Prevention) (Kim et al., 2011). The four charts below (Figures 3.5, 3.6, 3.7, and 3.8) depict the students’ fruit and vegetable consumption. These results show that 10% of the male students and 14% of the female students met the weekly fruit intake recommendations; therefore I fail to reject the hypothesis that at least 10% of students are meeting CDC fruit intake recommendations. However, for vegetables no male students and only 7% of female students met the intake recommendations. Therefore, the hypothesis that at least 10% of students meet CDC vegetable intake requirements is rejected.

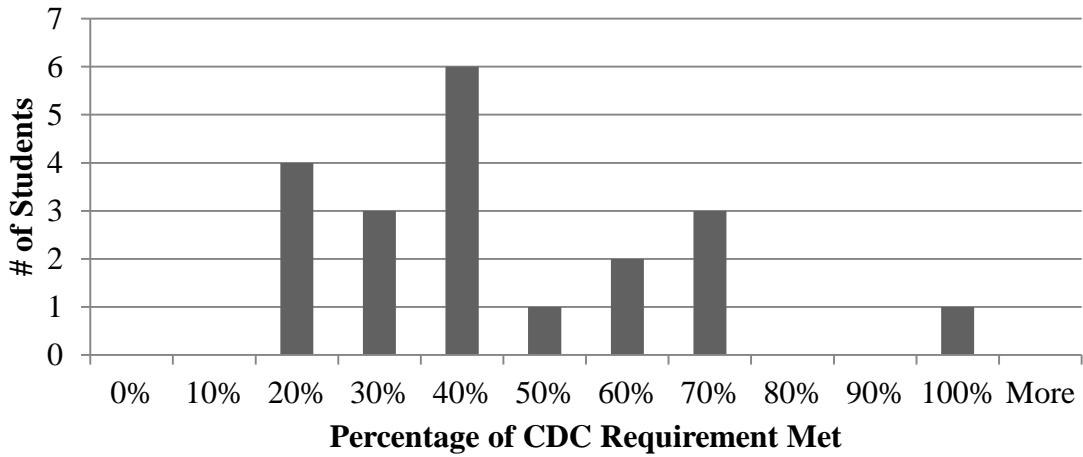
**Figure 3.5 Fruit Consumption of Male Students**



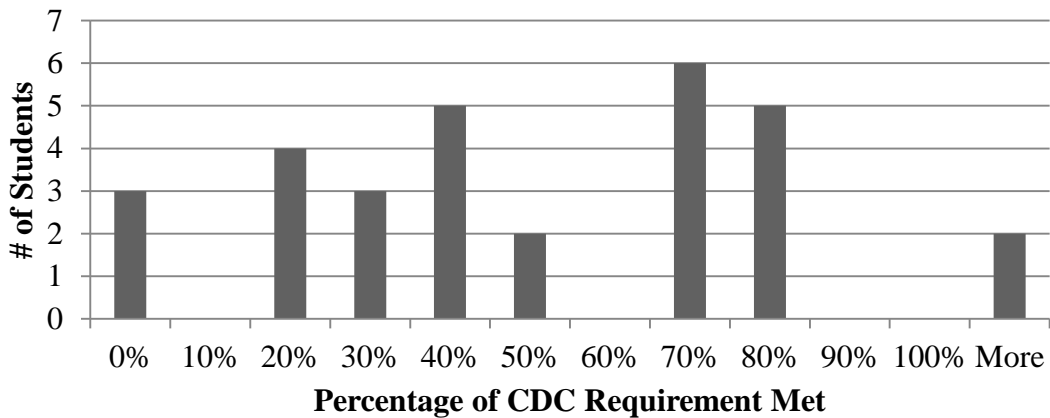
**Figure 3.6 Fruit Consumption of Female Students**



**Figure 3.7 Vegetable Consumption of Male Students**



**Figure 3.8 Vegetable Consumption of Female Students**

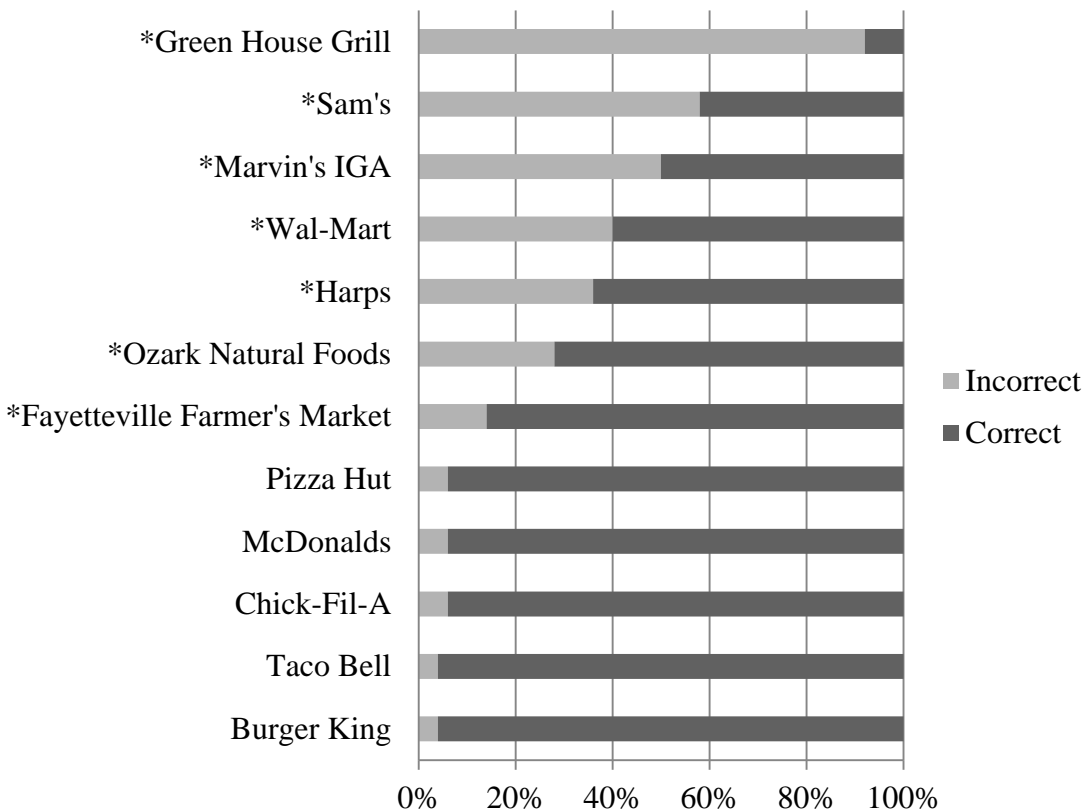


*H<sub>0</sub>2: Less than half of NWA students have proficient knowledge of where to buy local produce in NWA.*

As discussed in the Knowledge section above, students were asked which of 12 businesses in the area sold local produce. A summary of all responses was previously presented in Table 3.5. The places in this list that actually sold local produce were: Wal-Mart, Sam's, Ozark Natural Foods, Marvin's IGA, Harps, Green House Grill, and Fayetteville Farmer's

Market. Students had the highest percentages of correct answers regarding the fast food businesses. Most students indicated these establishments do not sell local foods. A majority (86%) of students correctly chose the Fayetteville Farmers Market as a place to purchase local foods. But a much smaller percentage knew that the Green House Grill and the grocery retailers sold local produce. Students were assigned a letter grade for this section based upon the number of correct selections out of the 16 businesses. The percentage of students earning an A through an F is presented in Table 3.7. Only 38% of all students (40% of males and 37% of females) scored a B or better. Therefore, the null hypothesis that at least 50% of students had a proficient knowledge of where to buy local produce was rejected.

**Figure 3.9 Percentages of Correct Answers for Local Produce Sales by Vendor**



**Table 3.7 Percentages of Respondents' Grades on Local Produce Sales**

<b>Grade</b>	<b>Male</b>	<b>Female</b>	<b>Overall</b>
A	35%	27%	30%
B	5%	10%	8%
C	25%	10%	16%
D	0%	20%	12%
F	35%	33%	34%

*H<sub>0</sub>3: At least 50% of NWA students are aware of how far their food travels, on average, from the farm to their plates.*

Figure 3.4 above presented the percentage of students who chose each of the four potential answers to the question regarding how far, on average, their food travels. The correct answer was 1500-2500 miles. Only 32% of the students made the correct choice. Since this number is less than 50 percent, the null hypothesis was rejected.

*H<sub>0</sub>4: At least 91% of NWA students are capable of visually identifying a sample of fruits and at least 78% of NWA students are capable of visually identifying a sample of vegetables that are grown in Arkansas.*

As stated in section F above, all students were not able to recognize all fruits and vegetables. However, for the fruit at least 96 percent of students were able to recognize strawberries and blueberries, resulting in the failure to reject the null hypothesis that less than 91 percent of students are capable of visually identifying a sample of fruits grown in an area. Furthermore, for the vegetables at least 86 percent of the students were able to recognize cucumbers and corn, resulting in the failure to reject the null hypothesis that less than 78 percent of students are capable of visually identifying a sample of vegetables grown in an area. Though these fruits and vegetables failed to reject the hypothesis, there is a fruit and a vegetable from this section that did reject the hypothesis. The fruit that resulted in the rejecting of the null



hypothesis was blackberries, with only 66 percent of students correctly identifying the fruit. The vegetable that resulted in the rejecting of the null hypothesis was sweet potatoes, with only 64 percent of students correctly identifying the vegetable.

*H<sub>0</sub> 5: There is no significant difference in a student's ability to identify fruits and vegetables based on eight experiences: 1) lived on a farm, 2) grew a garden, 3) been to a farmer's market, 4) took an agricultural class in high school, 5) consumption of fruit, 6) consumption of vegetables, 7) consumption of fast food and 8) where the student attends high school.*

Chi square or fishers tests were used to determine if any of these eight experiences influenced a student's ability to correctly identify fruits and vegetables. Before these test results are presented, the following must be noted. First, because of the low responses from Bentonville (6 responses) Bentonville and Farmington students were combined and compared to Lincoln students. Secondly, in cases where there was very little variation in responses (i.e. most students both correctly or incorrectly identified a fruit or vegetable and are represented by N/A within the table) the chi squares could not be run. Results of the tests conducted are presented in Table 3.8.

For all fruits and vegetables, growing a garden was only significant ( $p=0.0332$ ; Table 3.8) in the correct identification of sweet potatoes. Attending the farmer's market and high school agricultural class enrollment did not significantly affect the students' ability to identify any fast food, fruits, or vegetables. Consumption of fast foods, fruits and vegetables also failed to affect the students' ability to identify and food, fruits, or vegetables. Lastly, the school in which the students attend only had a significant result ( $p=0.0332$ ; Table 3.8) that explains the variance of their ability to identify a sweet potato.

**Table 3.8 P-Values for the Ability to Correctly Identify Fast Food and Produce Based on Seven Experiences**

<b>Identified This Food Item Correctly</b>	<b>Grown a Garden</b>	<b>Farmers' Market Attendance</b>	<b>High School Agricultural Class</b>	<b>Consumption of Fruit</b>	<b>Consumption of Vegetables</b>	<b>Consumption of fast foods</b>	<b>Bent./Farm . vs. Lincoln</b>
Taco	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Burger	N/A	N/A	N/A	N/A	N/A	N/A	N/A
French Fries	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pizza	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Strawberries	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Corn	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Blueberries	0.4580	0.6694	0.2865	0.8686	1.0000	1.0000	0.4441
Cucumber	0.3343	0.4051	0.2045	0.4203	0.1458	0.0337	0.1175
Blackberries	0.2432	0.1011	0.2100	0.0664	0.0384	0.2296	0.2327
Sweet Potatoes	<b>0.0332</b>	0.1230	0.2291	0.9191	0.2694	0.9006	<b>0.0332</b>

\*N/A suggests that the distribution of the responses did not allow for a p-value to be calculated.

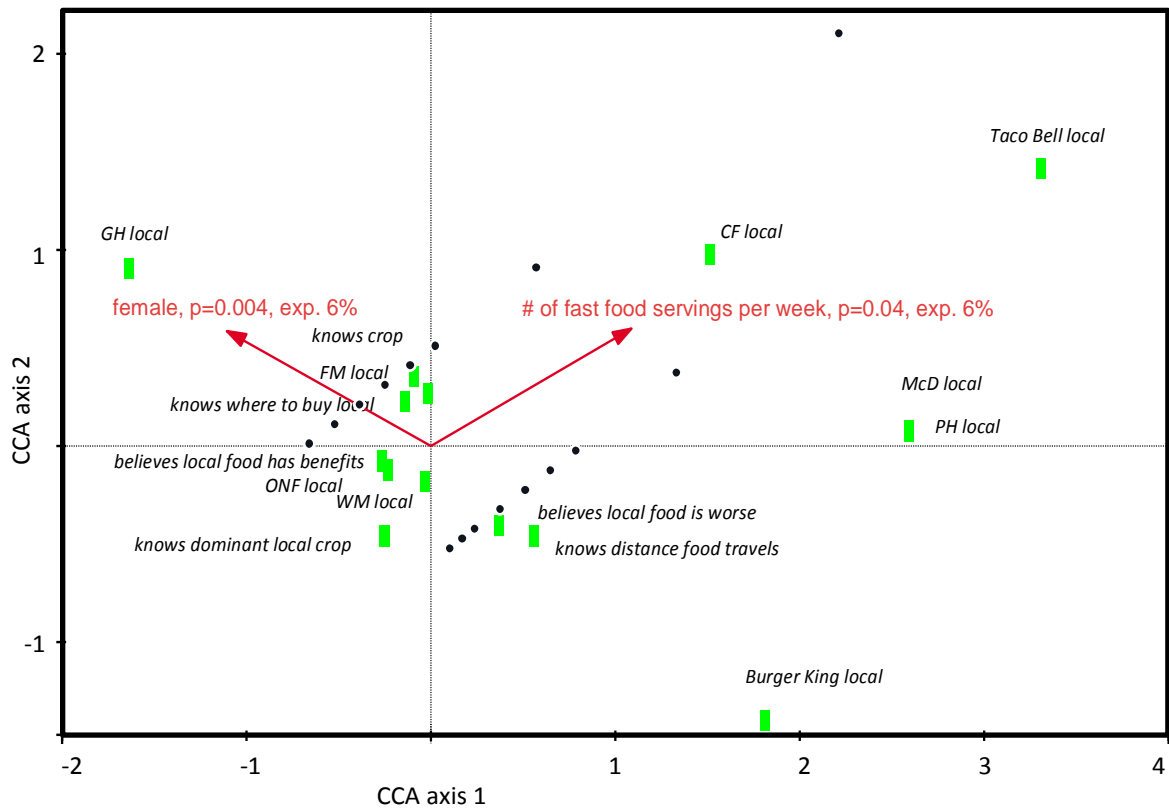
*H<sub>0</sub>6: The number of fast food servings the students consume will not significantly explain the knowledge and perceptions of local foods.*

With the CCA and the Monte Carlo Permutations tests the independent variable of the number of fast food servings the students consumed in a week was statistically analyzed along with the dependent variables found in Table 2.2 to find whether it produced statistically significant results. As seen in Table 3.9, of the 14 tests run, two significant results were identified. A significant ( $p=0.030$ , Table 3.9) relation was found from the comparison of the servings of fast food per week and the dependent variables (see Table 2.2) as a whole. Consequently, the null hypothesis suggesting that the number of fast food servings the students consume would not significantly explain the knowledge and perception of local foods was rejected because the the number of fast food servings the students consume in a week did significantly describe the variance of the dependent variables as a whole that can be found in Table 2.2.

**Table 3.9 Results of Canonical Correspondence Analysis (CCA) including a Monte Carlo Permutation Test**

<b>Independent variable</b>		<b>Var. expl. (%)</b>	<b>p-value</b>	<b>F-value</b>
Ffserv	<b>Servings Fast Food per week</b>	6.00	<b>0.030</b>	3.08
Frserv	Servings Fruit per week	1.30	0.672	0.64
Vegserv	Servings Vegetables per week	2.30	0.312	1.12
female	<b>Gender</b>	6.20	<b>0.004</b>	3.16
school	Name of School	2.80	0.202	1.36
L_FB	Lincoln vs. Farmington and Bentonville	2.80	0.182	1.37
F_BL	Farmington vs. Bentonville and Lincoln	1.50	0.638	0.71
ZIP	ZIP	0.80	0.470	0.38
Farmexp	Has student ever lived on a farm	2.20	0.200	1.10
Garexp	Has student ever grown a garden with family	1.60	0.644	0.78
FMexp	Has the student been to a farmer's market	2.00	0.306	1.00
AGJH	Did the student take agriculture class in junior high	1.90	0.342	0.94
AGH	Did the student take agriculture class in high school	1.90	0.388	1.07
Fa_sch	Student participated in Farm to School program	0.60	0.832	0.30

**Figure 3.10 Canonical Correspondence Analysis with the Significant Independent Variables**

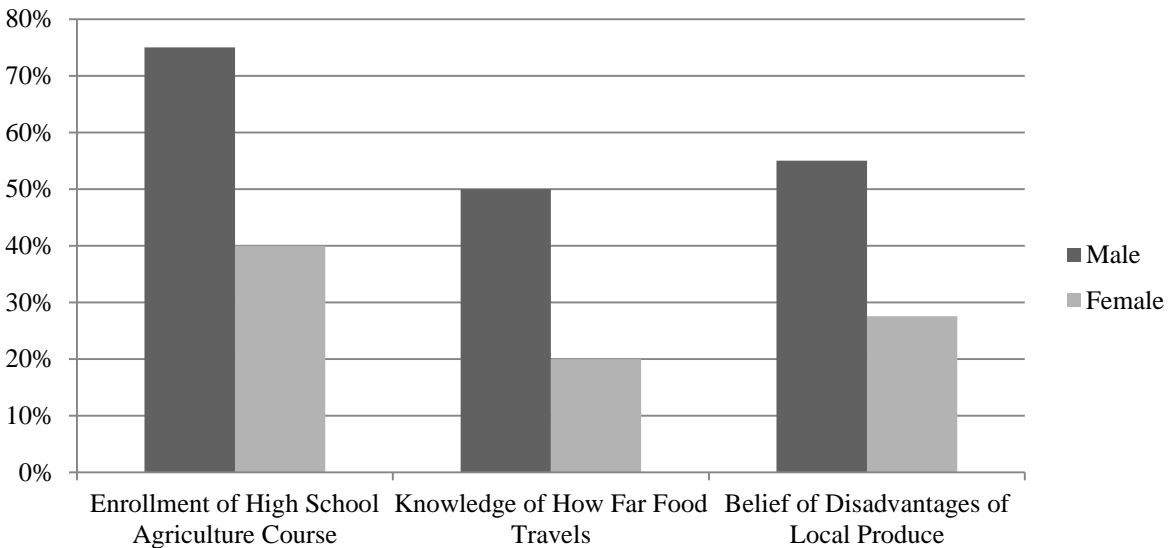


*H<sub>0</sub> 7: There is no significant difference by gender in experiences, knowledge and perceptions of local foods.*

Chi-square and Fisher’s exact tests were used to find whether there was a significant difference by gender in experiences, knowledge and perceptions of local foods in order to reject this null hypothesis. Most of the experiences, knowledge, and perceptions failed to reject the null hypothesis. However, there was a single variable for each of the categories (experiences, knowledge, and perceptions) that did reject the null hypothesis. Within the category of experiences, gender did significantly ( $p=0.0124$ ; Table 3.10) explain the variance of the number of students that had taken an agricultural class in high school. A greater percentage of males (75%) enrolled in the agriculture courses than their female (40%) counterparts. When it came to

the category of knowledge, the significant ( $p=0.0223$ ; Table 3.11) variable in which the variance was explained by gender was the students' knowledge how far their food travels from farm to plate. Males (50%), again, were more aware of how far their food travels than their female (20%) counterparts. In the category of perceptions the variable of gender significantly ( $p=0.0382$ ; Table 3.12) explained the variance of the perception of the disadvantages of local foods. In this case males (55%) were more likely to believe that local produce has disadvantages than their female (27.59%) counterparts.

**Figure 3.11 Gender Variance with Local Produce Experience, Knowledge, and Perception**



Also, as mentioned earlier, CCA and Monte Carlo Permutations tests were performed to find whether the independent variable gender (along with 13 other independent variables) would describe the variance of the dependent variables found in Table 2.2. Following the use of these tests, it was found that gender was the most important independent variables that significantly ( $p=0.004$ ; Table 3.9) described the variance of the dependent variables as a whole. Therefore, this null hypothesis is rejected according to the results of the test using multivariate statistics.

**Table 3.10 P-Values for Experience Variance Based on Gender**

<b>Experience</b>	<b>p-value</b>
Lived on a farm*	0.2101
Grew a garden	0.2365
Been to a farmer's market	0.2702
Took an agricultural class in junior high	0.1696
Took an agricultural class in high school	<b>0.0124</b>
Consumption of fruit	0.4804
Consumption of vegetables	0.1407
Consumption of fast food	0.3364

**Table 3.11 P-Values for Knowledge Variance Based on Gender**

<b>Knowledge</b>	<b>p-value</b>
<i>The locations where one can purchase local food at:</i>	
Fayetteville Farmer’s Market	0.2711
Chick-Fil-A	0.2908
Walmart	0.1196
Green House Grill	0.1190
Ozark Natural Foods	0.2365
Taco Bell	0.1551
Marvin’s IGA	0.1193
McDonald’s	0.0582
Harps	0.1857
Pizza Hut	0.0582
Sam’s Club	0.2158
Burger King	0.1551
The crop that Arkansas grows more of than any other state	0.1527
How far produce travels from farm to plate	<b>0.0223</b>
State program that promotes the sale of meats and produce grown in Arkansas	N/A
<i>Identification of fruits, vegetables and fast foods:</i>	
Taco	N/A
Burger	N/A
French Fries	N/A
Pizza	N/A
Strawberries	N/A
Corn	N/A
Blueberries	0.1551
Cucumber	0.1969
Blackberries	0.2365
Sweet Potatoes	0.2096

\*N/A suggests that the distribution of the responses did not allow for a p-value to be calculated.

**Table 3.12 P-Values for Perceptions Variance Based on Gender**

<b>Perceptions</b>	<b>p-value</b>
Benefits of local foods	0.4439
Disadvantages of local foods	<b>0.0382</b>

#### **IV. Discussion**

The total number of completed surveys fell very short of the 247 surveys needed; this study is not representative of eleventh grade students from Northwest Arkansas. Consequently, the information provided here is presented as a case study and may serve to guide and inform similar future studies in the region.

*H<sub>0</sub> 1: At least 10% of NWA 11<sup>th</sup> grade students are meeting CDC guidelines for the weekly intake requirements of fruits and vegetables.*

Because 94% of the student participants indicated that they liked vegetables and 96% of the student participants indicated that they liked fruit, one might assume that the rate of fruit and vegetable consumption would be high in this group. However, upon testing of the first hypothesis, it was determined that less than 10% of the students surveyed met the recommended daily intake of fruits and vegetables. This seems to indicate a disconnect between the students' preferences and their actual intake of food.

This could potentially be a result of many factors including parental and psychosocial influences, sensory characteristics, and/or socio-economic backgrounds as suggested in chapter I. Especially since socio-economic status is relatively low in Arkansas as a whole when compared to other states in the United State (CDC, 2011). The number of males and females failing to meet the requirements were similar, indicating that gender seems to have no effect. It is worth noting that this is a different result than what was found in the study by Emanuel et al. (2012) where females consumed more fruits and vegetables than their male counter parts. However, with more student participants this pilot study may have found the same result, because there were more females that met the fruit consumption, only not enough to find a statistically significant relationship.



This lack of fruit and vegetable intake should be noted because of the current pressing statistics that are affecting children in the United States. Across the nation, we are witnessing an increase in childhood obesity and Type II diabetes (Heneman et al., 2008; Flegal, 2005). This increase is costing this nation up to \$14 billion annually in health care alone. If students continue to fail to consume the proper amount of fruits and vegetables it is possible that more students will become increasingly overweight. Studies have shown that an increase in fruit and vegetable consumption could have a positive effect on the obese and overweight populations (Lin and Morrison, 2003).

*H<sub>0</sub> 2: Less than half of NWA students have proficient knowledge of where to buy local produce in NWA.*

As shown above, only slightly more than a third of the students surveyed had proficient (a letter grade of B or better) knowledge of where to buy local produce. There are possible reasons that could explain the results. First, incorrect answers may be tied to lack of awareness of these retailers or restaurants as opposed to their products. The Green House Grill may have been missed so often (90% of the time) because of its location. Green House Grill is in Fayetteville, Arkansas, a range of five to 26 miles from each of the schools included in this study. The original intention was to survey the students at Fayetteville High; however the schools information was unavailable, so this question was not optimal. It is not a chain like most of the other eateries within the list, so the incorrect responses may be a result of a lack of awareness of the place itself, rather than a lack of awareness of whether they sell local produce. Marvin's IGA was missed 50% of the time. None of the students listed Marvin's IGA as the place where they buy their fruits and vegetables. This too could indicate lack of familiarity with the store. Lack of familiarity with the retailers does not sufficiently explain the lack of

knowledge, however. Most students were experienced with Walmart and Sam's Club, but were not aware that these businesses sell local produce. This fact is not entirely surprising because Keeling-Bond et al. (2006) and Cranfield et al. (2012) state that local produce is often known to be available at farmers' markets and road side stands. While other studies (Chambers et al., 2007; Guptill and Wilkins, 2002; Selfa and Qazi 2005; Cranfield et al., 2012) have shown that many are unaware that larger retailers, such as Wal-Mart, are beginning to support local markets.

Even large retailers beginning to support local market may not be sufficient to increase awareness of when produce is grown locally. Despite Walmart's support of local markets, 40% of students believed that Walmart did not sell local produce and 58% believed Sam's Club did not sell local produce. This lack of knowledge is surprising for many reasons. First, within the survey, 72% of students answered that they buy their produce from Walmart or Sam's Club, so there is not a lack of experience in attending either place. The lack of knowledge could be associated with Walmart being a worldwide corporation and students not noticing that Wal-Mart is taking steps to increase their support for the small farmer. Currently, Walmart Stores, Inc. has vowed to keep at least 9% of their produce local, when it is available (Clifford, 2010).

*H<sub>03</sub>: At least 50% of NWA students are aware of how far their food travels, on average, from the farm to their plates.*

In addition to a lack of knowledge about buying local produce, students were also not knowledgeable about where their food is grown. Less than a third of students were aware that, on average food travels between 1500 and 2500 miles from farm to table. This possibly indicates that students are unaware of where most of their food is produced or of the actual distances between production areas and where they live. The study that was found that was closest to this variable was a study in the United Kingdom which found that only 19 percent of

surveyed grocery store shoppers were able to identify the country of origin of various products (Kemp et.al, 2010). Food travel or food miles have become a hot topic in the agricultural industry due to their effect on greenhouse emissions and increased fuel prices (Trexler, 2011).

*H<sub>0</sub> 4: At least 91% of NWA students are capable of visually identifying a sample of fruits and at least 78% of NWA students are capable of visually identifying a sample of vegetables that are grown in Arkansas.*

As shown above, students were capable of correctly identifying the majority of fruits and vegetables that they were presented with in the course of the survey. However, 64% of the students that participate in this study incorrectly identified at least one fruit or vegetable. The number of misidentifications of some relatively common produce seems to indicate that, even though students have stated that they enjoy fruits and vegetables, they may only be familiar with a fairly narrow range of available products. As the majority of students were able to correctly identify most of the sample items, the null hypothesis could not be rejected. The higher number of blackberry misidentifications seemed to be caused by the students often confusing blackberries with closely related raspberries. A possible explanation for the higher sweet potato misidentifications may stem from the fact that, of the produce listed, sweet potatoes are most commonly served in a prepared form that bears less resemblance to the raw form than the other products.

*H<sub>0</sub>5: There is no significant difference in a student's ability to identify fruits and vegetables based on eight experiences: 1) lived on a farm, 2) grew a garden, 3) been to a farmer's market, 4) took an agricultural class in high school, 5) consumption of fruit, 6) consumption of vegetables, 7) consumption of fast food and 8) where the student attends high school.*

It was found that only the experience in growing gardens and the school in which the students attended significantly affected the students' ability to identify fruit and vegetables within the Local Produce Survey. To begin, this could be a direct result of students' interaction and experience with the process of growing produce. As discussed in the first chapter Bagdonis (2009) and Berlin (2002) found that students experiencing less farmland and agricultural processes can have a negative effect on knowledge about local produce and agriculture. The ability of students that had grown a garden to identify a sweet potato in relationship to the relative inability to identify a sweet potato of students that had not grown a garden is a prime example of experiences such as producing fruits and/or vegetables in gardens having a positive influence on the students' produce knowledge. The experience that some students in this survey gained by growing corn on their farms may have played a role in the identification capabilities as well. However, this could not be tested within this preliminary study because there was not enough variability in those who lived on a farm and those who did not to conduct the test, as only a few lived on a farm. This study suggests that the more experience working with fruits and/or vegetables, the greater the ability of the student to identify more fruits and/or vegetables grown within Arkansas.

*H<sub>0</sub>6: The number of fast food servings the students consume will not significantly explain the knowledge and perceptions of local foods.*

The sixth hypothesis involved the influence of the average number of servings of fast food that students consumed in a week on the other variables surveyed. Several of these variables showed a strong correlation with the fast food servings. Students who ate an above average number of fast food meals per week were more likely to know that Chik-Fil-A, Taco Bell, McDonalds and Pizza Hut did not serve local produce. This is likely a result of these students' greater experience and knowledge of these types of establishments.

Students who ate a below average number of fast food meals per week were more likely to believe that local food has benefits. They were also more aware that Walmart and Ozark Natural Foods were retailers that carried local produce. Additionally, they were more likely to know that rice was the most common crop farmed in Arkansas. As these students are eating more meals prepared at home, they are more likely to be exposed to groceries and, perhaps, have a greater familiarity with the vendors that sell these items. The connection between the lower number of fast food meals and the belief that local food has benefits may come from the greater knowledge and consumption of local or, at least, home cooked foods rather than fast food items. However, the link between lower fast food consumption and greater knowledge of Arkansas farming is not readily apparent.

*H<sub>0</sub>7: There is no significant difference by gender in experiences, knowledge and perceptions of local foods.*

Gender also played a role when compared to the other variables that were surveyed. Females had a greater knowledge of where to buy local produce in general and were specifically more aware that Greenhouse Grill and the farmer's market carried local produce. They were also

more likely to know that rice was Arkansas' dominant crop. Males were more likely to believe that local food has negative effects and were more knowledgeable about the average distance that food travels from farm to table. They were also more likely to know that Burger King was not a retailer that carried local foods. The reasons for these particular correlations are unclear. However, one of the results of the statistical analysis suggested that males are significantly ( $p=0.0124$ ; Table 3.10) more likely to enroll in a high school agriculture course. This possibly suggests that males are more likely to be in an environment conducive to further their educational opportunities in the field of agriculture. Females were also found to have a significantly ( $p=0.038$ ; Table 3.12) more positive outlook of local produce, matching what was found in the studies discussed in chapter I (Gallons et al., 1997; Jekanowski, Williams II, and Schiek, 2000; Kezis et al., 1998; Weatherell et al., 2003, Gracia, Magistris, and Nayga, 2012). Furthermore, it is possible that with a larger sample size the differences could be more strongly correlated. Because the variance was apparent in a small sample size, it may become more apparent with a more in depth study.

## **V. Conclusions**

In this case study it was found that most students are not meeting the daily fruit and/or vegetable consumption recommended by the CDC; although students' ability to identify fruits, vegetables, and fast foods was very high. Most of the experiences reviewed did not affect their ability to identify these commodities. The only exception was in the ability to identify a sweet potato. In this instance, it was found that the schools in which the students attended (Lincoln high school was less likely to identify a sweet potato than Farmington and Bentonville high schools) and/or the students that had grown a garden that produced fruits and/or vegetables affected their ability to more accurately identify a sweet potato.

According to this case study, students lacked knowledge of where to purchase local produce and how far their food travels. It was also found that as fast food consumption increased the students' ability to identify places that offer local produce for sale or on their menu decreased. Additionally, increased fast food consumption also decreased students' ability to identify Arkansas' most grown crop.

The final findings of the case study resulted in the importance of gender in the experiences, knowledge, and perceptions of local produce and agriculture. Though most variables of the survey did not show to be effected by the variable of gender, there were three variables that were found to have an effect. The male students were found to be more likely to enroll in high school agricultural classes and know how far produce travels on average from the farm to the dinner table. The female students' perception of local foods seemed to be more positive than that of their male counterparts, because female students were less likely to believe that local produce had disadvantages.

The results of this case study identified that students could use some improvements in many areas of local produce and agriculture. These findings suggest that both fast food consumption and gender play a role in the students' experience and knowledge with local produce and agriculture. With this knowledge it can be concluded that methods to address the reduction of fast food consumption in high school level students should be pursued within educational settings. It can also be concluded that gender differences in local produce and agriculture experience and knowledge should be addressed to offer opportunities for both male and female students to improve future actions, such as eating habits.

This case study is a start to a better understanding of the amount of experience and knowledge of local produce and agriculture within Northwest Arkansas high school students. This study should be replicated with representative samples to determine if results hold across the range of NWA eleventh grade students. If findings here hold true in a larger study, the information obtained should be used to further develop educational programming for schools. Based on previous studies by Morris et al. (2002) and Nolan (2005), the amount of interaction and exposure to local produce and agricultural knowledge may have an effect on the amount of fruit and vegetable consumption. Furthermore, information obtained could be used to work with places that sell local produce to aid in the improvement of students' daily fruit and vegetable intake.



## **A. Recommendations for Additional Research**

The following recommendations are made for future research:

1. A representative sample of NWA schools and students is needed to more accurately represent the perceptions and knowledge of eleventh grade students in northwest Arkansas.
2. This study can be replicated in other regions (with representative samples) to determine whether the variable of place or location has an effect on the results of the survey.
3. A similar study could be done with high school teachers in order to identify the amount of experience and knowledge with local produce and agriculture. This could be done to find whether high school teachers are able to offer students further experience and knowledge with local produce and agriculture.

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## Appendix A: Local Produce Survey

### Local Produce Survey

**Purpose:** The purpose of this survey is to analyze the experience and knowledge students have with local produce and agriculture. This survey is voluntary. All of your individual responses will be kept confidential. It is not necessary to place your name on the survey. I appreciate your help in collecting these data for my Master's thesis.

**Directions:** Please fill out every question.

If there is a blank \_\_\_\_\_ please write a word, phrase, or number.

If there are boxes like this [ ], please choose one answer to that question.

If there are circles like this O, please choose all of the answers that apply.

#### General Information

1. Do you like any vegetables?  
[ ] Yes. Which vegetable is your favorite? \_\_\_\_\_  
[ ] No, I do not like any vegetables.
2. Do you like any fruits?  
[ ] Yes. Which fruit is your favorite? \_\_\_\_\_  
[ ] No, I do not like any fruit.

#### Experiences

3. Have you lived on a farm that grew vegetables and/or fruit?  
[ ] Yes. If so, what did you grow? \_\_\_\_\_  
[ ] No, I never lived on a farm that grew fruits or vegetables. (Please go to #5)
4. How many years have you lived on a farm that grew fruits and/or vegetables? \_\_\_Years
5. Has your family had a garden (not on a farm) that produced fruit and/or vegetables?  
[ ] Yes. If so, what did you grow? \_\_\_\_\_  
[ ] No, my family never had a garden that produced fruit or vegetables. (Please go to #7)
6. In what year did you last have a garden? \_\_\_\_\_(example: 2010)
7. Have you ever been to a farmer's market? [ ] Yes [ ] No
  - a. Have you bought (or helped someone buy) fruit there? [ ] Yes [ ] No
  - b. Have you bought (or helped someone buy) vegetables there? [ ] Yes [ ] No
8. Did you take an agriculture class in junior high? [ ] Yes [ ] No
9. Have you taken an agriculture class in high school? [ ] Yes [ ] No
10. Where does your family usually buy fruits? \_\_\_\_\_
11. Where does your family usually buy vegetables? \_\_\_\_\_
12. How many times a week does your family eat fast food for:  
Breakfast \_\_\_\_\_ Lunch \_\_\_\_\_ Dinner \_\_\_\_\_
13. How many times a week does your family eat fruits for:  
Breakfast \_\_\_\_\_ Lunch \_\_\_\_\_ Dinner \_\_\_\_\_
14. How many times a week does your family eat vegetables for:  
Breakfast \_\_\_\_\_ Lunch \_\_\_\_\_ Dinner \_\_\_\_\_
15. Have you ever participated in a Farm to School Program event? [ ] No [ ] Yes. If so, what was the event? \_\_\_\_\_

**Knowledge**

*(local- means that the produce was grown in the state of Arkansas)*

16. Check the following places you can buy **local** produce in Northwest Arkansas.

- Fayetteville Farmer's Market
- Chick-Fil-A
- Wal-Mart
- Green House Grill
- Ozark Natural Foods
- Taco Bell
- Marvin's IGA
- McDonald's
- Harps
- Pizza Hut
- Sam's Club
- Burger King

17. Are there benefits of buying **local** produce? [ ] No [ ] Yes. If so, list some benefits.

18. Are there disadvantages of buying **local** produce? [ ] No [ ] Yes. If so, list some disadvantages.

19. Arkansas produces more \_\_\_\_\_ than any other state.  
[ ] Corn [ ] Rice [ ] Soybeans [ ] Wheat

20. Today, on average, how far does produce travel from a farm to your home? (In miles)  
[ ] 0 to 1000 [ ] 1500 to 2500 [ ] 3000 to 4000 [ ] 4500 to 5500

21. What is the name of the state program that promotes the sale of meats and produce grown in Arkansas? \_\_\_\_\_

**About You**

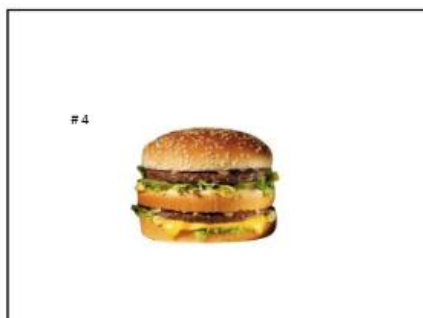
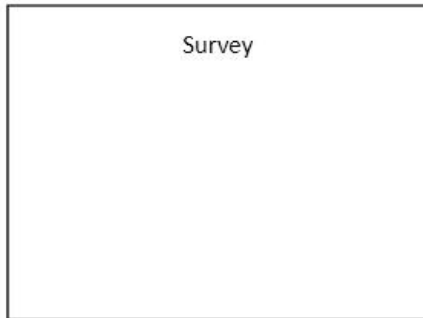
- 22. What is your gender? [ ] Male [ ] Female
- 23. What is your age? \_\_\_\_\_ Years old
- 24. What grade are you in? \_\_\_\_\_ Grade
- 25. Name of Your School: \_\_\_\_\_ (example: Farmington High School)
- 26. What is the zip code of your home address? \_\_\_\_\_

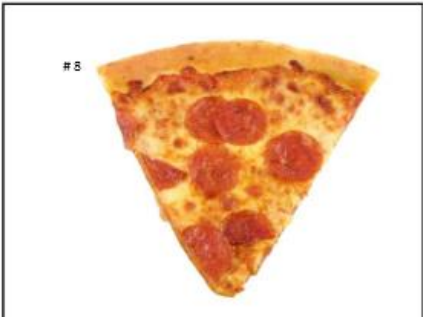
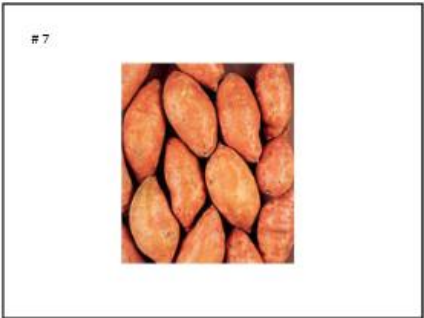
**Classification**

27. Please look at the pictures shown in class. Write the name of the object within each photo.

- 1. \_\_\_\_\_ Blueberries
- 2. \_\_\_\_\_ Sweet Potatoes
- 3. \_\_\_\_\_ Taco
- 4. \_\_\_\_\_ Blackberries
- 5. \_\_\_\_\_ Big Mac/Hamburger
- 6. \_\_\_\_\_ Cucumbers
- 7. \_\_\_\_\_ Corn
- 8. \_\_\_\_\_ French Fries
- 9. \_\_\_\_\_ Pizza
- 10. \_\_\_\_\_ Strawberries

## Appendix B: Survey Supplemental





## Appendix C: IRB Consent



Office of Research Compliance  
Institutional Review Board

February 6, 2012

### MEMORANDUM

TO: K. Colton Flynn  
Jennie Popp

FROM: Ro Windwalker  
IRB Coordinator

RE: New Protocol Approval

IRB Protocol #: 12-01-425

Protocol Title: *High School Student Knowledge of Local Foods*

Review Type:  EXEMPT  EXPEDITED  FULL IRB

Approved Project Period: Start Date: 02/03/2012 Expiration Date: 02/01/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (<http://vpred.uark.edu/210.php>). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

**This protocol has been approved for 600 participants.** If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or [irb@uark.edu](mailto:irb@uark.edu).

210 Administration Building • 1 University of Arkansas • Fayetteville, AR 72701  
Voice (479) 575-2208 • Fax (479) 575-3846 • Email [irb@uark.edu](mailto:irb@uark.edu)

*The University of Arkansas is an equal opportunity/affirmative action institution.*

## Appendix D: Principals' Consent



# BENTONVILLE HIGH SCHOOL

1801 Southeast J Street  
Bentonville, Arkansas 72712

(479) 254-5100 ♦ Fax: (479) 271-1184

<http://www.bentonvillek12.org>

2007 US Department of Education Blue Ribbon School  
IB World School

January 19, 2012

To whom it may concern:

I, Kim Garrett, Principal of Bentonville High School, give Mr. Colton Flynn, a Masters student at the University of Arkansas, permission to conduct his Local Product Survey at Bentonville High School to approximately 500 eleventh grade students.

Thank you,



Kim Garrett,  
Principal

COGNITO PRO VITA  
"Learning for Life"



# Lincoln High School

201 E. School Street  
Lincoln, Arkansas 72744



Mary Ann Spears, Principal  
479-824-3010 ext. 3013

Heather Bottoms, New Tech  
479-824-3010 ext. 3160

I Mrs. Heather Bottoms, Vice Principal and New Tech of Lincoln High School, give Mr. Colton Flynn, a Masters student at the University of Arkansas, permission to conduct his Local Produce Survey at Lincoln High School's eleventh grade students. The signature of the eleventh grade teacher is also present to show his agreement to work with Mr. Colton Flynn in conducting the Local Produce Survey to Lincoln High School's eleventh grade students.

[Redacted Signature]

[Vice Principle]

11/22/11

[Date]

[Redacted Signature]

[Teacher]

11/22/11

[Date]

[Redacted Signature]

[Researcher]

11/22/11

[Date]





Farmington High School  
 278 West Main Street  
 Farmington, Arkansas 72730  
 (479) 266-1860  
 Fax (479) 267-6065



Mr. Chris Webb  
 Principal  
 (479) 266-1860  
[cwebb@farmcards.org](mailto:cwebb@farmcards.org)

Mr. Bob Echols  
 Assistant Principal  
 (479) 266-1860  
[bechols@farmcards.org](mailto:bechols@farmcards.org)

I, Bob Echols, Assistant Principal of Farmington High School, give Mr. Colton Flynn, a Masters student at the University of Arkansas, permission to conduct his Local Produce Survey at Farmington High School to approximately 100 eleventh grade students. The signatures of the eleventh grade teachers are also present to show their agreement to work with Mr. Flynn in conducting this research.

[Redacted Signature]

Bob Echols

11/28/2011

[Redacted Signature]

Jennifer Fuson

11/28/2011

[Redacted Signature]

Lynne Dooley

11/28/11

[Redacted Signature]

Colton Flynn

11/28/11

## Appendix E: Parent Consent Form

### High School Student Knowledge of Local Foods Consent for a Minor to Participate in a Research Study

Principal Researcher: Mr. Colton Flynn, Graduate Student, Department of Geosciences  
Faculty Advisor: Dr. Jennie Popp, Professor, Department of Agricultural Economics and Agribusiness

**This is a parental permission form for research participation.** It contains important information about this study and what to expect if you permit your child to participate.

**Your child's participation is voluntary.**

Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form. We must also have your child's assent to participate in this study.

#### INVITATION TO PARTICIPATE

Your child is being invited to participate in a research study about high school student knowledge of local foods. Your child is being asked to participate in this study because your child is enrolled in one of the targeted classes to receive the survey.

#### WHAT YOU SHOULD KNOW ABOUT THE RESEARCH STUDY

*Who is the Principal Researcher?*

Mr. Colton Flynn, Graduate Student, Department of Geosciences, [kcflynn@uark.edu](mailto:kcflynn@uark.edu)

*Who is the Faculty Advisor?*

Dr. Jennie Popp, Professor, Department of Agricultural Economics and Agribusiness, [jhpopp@uark.edu](mailto:jhpopp@uark.edu)

*What is the purpose of this research study?*

The purpose of this study is to assess student knowledge of local food production in Arkansas and how life experiences may influence those knowledge levels.

*Who will participate in this study?* Students enrolled in 11<sup>th</sup> grade classes in three Northwest Arkansas high schools.

300 students in 11<sup>th</sup> grade across NW Arkansas

*What will your child be asked to do?* Answer 24 questions about experiences with, knowledge of and preferences for fruits and vegetables

Your child's participation will require the following:

Filling out the paper survey which will take less than 10 minutes.

*What are the possible risks or discomforts?*

There are no risks. The child is not asked to provide a name on the survey. The responses will not be assessed for grades at the high school.

*What are the possible benefits to your child if he/she participates in this study?*

By participating in the survey the students may gain an interest in local produce production.

*How long will the study last?* The survey should take no more than 10 minutes to complete.

*Will your child receive compensation for time and inconvenience if you choose to allow him/her to participate in this study?*

No

*Will you or your child have to pay for anything?*

No, there will be no costs associated with participation.

*What are the options if I do not want my child to be in the study?*

If you do not want your child to be in this study, you may refuse to allow him/her to participate. Your child may refuse to participate even if you give permission. If your child decides to participate and then changes his/her mind, your child may quit participating at any time. Your child will not be punished or discriminated against in any way if you refuse to allow participation or if your child chooses not to participate.

*How will my child's confidentiality be protected?*

All information will be kept confidential to the extent allowed by applicable State and Federal law and University policy. Surveys will be anonymous. Only aggregated responses to the questions will be released.

*Will my child and/or I know the results of the study?*

At the conclusion of the study you will have the right to request feedback about the results. You may contact the faculty advisor, Dr. Jennie Popp, [jhpopp@uark.edu](mailto:jhpopp@uark.edu) or Principal Researcher, Colton Flynn, [kcflynn@uark.edu](mailto:kcflynn@uark.edu). You will receive a copy of this form for your files.

*What do I do if I have questions about the research study?*

You have the right to contact the Principal Researcher or Faculty Advisor as listed below for any concerns that you may have.

Principle Researcher: Colton Flynn, [kcflynn@uark.edu](mailto:kcflynn@uark.edu)

Faculty Advisor: Dr. Jennie Popp, [jhpopp@uark.edu](mailto:jhpopp@uark.edu)

You may also contact the University of Arkansas Research Compliance office listed below if you have questions about your rights as a participant, or to discuss any concerns about, or problems with the research.

Ro Windwalker, CIP  
Institutional Review Board Coordinator  
Research Compliance  
University of Arkansas  
120 Ozark Hall  
Fayetteville, AR 72701-1201  
479-575-2208  
[irb@uark.edu](mailto:irb@uark.edu)

I have read the above statement and have been able to ask questions and express concerns, which have been satisfactorily responded to by the investigator. I understand the purpose of the study as well as the potential benefits and risks that are involved. I understand that participation is voluntary. I understand that significant new findings developed during this research will be shared with me and, as appropriate, my child. I understand that no rights have been waived by signing the consent form. I have been given a copy of the consent form.

---

Student

Date

Parent

Date