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ASSOCIATIONS BETWEEN CONSUMPTION OF FRUITS AND VEGETABLES AMONG OLDER CONSUMERS AND FARMERS MARKET SHOPPING

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ASSOCIATIONS BETWEEN CONSUMPTION OF FRUITS AND VEGETABLES
AMONG OLDER CONSUMERS AND FARMERS MARKET SHOPPING

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Agriculture, Food and Environment
at the University of Kentucky

By

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2016

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ABSTRACT OF THESIS

ASSOCIATIONS BETWEEN CONSUMPTION OF FRUITS AND VEGETABLES AMONG OLDER CONSUMERS AND FARMERS MARKET SHOPPING

The number of farmers' markets in the United States has increased over 300% in past two decades. Many studies have also shown a positive association between an increased access to farmers' markets and consumption of fruits and vegetables. However, few studies have explored relationships between older consumers aged 55+ whose fruit and vegetable consumption and their attendance at farmers' markets. In Taiwan, no previous studies regarding farmers' markets had been conducted from nutritional perspectives. The aims of this study were to determine general characteristics of farmers' markets shoppers and their perceptions regarding the markets in Lexington, Kentucky and Taipei City, Taiwan; to compare the amount of fruit and vegetable consumption and shopping behaviors between older and younger consumers; to identify common barriers that affect consumers shopping at farmers' markets; and to compare similarities and differences of farmers' markets in these two cities. The results of this descriptive, cross-sectional, and cross-cultural study shown that, although overall farmers' market shoppers had a higher fruit and vegetable consumption compared to statewide data, the average amount of fruit and vegetable intake still failed to meet the standards recommended by the dietary guidelines in both cities, regardless of age.

KEY WORDS: Farmers' Markets, Fruit and Vegetable Consumption, Older Consumers, Shopping Behaviors, Barriers

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November 29, 2016

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Chapter One: Introduction

More than 1,000 new farmer's markets were added in the United States between 2010 and 2011, leading to over 7,000 farmer's markets to supply local foods to the public. Farmer's markets provide consumers with access to locally grown, farm fresh produce (USDA, 2015). Many studies have shown the benefits of farmers' markets, including an increase of vegetable and fruit consumption, especially for low-income populations. However, few studies emphasize the effects of farmer's markets on the elderly aged 55 or over because it is more challenging to recruit older adults than their younger peers in a study. Namely, the number of seniors are typically not enough in samples, so it is difficult to distinguish older participants from others. Therefore, this project was conducted to study whether or not older and younger farmers' market shoppers have different characteristics regarding demographics, perceptions of farmers' markets, consumption of fruits and vegetables, and shopping behavior as measured by the adapted "customer intercept survey" from the Perkins's thesis (2014). Furthermore, I compared similarities and differences of farmers' markets in Lexington, Kentucky and Taipei City, Taiwan because local governments in Taiwan recently increase their efforts to promote farmers' markets. Since the diet pattern in both countries has become more homogeneous and thus they have some common health issues, such as chronic diseases and obesity, the cultural difference still plays a critical part in shopping and eating behaviors. It is of my interest to explore general characteristics of shoppers and the possibility to encourage the consumption of fruits and vegetables via farmers' markets in Taiwan as the US has successfully done.

1.1 Problem

Compared to the Women, Infants, and Children Nutrition Program (WIC), the

Senior Farmers Market Nutrition Program (SFMNP), which offers an annual \$25 to low-income seniors, is available at a very limited number of farmers' markets in the U.S. For instance, SFMNP does not apply to farmers' markets in Lexington, Kentucky since there are other programs to support older Kentuckians, such as the Meals on Wheels. Thus, it remains unclear whether the elderly can benefit from farmers' markets without SFMNP if they purchase products there. In addition, a great many countries have farmers' markets, including Taiwan, but few studies have investigated the similarities and differences across different countries. Compared to farmers' markets in the US, those in Taiwan might affect people in different ways.

1.2 Statement of Purpose

The purpose of this study is to compare the characteristics of younger and older adults as related to their perceptions of farmers' markets, their consumption of fruits and vegetables, and their shopping behaviors. Furthermore, three farmers' markets in Lexington, Kentucky will be compared with three farmers' markets in Taipei City, Taiwan to determine their similarities and differences, and to identify how farmers' markets impact people in these two different cultures. Since food environments and the prevalence of chronic diseases and obesity in both countries become more and more similar to each other, this study attempts to find implications for farmers' markets in Kentucky and Taiwan to make progress.

1.3 Research Objectives

1. Determine the general characteristics of farmers' markets shoppers and their perceptions regarding the markets in both locations.
2. Compare the amount of fruit and vegetable consumption and shopping behaviors between older and younger consumers.
3. Identify common barriers that affect Kentucky residents shopping at

farmers' markets in Lexington, Kentucky.

4. Compare similarities and differences in three farmers' markets in Lexington, Kentucky and three farmers' markets in Taipei City, Taiwan.

1.4 Hypotheses

It is hypothesized that there are differences between older shoppers and their younger peers. Specifically, elderly aged 55 and over in both countries has lower fruit and vegetable intake, and less healthy diets compared to younger adults. Another assumption is that older adults might have different perceptions related to farmers' markets than younger shoppers. The other hypothesis is that there are more differences than similarities between the two countries.

1.5 Justification

It has been reported that farmers' markets in the US help increase people's intake of fruits and vegetables; a similar trend is more obvious among elderly adults and low-income populations (Byker et al, 2013). The SFMNP especially works for low-income seniors in order to increase their access and consumption of fruits and vegetables (Smith et al, 2004). Unfortunately, the SFMNP is not employed at every farmers' market in the U.S. Taiwan also has farmers' markets, but it remains unclear how the markets influence people, compared to a number of studies regarding the effects of farmers' markets done in the U.S. Accordingly, there is a gap in understanding regarding whether and how the elderly can benefit from farmers' markets without SFMNP in terms of their fruit and vegetable consumption, and shopping behaviors. It is also of importance to identify similarities and differences in farmers' markets in the US and Taiwan since few studies have explored how farmers' markets affect people's health.

Chapter Two: Literature Review

21 Farmers' Markets, Fruit and Vegetable Consumption, and Food Assistance Programs in the United States

A farmers' market is a place where local farmers gather on a recurring basis to sell fresh fruits, vegetables, and other farm products directly to consumers. The number of farmers' markets rose to 8,476 in 2015, up from 3,706 in 2004, a number that reflected a jump from 1,755 in 1994, according to the United States Department of Agriculture (USDA, 2015). The growing number of farmers' markets reflects increasing demands for local food products based on consumer perceptions of freshness and quality, support for the local economy, or other perceived attributes relative to foods different from conventional food retailers (Martinez et al, 2015). However, the fruit and vegetable consumption remains low in Kentucky. According to the State Indicator Report on Fruits and Vegetables: 2013 Behavioral Indicators, published by the Centers for Disease Control (CDC), the median intakes of fruits and vegetables in Kentucky were 1.0 and 1.7 times per day, respectively. Moreover, the percentage who reported consuming fruits and vegetables less than one time daily in Kentucky were 45.9 and 25.2, respectively. Considering the low fruit and vegetable consumption among the public, health and nutrition professionals regard farmers' markets as an ideal opportunity to reach many people and encourage them to consume fruits and vegetables.

Numerous studies have demonstrated an inverse association between low intake of fruits and vegetables and high risks for chronic diseases and obesity (Boeing et al., 2012). As a result, improving access to healthy food venues, such as improving access to farmers' markets, is regarded as a method by many nutrition professionals to promote fruit and vegetable consumption because the lack of affordable sources of

fresh produce may contribute to poor nutrition, especially in low-income populations. To tackle the issue, the CDC and the USDA recommend increasing access to farmers' markets (Cole et al, 2013). Shopping at farmers' markets has been considered a cost-effective way for low-income individuals to purchase and consume recommended amounts of fruits and vegetables. Given that federal nutrition assistance programs are meant to be an environmental intervention in a community to expand access to healthy foods, farmers' market participation makes sense (Freedman, et al., 2012). Consequently, the USDA's Supplemental Nutrition Assistance Program (SNAP) and Supplemental Nutrition Program for Women, Infants, and Children (WIC) now allow participants to use benefits at farmers' markets (Cole et al, 2013).

In addition to these federal programs, more and more statewide or local assistance programs also offer financial incentives to low-income shoppers enrolled in SNAP or WIC to encourage their purchase of fresh produce at farmers' markets. From 2012 to 2014, the Community Transformation Grant Project (GTC-Project) promoted statewide efforts to support farmers' markets in order to increase access to fresh produce in underserved areas in North Carolina. Jilcott Pitts et al (2015) evaluated this project and discovered that healthier food zoning was greater in urban areas and areas at the county level that have less poverty. Results also demonstrated that self-reported fruit and vegetable consumption was associated with healthier food zoning at the individual level. Therefore, food environment changes could improve food access and reduce health disparities. The Health Buck initiative, introduced in 2005 and funded by the New York City Department of Health and Mental Hygiene (DOHMH) and the Human Resources Administration, is also one of these programs. "Health Bucks" are \$US 2 coupons redeemable for the purchase of fresh fruits and vegetables at participating farmers' markets in New York City. Participating markets dispense one \$US 2 Health Buck coupon for every \$US 5 in benefits spent by SNAP participants

using their electronic benefit transfer (EBT) cards, with no ceiling amount. In 2011, more than 28,000 Health Bucks were distributed to over 150 community-based organizations in District Public Health Offices (DPHO) neighborhoods, with redemption rates topping 70%. Olsho and her colleagues (2015) conducted a study and found that greater Health Bucks exposure was associated with greater awareness of farmers' markets, increased frequency and amount of farmers' market purchases, and greater likelihood of a self-reported year-over-year increase in fruit and vegetable consumption. These findings demonstrated that "Health Bucks" was an effective plan for improving fruit and vegetable consumption among SNAP participants in general.

Similarly, in Utah, Savoie-Roskos et al (2015) assessed the "Double-Up Food Bucks" farmers' market incentive program to determine whether or not SNAP participants improved their food security and dietary intake. Findings indicated that participants in the farmers' market incentive program were positively related to greater food security and intake of selected vegetables among SNAP participants, showing the potential benefits of implementing farmers' market incentive programs. Another similar pilot project called "Bluegrass Double Dollars" has been executed at farmers' markets in Lexington, Kentucky. SNAP users who make a qualifying SNAP purchase of at least \$10 at any of the five Lexington Farmers' Market locations can receive a token for \$10 and use them at any of these five farmers' markets (Bluegrass Farm to Table, 2015).

Moreover, the Healthy Foods, Healthy Families (HFHF) program established by the Farm Fresh Rhode Island (FFRI) has been implemented in six farmers' markets in urban low-income neighborhoods from July through October each year in Rhode Island. This program seeks to address not only fruit and vegetable access, but also exposure and acceptance among US federal food assistance recipients. Eligible participants are families who have at least one child under 12 years old or who

participate in at least one of the federal assistance programs, such as WIC or SNAP. Research conducted by Bowling et al (2016) illustrated that the HFHF program's incentives were used effectively by participants to increase their fruit and vegetable consumption. Participants were, in fact, using the financial incentives to supplement, rather than replace, their WIC or SNAP fruit and vegetable budget. Therefore, researchers have concluded that there is a strong potential to improve the diet quality of low-income families if promotion activities and modest financial incentives are implemented together at farmers' markets.

Previous studies have also revealed the favorable relationship between shopping at farmers' markets and consumption of fruits and vegetables, despite ongoing challenges. For low-income populations, prices at farmers' markets were more frequently reported to be fair and reasonable, foods overall were perceived to be healthy, food quality was described to be very good, and food variety was rated to be satisfactory. Farmers' markets also represented spaces for obtaining information and resources about food procurement and preparation. Furthermore, convenient locations were identified to facilitate utilization of farmers' markets (Byker, 2013; Cole, 2013; Woodruff, 2016; Jilcott Pitts, 2015).

Higher income populations, on the other hand, mentioned greater levels of social benefits from farmers' market use, such as camaraderie, social interaction with farmers and customers, and support of the local economy and environment-related consciousness as facilitators of farmers' market use (Freedman, et al, 2016). Obstacles still exist, however, that prevent more successful use of farmers' markets. Low EBT redemption rates at farmers' markets suggested a need for more outreach to low-income shoppers because these programs are currently designed to better suit large food retailers than farmers' markets (Cole et al., 2013). Barriers to farmers' markets use include the outdoor farmers' market design, inconvenient locations or

hours of operation, transportation challenges, and a mismatch between the farmers' market food retail space and personal lifestyles or food shopping habits (Freedman, et al, 2016).

In Lexington, Kentucky, findings from Perkins's thesis (2013) showed that, while the Fruit and Vegetable Score of Kentucky farmers' market customers was positively related to their frequency of purchasing fruits and vegetables at farmers' markets, some barriers hindered shoppers' utilization of farmers' markets. Jilcott Pitts et al (2014) found that the consumption of fruits and vegetables was positively associated with use of farmers' markets among Kentucky customers. Yet several major barriers, including "out of way" market locations and "market days and hours," need to be addressed to accomplish farmers' market enhancements.

22 Farmers' Markets in Taiwan

Taiwan's farmers' markets were developed to deal with several challenges. In 1986, Taiwan's government and academic institutions initially started to promote organic agriculture and assist farmers to transfer from traditional farming to organic farming. Later, when the Agricultural Production and Certification Act was passed in January 2007, organic product certifications were developed. However, today farmers still face some issues, including small-sized or fragmented farm lands, high production costs, unstable quality and quantity, and a lack of sales channels. Additionally, global agricultural competitions have intensified and threatened the survival of farmers since Taiwan joined the World Trade Organization (WTO) in 2002 (Lin and Wang, 2014). Thus, many farmers, particularly those running small farmers, introduced the concept of farmers' markets from western countries as a potential solution to add value to Taiwan's agricultural products. The first farmers' market was established in 2006. To date, 34 farmers' markets have successfully persisted, up from

18 in 2012 (Huang, 2014).

In contrast to US farmers' markets, those in Taiwan are not regarded as a major strategy to facilitate consumption of fruits and vegetables, even though the low fruit and vegetable intake is of great public health concern. Instead, farmers' markets are generally considered to be marketing channels for small farmers, especially organic farmers, who benefit from directly selling their products to customers. Lin and Wang (2014) learned that although farmers' markets have their own styles and operation objectives, they indeed share a common goal to promote the use of the environmental friendly farming, provide a face-to-face interaction for producers and customers, and establish a new sales channel for local small farmers. Wan and his colleagues (2010) conducted a case study regarding three farmers' markets in Hsinchu County. Results indicated that shoppers visited markets once a week on average. People mentioned that product quality, including freshness, sanitation, and safety, was the most significant factor affecting their satisfaction and willingness to visit farmers' markets.

Other reasons, such as support for local farmers and economy, did not stand out as influential motivations for those shoppers. When compared to a neighboring country, Japan, where 17,000 farmers' markets were already established in 2010 and over a third of fruits and vegetables were sold via farmers' markets, the sales at farmers' markets remain a small fraction in Taiwan. In other words, the development of Taiwanese farmers' markets has stayed immature for a decade.

Unlike other countries, Taiwan has difficulties in developing farmers' markets. Huang (2014) proposed possible reasons including innumerable traditional markets and supermarkets that already existed, fewer farmers willing to join farmers' markets, limited variety of products at farmers' markets, higher prices at farmers' markets compared to supermarkets and traditional markets, difficulty in locating and accessing farmers' markets, a lack of advertising and resources, and others. Hence, more studies

and efforts are needed to promote farmers' markets in Taiwan. Besides promoting organic produce, linking health benefits, such as fruit and vegetable consumption, to farmers' markets might be a feasible approach.

23 Farmers' Markets and Consumption of Fruit and Vegetable among Older Adults

2.3.1 Seniors' Farmers' Market Nutrition Programs in the United States

The older population in the United States continues to grow dramatically. It is estimated that one in five Americans would be 65 years of age and over by 2030, according to the United States Census Bureau (2015). Literature regarding nutrient intake among elderly has shown that older adults have unique difficulties in obtaining, preparing, and consuming fruits and vegetables, and that these barriers exist at the individual and environmental levels. Moreover, situations could be escalated by food insecurity, malnutrition, physical inactivity, and disabilities (Lee, et al, 2010; the Academy of Nutrition and Dietetics, 2012). For example, Nicklett and Kadell (2013) discovered that older men, older African Americans, and seniors with low socioeconomic status also tended to eat fewer fruits and vegetables than others. Federal food assistance programs, such as SNAP, were available to older adults, but participation was low among eligible seniors.

On the other hand, Middleton and Smith (2011) found that seniors' attitudes were highly correlated with their intention to purchase more fresh fruits and vegetables at farmers' markets. Therefore, they suggested programs or interventions aimed at positively influencing seniors' attitudes might focus on promoting information and education about the significance of fruit and vegetable consumption. They also discovered that perceived behavioral control was a significant predictor of intention to purchase more fresh fruits and vegetables at farmers' markets for seniors. Nonetheless,

older people who lacked social contact with family or friends might have a weakened subjective norm regarding healthy eating. Researchers accordingly suggested programs that allowed seniors to prepare and eat healthy meals together could help single seniors form a social network, which might positively affect their eating habits. Hence, it was of particular importance that interventions should be planned and tailored specifically for older adults to address age-specific knowledge or access. The Senior Farmers' Markets Nutrition Program (SFMNP) was thereby developed.

In general, the purposes of the SFMNP include providing fresh, nutritious, unprepared, locally grown fruits and vegetables; increasing domestic consumption of agricultural commodities; and developing or expanding markets (Kunkel et al, 2003; Johnson et al, 2004). Low-income seniors enrolled in the program, by and large, are offered vouchers to purchase fruits and vegetables at participating farmers' markets, roadside stands, and community-supported agricultural programs. Kunkel et al (2003) conducted a study to evaluate the effectiveness of the first pilot SFMNP in South Carolina. Results revealed that older adults in the program increased their intake of fruits and vegetables, and farmers at the farmers' markets benefited from the program as well. Most participants and farmers had positive attitudes toward this trial program and were willing to participate again in the future.

The Seattle SFMNP in Washington State was a unique trial because it delivered fresh fruits and vegetables to elders' houses rather than distributing vouchers. Findings revealed that there were favorable relationships of the program participation between the increased mean fruit and vegetable consumption and the increased number of older adults meeting the daily recommendation for fruit and vegetable intake. These outcomes illustrated improvements compared to the lower consumption of fruits and vegetables by other elders statewide and the failure of meeting fruit and vegetable suggestions based on the American Dietary Guidelines (Johnson et al,2004).

Smith et al (2004) carried out qualitative research to further explore the success of the Seattle SFMNP. Overall, participants used as much of the produce as they could; even for those with disabilities, on special diets, or experiencing polypharmacy. Most fruits could be consumed by interviewed participants since fruits could be eaten with little preparation. Some elders also indicated that they could not afford fruits regularly because fruit prices were high. The utilization of vegetables, in contrast, varied more than that of fruits because vegetables required more preparation. Nevertheless, most participants felt that they gained access to fresh, healthy produce, and that their life quality had been improved through the program.

Farmers' market programs in the United States have successfully encouraged people to consume more fruits and vegetables thus far (Kunkel et al, 2003; Johnson et al, 2004; Smith et al, 2004). In addition, older adults now receive more attention from many programs to improve their health because of their growing number, the prevalence of chronic diseases, and the costly healthcare system. However, except the SFMNP, how older adults can benefit from general farmers' markets remain unclear.

2.3.2 Fruit and Vegetable Consumption among Older adults in Taiwan

According to the United Nations, an aging society is defined as a country with at least 7% of its total population that is older adults aged 65 and over; an aged society as one with that at least 14%; and a hyper-aged society as one with 20%. Taiwan has been an aging society since 2011, and will become an aged society by late 2017 or early 2018. By 2056, Taiwan is estimated to turn into a hyper-aged society (National Policy Foundation, 2012). Seniors constitute a large proportion of the total population in Taiwan. Based on a feature report published by the Department of NGO International Affairs (2015), domestic elders worried most about their health, followed by financial resources. Among a wide variety of health issues, the insufficient consumption of fruits and vegetables by elders is the most significant.

Studies have shown that the low consumption of fruits and vegetables is a risk factor for many chronic diseases, and the prevalence of low fruit and vegetable intake tends to increase with aging. The dietary guidelines published by Taiwan's Department of Health recommend a daily intake of 2-4 servings of fruits and 3-5 servings of vegetables (Health Promotion Administration, 2012). Furthermore, food consumption is greatly affected by the environment and economy. The current trend focusing on healthy eating has the potential to change individuals' dietary patterns; yet sedentary lifestyles and the prevalence of convenience foods could compromise this trend.

Accordingly, inadequate fruit and vegetable intake remains a major concern for public health in Taiwan. Wu et al (2011) compared results of the 1993-1996 and 2005-2008 Nutrition and Health Survey in Taiwan (NAHSIT). They found that elderly people, defined as aged 65 years and over, usually had a wide variety of nutrient intake below the Dietary Reference Intakes (DRIs). With regard to fruit and vegetable consumption, elderly persons had approximately 3.2 to 3.5 servings of vegetables and 1.5 servings of fruit daily in the 2005-2008 NAHSIT, which was not a significant increase in consumption of fruits and vegetables compared to the 1993-1996 NAHSIT. Hsu and her colleagues (2014) investigated the current status of fruit and vegetable intake among seniors as well as the factors influencing their fruit and vegetable intake behavior. Their findings illustrated that the frequency of dining out had a negative effect on the consumption of fruits and vegetables, but outcome expectancy, social support, self-efficacy, and role modeling had positive impacts on fruit and vegetable intake. The significant predictors of fruit and vegetable intake were education level, outcome expectancy, social support and frequency of dining out. Among these variables, social support was the most influential factor.

In summary, insufficient consumption of fruits and vegetables is a significant

and complex health concern that needs various efforts to address it in both countries. In the US, farmers' markets are viewed as an ideal platform to contact countless people and encourage fruit and vegetable consumption, specifically for low-income populations. While these programs have proven beneficial to participants, older adults are not specifically targeted, so their participation rates stay low. Furthermore, compared to SNAP and WIC, SFMNP is not widely used at the majority of farmers' markets, such as Lexington Farmers Markets in Lexington, Kentucky. Farmers' markets in Taiwan, however, are not employed as an approach to increase consumption of fruits and vegetables since they are not as prevalent and popular as in the United States. Nonetheless, there is a potential for farmers' markets in Taiwan to advocate for health benefits provided by fruits and vegetables from their fresh produce to promote farmers' revenues and consumers', especially the elderly population's, intake of fruits and vegetables. As a consequence, this study attempts to compare the general characteristics of farmers' markets between the Lexington, Kentucky and Taipei City, Taiwan, and compare the fruit and vegetable intake, health perspectives, and shopping behaviors between older and younger adults. This cross-cultural study aims to improve the success and sustainability of farmers' markets in both places.

Chapter Three: Methodology

3.1 Study Design

A descriptive, cross-sectional study was designed to determine barriers, motivators, and general characteristics of Lexington and Taipei City residents who visited local farmers' markets. In addition, via a survey, this study investigated any differences in current fruit and vegetable intake and purchasing practices between older and younger adults. Results from the aforementioned examinations of these two cities were further compared to find implications and improve performances of farmers' markets in both regions.

3.2 Survey Location

Questionnaires were administered at farmers' markets in Lexington, Kentucky, and Taipei City, Taiwan from June to August in 2015. These areas were selected because of their solid foundations for local farmers' markets. An organization known as the Lexington Farmers' Market sets up farmers' markets at the following locations:

- 241 West Main Street, also called Downtown, from 7 am to 2 pm on Saturdays;
- 348 Southland Street from 10 am to 2 pm on Sundays;
- 400 West Maxwell Street from 7 am to 4 pm; and
- University of Kentucky's ES Good Barn from 3 to 6 pm on Wednesdays within Lexington in summer.

The market at the University of Kentucky was excluded from this study due to its smaller scale and fewer shoppers compared to the other three locations. In Taipei City, Taiwan, three farmers' markets were also selected:

- the 248 Farmers' Market;
- the Water Garden Organic Farmers' Market, and

- the Taipei Expo Farmers' Market.

These markets were chosen based on their convenient locations and accessible operating hours for investigators to conduct the survey.

3.3 Survey Instrument

The questionnaire, known as the “customer intercept survey,” was obtained from Perkins’s thesis (2014) and adjusted for this study. Researchers from the University of Kentucky, East Carolina University, and the University of North Carolina at Chapel Hill collaboratively developed the survey to include selected questions from the Behavioral Risk Factor Surveillance System (BRFSS), items specific to farmers’ markets, and topics related to food shopping patterns. The questionnaire has been proven to be valid and reliable according to the Perkins’s thesis (2014).

The adapted customer intercept survey consisted of four parts. To begin with, questions assessed respondents’ transportation methods, reasons, and barriers to visit farmers’ markets; and participation in any nutrition assistance programs. Fruit and vegetable consumption represented the second section. Questions examined self-reported views related to health and consumption of fruits and vegetables. The third part evaluated respondents’ shopping behaviors by requesting the shopping frequency at farmers’ markets, price considerations, and grocery stores. The fourth part of the survey included a series of demographic questions, much like those in the BRFSS, touching upon demographic factors, such as gender, age, marital status, education level, ethnicity, employment status, and income level. The survey is in the Appendix.

In order to carry out the study at farmers’ markets in Taipei City, Taiwan, this survey was later translated into traditional Chinese with a few revisions due to cultural and social differences. For instance, questions associated with participation in

nutrition assistance programs were removed from the Chinese version because no similar program has been implemented in Taiwan. Income and money were expressed in a local unit different from the US dollar, so they would be relevant to Taiwanese culture. These differences, however, did not affect the following data analyses and results. These surveys were five pages long, taking respondents approximately 3-5 minutes to complete.

3.4 Study Population

Selection criteria included residents who were at least 18 years of age in both places. There was no upper age exclusion for participation. Children and adolescents were excluded since they were not the target audience for this study. Both men and women were included in the sample. The target populations were able to read and write English and traditional Chinese in Lexington, Kentucky and Taipei City, Taiwan, respectively. The qualified respondents were further limited to local residents shopping at farmers' markets and willing to take the survey. Non-Kentucky residents and Taiwanese were not included in their corresponding datasets because they would not be applicable to a study focusing on Kentucky and Taiwan residents.

3.5 Study Procedure

The IRB was approved by the University of Kentucky. Farmers' market managers were contacted to request their agreement for the study. The adapted survey was thereby conducted at three farmers' markets in Lexington, Kentucky and three farmers' markets in Taipei City, Taiwan from June to August 2015. A convenience sample of participants were adults at least 18 years old shopping at farmers' markets and were willing to complete the questionnaire. The English survey was carried out in Lexington, Kentucky, and the traditional Chinese survey was conducted in Taipei City,

Taiwan. During the summer, interviewers were granted a space to set up a booth in order to conduct the survey at farmers' markets. The interviewers approached potential respondents, introduced themselves, explained the purpose of the survey, and requested participation. If shoppers agreed, they were directed to the booth to take the survey. After a questionnaire was completed, a respondent was thanked by choosing a free gift. The options included healthy meal recipe cards or pens sponsored by the Department of Dietetics and Human Nutrition (DHN) at the University of Kentucky. In Taiwan, respondents were also appreciated by giving them free sticky pads or pens.

Data were collected from questionnaires following survey completion. Participants were de-identified through numbers for each record. The data were initially coded into Microsoft Excel separately by interviewers following predetermined coding manuals for both survey versions, so the primary researcher did not need to wait for the questionnaires from Taiwan. The Excel files were later imported into John's Macintosh Project, or John's Macintosh Program, (JMP) version 12.0 for statistical analysis by demographics and variables extracted from the data set, including demographic characteristics, shopping behaviors, fruit and vegetable consumption, and consumers' perceptions of their overall health and diet. The descriptive statistics were used to show the general characteristics among respondents' demographics; transportation, reasons, and barriers to visit farmers' markets; and shopping behaviors. The quantitative statistics were employed to compare fruit and vegetable consumption and perceived health among older adults (at least 55 years of age) and younger adults (less than 55 years of age). When analyzing how much money the younger and older people spent at farmers' markets, outliers were excluded because they represented tourists or those visiting the farmers' markets for the first time. Therefore, the t-test using the means could be performed.

Chapter Four: Results

4.1 Research Question 1: General characteristics of farmers' markets shoppers and their perceptions regarding the markets in both locations

Table 1 presents general demographics of respondents in Lexington, Kentucky. Of 308 respondents, common farmers' market shoppers were married Caucasian females with college education and was a full-time employee with an annual household income above \$80,000. Overall, 85.7% of respondents reported that they drove a car to farmers' markets, with no difference between older and younger adults. 35% and 28% of respondents attended farmers' markets weekly and two to three times a month in summer, respectively.

When it comes to reasons why consumers shopped at farmers' markets, 85.4% of respondents reported to support local farmers, 85.4% for fresher produce, 63.6% for better produce taste, 60.4% for friendly environment, and 59.1% for better product quality, with no difference between the two age groups. However, when divided by the locations of farmers' markets, several variations emerged. In addition to the reasons mentioned above, people visiting farmers' markets at Main Street perceived a greater variety of products (50.5%). People going to farmers' markets at Southland also believed that produce is grown with fewer pesticides (54.3%), and a greater variety of products (50.6%).

Table 2 presents general demographics of respondents in Taipei City, Taiwan. Of 344 respondents, common farmers' market shoppers were married Taiwanese females with college education and were employed full-time with an annual household income between \$16,668 and \$23,333. There was a wide variety of transportation to a farmers' market, and 31% of respondents went to farmers' markets via Subway, followed by driving a car (19%), with no difference between older and younger adults. Overall, 37% of respondents reported shopped at farmers' markets less than once a month. When

aged was divided, 38% of participants aged 55 and over visited farmers' markets two to three times weekly. Asked why shopping at farmers' markets, participants generally agreed that fresher produce (50%) was the major rationale, but reasons varied across different locations. Consumers visiting the 248 Farmers' Markets said it was because they wanted to support local farmers (50%); respondents visiting the Water Garden Farmers' Markets mentioned that they wanted to buy fresher produce (67.8%), purchased products with better qualities (51.1%), support local farmers (50%).

4.2 Research Question 2: Compare the amount of fruit and vegetable consumption and shopping behaviors between older and younger consumers.

Table 3 showed the consumption of fruits and vegetables between two studied regions. Respondents in Lexington, Kentucky, generally self-reported that they consumed a daily average of 2.41 ± 1.15 and 2.82 ± 1.12 servings of fruits and vegetables, respectively. When respondents were divided by the age of 55, there was no difference between older and younger respondents related to the fruit and vegetable intake. There was a difference in dollars spent at farmers' markets: younger adults tended to spend significantly more money than older adults. In Taipei City, Taiwan, overall respondents self-reported to consume a daily average of 2.26 ± 0.97 and 2.50 ± 0.97 servings of fruits and vegetables, respectively. When divided by age, there was no difference in the vegetable intake, but respondents aged 55 and over consumed more daily servings of fruit than younger adults. There was a statistically significant difference in dollars spent at farmers' markets: older consumers spent more money than younger participants at farmers' markets.

Table 4 showed the differences between older and younger consumers in terms of health perceptions and shopping behaviors. Lexington respondents generally reported that their overall health was very good (38.3%), followed by good (30.8%).

They also considered their overall diet very good (44.8%) and good (30.8%). There was a difference in both perceptions of overall health and diet between the two age groups. While 36% of younger adults considered their overall health to be good, 46.62% of older respondents regarded their overall health as very good. Similar patterns also continued in their views on the overall diet. While 37.57% of younger respondents said their overall diet was good, 60.15% of older respondents reported their overall diet was very good. Moreover, as a result of shopping at farmers' markets, most respondents reported that they increased the number of fruit and vegetable intake a little more, followed by no change. Whereas a similar pattern could be seen relative to the increased variety of vegetables, respondents said there was no change in the variety of fruits. With regard to shopping behaviors, most respondents reported that they went to farmers' markets with their friends or family (55.84%), followed by shopping alone (37.66%). However, when divided by age, 64.57% of younger respondents said that they went to farmers' markets with their friends or family, while 51.13% of older respondents went shopping alone.

In Taipei City, Taiwan, respondents generally considered their overall health to be very good (44.5%), followed by good (37.3%). In addition, approximately 43% of respondents believed that their overall diet was good, followed by very good (40%). When sorted by their age, younger adults considered their overall health very good (44.59%), followed by good (40.54%), compared to the older respondents considering their overall health to be very good (48.78%). Additionally, 47.64% of younger adults believed that their overall diet was good, whereas 58.54% of older adults considered their overall health very good. Results were similar regardless of countries.

In terms of shopping behaviors, 37% of respondents reported that they visited farmers' markets less than once a month. However, when these answers divided by the age of respondents, a difference emerged. While 40.14% of younger respondents

said that they went to farmers' markets less than once a month, 37.50% older respondents reported they visited farmers' markets two to three times a month. In general, 58.2% of respondents reported that they usually went to farmers' markets with their friends or family. Yet when people were divided by age, a difference could be observed. Compared to 61.36% of younger adults that tended to visit farmers' markets with their friends and family, 63.41% of older adults went alone. Regardless of age, most respondents felt that products sold at farmers' markets were more expensive than those sold at other places, such as traditional markets and supermarkets. However, older respondents spent more amount of money than younger adults at farmers' markets, even though they felt that prices were more expensive.

4.3 Research Question3: Identify common barriers that affect Kentucky residents shopping at farmers' markets in Lexington,Kentucky.

Respondents in both studied cities did not experience any significant barrier to shopping at farmers' markets in summer 2015. However, for the utilization of federal nutrition programs in Lexington, although the Bluegrass farmers' markets do provide the SNAP benefits to its participants, only 6 out of 308 surveyed participants (2%) redeemed the benefit. That is, 2 out of 173 younger adults (1.63%) and 4 out of 113 older adults (3.23%), respectively, reported that they knew and were able to employ the SNAP benefit at the farmers' markets.

4.4 Research Question 4: Compare similarities and differences in three farmers' markets in Lexington, Kentucky and three farmers' markets in Taipei City, Taiwan.

Table 5 showed the similarities of farmers' market consumers in Lexington, Kentucky, and Taipei City, Taiwan. Younger respondents aged less than 55 in these two cities considered their both overall health and overall diet to be good, and they usually attended farmers' markets with friends or family. Older consumers in these

two cities considered their both overall health and overall diet to be very good; they usually shopped alone at farmers' markets; and they thought that products cost more at farmers' markets than other places.

On the contrary, Table 6 demonstrated the differences of farmers' market consumers in Lexington, Kentucky, and Taipei City, Taiwan. Compared to younger consumers in Taipei City, younger respondents in Lexington considered prices at farmers' markets to be similar as other markets, attended farmers' markets more frequently, consumed more servings of fruit and vegetable per day, and spent more money at farmers' markets. Older respondents in Lexington spent significantly more money at farmers' markets than those in Taipei City, but there was no statistically significant difference in the average daily consumption of fruit and vegetable.

Table 1: Characteristics of demographics and descriptive statistics of respondents at farmers' markets in Lexington, Kentucky (N=308).

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
	n	%	n	%	n	%
Gender						
Female	217	70	127	73	90	68
Male	88	29	45	26	43	32
Transgender	3	1	3	2	0	0
Race						
African American	20	6	10	6	10	8
White	266	86	149	85	117	88
Others	22	8	16	9	6	4
Education						
< high school	1	1	1	1	0	0
High school graduate	25	8	11	6	14	11
Some college	62	20	32	18	30	23
College graduate	108	35	67	38	41	31
postgraduate	112	36	64	37	48	36

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
Marital status	n	%	n	%	n	%
Single	66	21	56	32	10	8
Live with partner	21	7	17	10	4	3
Married	164	53	87	50	77	58
Widowed	18	6	1	0.5	17	13
Divorced	36	12	13	7	23	17
Separated	3	1	1	0.5	2	1
Employment	n	%	n	%	n	%
Employed	140	45.8	103	60	37	28
Self-employed	41	13	27	15	14	11
Looking for work	10	3	7	4	3	2
Not looking for work	1	0.3	1	0.5	0	0
Homemaker	10	3	7	4	3	2
Student	25	8	25	14	0	0
Military	1	0.3	1	0.5	0	0

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
Retired	73	24	1	0.5	72	54
Unable to work	5	2	2	1	3	2
Other	2	0.6	1	0.5	1	1
Annual income	n	%	n	%	n	%
<\$20,000	44	14	33	19	11	8
\$20,000~\$40,000	62	20	30	17	32	24
\$40,001~\$60,000	73	24	35	20	38	29
\$60,001~\$80,000	39	13	21	12	18	14
>\$80,000	90	29	56	32	34	26

Table 2: Characteristics of demographics and descriptive statistics of respondents at farmers' markets in Taipei City, Taiwan. (N=344)

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
	n	%	n	%	n	%
Gender						
Female	271	80	231	79	35	87.5
Male	69	20	62	21	5	12.5
Nationality						
Taiwan	336	98	289	98	40	98
Others	8	2	7	2	1	2
Education						
Elementary school	2	1	1	~0	1	2.5
Junior high school graduate	3	1	1	~0	2	5.5
Senior high school graduate	36	10	23	8	12	29
College graduate	220	64	201	68	16	39
postgraduate	82	24	70	24	10	24

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
Marital status	n	%	n	%	n	%
Single	124	36	119	40	2	5
Live with partner	37	11	36	12	0	0
Married	179	52	139	47	38	93
Widowed	2	1	2	1	0	0
Divorced	1	~0	0	0	1	2
Employment	n	%	n	%	n	%
Employed	245	71	225	76	16	39
Self-employed	8	2	4	1	3	7
Looking for work	4	1	4	1	0	0
Not looking for work	0	0	0	0	0	0
Homemaker	23	7	15	5	8	20
Student	40	12	40	14	0	0
Military	2	0.5	2	0.5	0	0
Retired	20	6	6	2	14	34

Demographics	Overall		Age < 55 yrs		Age \geq 55 yrs	
Employment	n	%	n	%	n	%
Unable to work	0	0	0	0	0	0
Other	2	0.5	2	0.5	0	0
Annual income	n	%	n	%	n	%
<\$10,000	42	13	42	14	0	0
\$10,000~\$16,667	38	11	31	11	5	13
\$16,668~\$23,333	78	23	71	24	6	15
\$23,334~\$30,000	67	20	62	21	3	8
>\$30,000	63	19	53	18	9	23
Prefer not to answer	48	14	31	11	17	43

Table 3 Analyses of t-tests for farmers' market respondents divided by age

Lexington, Kentucky	Age		t	df
	< 55 yrs	≥ 55 yrs		
Average daily fruit servings consumed	2.40 (0.09)	2.43 (0.10)	0.21	306
Average daily vegetable servings consumed	2.85 (0.08)	2.79 (0.10)	-0.48	306
Dollars spent at farmers' markets***	22.48 (0.79)	19.54 (0.91)	-2.45*	294
Taipei City, Taiwan	Age		t	df
	< 55 yrs	≥ 55 yrs		
Average daily fruit servings consumed	2.23 (0.06)	2.59 (0.15)	2.23*	335
Average daily vegetable servings consumed	2.48 (0.06)	2.73 (0.15)	1.60	335
Dollars spent at farmers' markets***	15.40 (0.62)	22.25 (1.71)	3.77**	303

Note. * = $p < .05$, ** = $p < .001$. Standard Deviations appear in parentheses below means. *** Outliers were excluded in analysis.

Table 4 Pearson contingency analyses for divided age groups

Lexington, Kentucky	Age		χ^2	<i>p</i>
	< 55 yrs	\geq 55 yrs		
Overall health	Good	Very good	10.345	.035
Overall diet	Good	Very good	23.748	<.0001
Shopping companies	Shopping with friends or family	Shopping alone	18.908	.0008
Food price perception	About the same	More expensive	6.637	.0362
Shopping frequency	Once a week	Once a week & 2-3 times a month	20.105	.0005
Taipei City, Taiwan	Age		χ^2	<i>p</i>
	< 55 yrs	\geq 55 yrs		
Overall health	Good & Very good	Very good	14.504	.0058
Overall diet	Good	Very good	22.504	.0002
Shopping companies	Shopping with friends or family	Shopping alone	16.904	.0020
Food price perception	More expensive	More expensive	4.007	.1349
Shopping frequency	< once a month	2-3 times a month	18.197	.0011

Table 5 Similarities of farmers' markets in Lexington, Kentucky and Taipei City, Taiwan.

Similarities	Age	
	< 55 yrs	≥ 55 yrs
Overall health	Good	Very good
Overall diet	Good	Very good
Shopping companies	Shopping with friends or family	Shopping alone
Food price perception		More expensive

Table 6 Differences of farmers' markets in Lexington, Kentucky and Taipei City, Taiwan.

Location	Lexington, KY		Taipei City, TW	
	< 55 yrs	≥ 55 yrs	< 55 yrs	≥ 55 yrs
Food price perception	About the same	More expensive	More expensive	
Shopping frequency	Once a week		< once a month	
Average fruit servings consumed/day (95 % CI)	2.40 (2.31 to 2.49)*	2.43 (2.33 to 2.53)	2.23 (2.17 to 2.29)*	2.59 (2.44 to 2.74)
Average vegetable servings consumed/day (95 % CI)	2.85 (2.77 to 2.93)*	2.79 (2.69 to 2.89)	2.47 (2.42 to 2.54)*	2.73 (2.58 to 2.88)
Dollars spent at farmers' markets	\$22.48 (21.69 to 23.27)*	\$19.54 (18.63 to 20.45)+	\$15.00 (14.78 to 16.02)*	\$21.67 (20.54 to 23.96)+

* p<0.05 in the group of age < 55 years between 2 cities

□ p<0.05 in the groups of age ≥ 55 years between 2 cities

Chapter Five: Discussion

An unexpected result was that majority of Lexington respondents reported that they did not experience any barrier related to visiting farmers' markets from June to August in 2015, which is completely contradictory to previous studies (Freedman, et al, 2016; Jilcott Pitts et al, 2014; Perkins, 2013). However, this study was conducted in summer when the Lexington Farmers' Market set up four farmers' markets at various time and locations, making them more available and accessible to people. In addition, many previous studies collected data throughout a year, which included more samples and information than this research.

The other unanticipated result was the percentage of the SNAP participants redeeming their benefits at farmers' markets: only 2% in this study. While previous studies had demonstrated the success of many programs encouraging the redemption of the SNAP benefits at farmers' markets, such as approximately 70% redemption rate in the Health Bucks project in the New York City (Olsho et al, 2015), this was not the case at farmers' markets in Lexington, Kentucky. Although the farmers' market managers reported they have introduced the "Bluegrass Double Dollars" and promoted the relevant information in recent years, the result showed the percentage of the SNAP participants who utilized their benefits at farmers' markets as extremely low in this study. Cole et al (2013) pointed out the reasons of the low redemption rate

of the SNAP benefits could be limited outreach and the nature of the SNAP program's design, but further studies are needed to explore reasons and to develop effective strategies to encourage the redemption in Lexington, Kentucky.

The results of the shopping frequency analysis suggested that most Kentucky residents visited farmers' markets once a week, whereas Taiwanese attended farmers' markets less than once a month. This was a significant difference, which might be partially related to the price perception at farmers' markets. The result showed that 50% of Kentucky respondents expressed that the prices of products sold at farmers' markets were similar to other places, but the majority of Taiwanese, or 75% of the respondents, reported that prices were much higher at farmers' markets. When respondents were divided by the age of 55, the price perception remained unchanged among Taiwanese respondents, but older Kentucky respondents aged 55 and over reported that they considered goods at farmers' markets to be more expensive compared to their younger peers.

When analyzing how much money spent at farmers' markets in Lexington, it is anticipated to find that older respondents generally spent fewer dollars ($\$19.54 \pm 0.91$) than their younger counterparts ($\$22.48 \pm 0.79$). When the same analysis applied to Taiwan's data, the result showed that older respondents unexpectedly spent more money ($\$22.25 \pm 1.71$) than younger adults ($\15.40 ± 0.62), even though both groups

thought the products were costly. More studies are needed to explore why older adults have the opposite behavior in both countries.

In both countries, the results of the self-reported perceptions on overall health and diet from the older groups were better than from the younger groups. When it comes to the fruit and vegetable consumption, the results were mixed. In Taiwan, it turned out that the servings of fruits consumed by the older respondents were statistically significantly higher than the younger peers. Although the statistical analysis was insignificant, older Taiwanese also tended to consume more vegetables than the younger adults. However, both groups failed to meet the recommended number of servings for the consumption of fruits and vegetables, so did the two groups in Lexington, Kentucky. Furthermore, although the results were insignificant, it appeared that older respondents consumed more servings of fruits than younger respondents; yet the younger group's vegetable consumption was higher than the older group. According to the research conducted by Smith et al (2004), the reason could be because vegetables require certain manual preparation to eat, which might cause difficulties for seniors.

Limitations

This study has a number of limitations. To begin with, unlike a longitudinal study, the cross-sectional design of this research just studied the research questions for a

certain short period of time. This might cause limited generalization of the study because the results may vary from time to time and places and places. Secondly, due to the utilization of surveys, the researcher was able to find the associations, not causation. The non-response bias is another restriction because the investigators obtained no information from people who chose not to be surveyed, resulting in flawed findings potentially. A convenient sampling method also generates a concern regarding whether or not the samples are representative of the younger and older adult populations, even though the investigators tried to include as many participants as possible. Similar to previous studies discussed in the literature review, female participants and participants aged less than 55 years old accounted the majority of total participants regardless of countries. Accordingly, the number of older participants targeted in this study might not be representative enough and cause skewed outcomes. All aforementioned limitations need to be taken into consideration when the results were interpreted and applied to the generalization.

Implications

The 2015-2020 American Dietary Guidelines recommends a daily intake of at least 5 servings of fruits and vegetables combined, while in Taiwan the 2012 Daily Dietary Guidelines encouraged to have 5 servings of vegetables and 3 servings of fruits on a daily basis. Regardless of countries, nearly third-fourths of population fail

to meet the recommendations. Previous studies have demonstrated that there is a positive relationship between people's attendance of local farmers' markets and their consumption of fruits and vegetables in the US. However, this study showed that even the majority of this population, often considered to be healthier, still fail to meet the recommendations. Low redemption rate of the SNAP benefits is also an issue needed to be resolved for farmers' markets in Lexington, Kentucky. As a result, bridging a gap between the attendance of farmers' markets and the intake of fruits and vegetables is a critical topic for future studies, especially for older adults.

In addition, perhaps this is the first research from a nutritional standpoint to study farmers' markets in Taiwan. The analyses illustrated that farmers' markets in Taiwan are not as popular and prevalent as in the US, due to the general perception of costly products. Unlike Japan and the US, farmers' markets in Taiwan are probably not suitable for encouraging fruit and vegetable consumption unless products could be less expensive or could become more available and accessible to customers. As a result, nutrition professionals need to find different method to increase the intake of fruits and vegetables in Taiwan.

Recommendations for Future Studies

There are some areas in which the research can be expended based on this study. Initially, it is recommended to study what causes a gap between the attendance of

farmers' markets and the consumption of fruits and vegetables, and how to bridge the gap afterwards. Furthermore, it is helpful to figure out reasons why the redemption of SNAP benefits remains extremely low at farmers' markets in Lexington, Kentucky, and how this issue can be resolved. Future researchers might plan to include more farmers' markets across various regions and more participants aged 55 and over than this study to explore correlations or causations related to how older adults can benefit from farmers' markets since the older population in the US continue growing. A longitude study design is desired to collect more comprehensive data for analysis. For instance, long-term effects of the fruit and vegetable consumption on health could be studied on those who visit farmers' markets weekly. Investigators might also desire to utilize more objective tools to measure and collect data associated with personal feelings related to their health instead of self-reporting. In Taiwan, further studies are need to examine what motivates older adults spending more money than their younger peers at farmers' markets, although both age groups feel products are expensive than supermarkets and traditional markets.

Appendix: Adapted Customer Intercept Survey, English Version

Research survey

This survey is taken at

- 241 West Main Street
- 348 Southland Drive
- 400 West Maxwell Street
- UK ES Good Barn

A. Farmers' market accessibility

1. Which farmers' markets in Lexington do you usually visit? (Select one answer)

- 241 West Main Street
- 348 Southland Drive
- 400 West Maxwell Street
- UK ES Good Barn
- Other: _____

2. What type of transportation do you usually use to visit farmers' markets in Lexington? (Select one answer and fill in the blank for the one that applies)

- Drive a car _____ Minutes _____ Miles
- Share a ride _____ Minutes _____ Miles
- LexTran _____ Minutes _____ Miles
- Trolley _____ Minutes _____ Miles
- Walk _____ Minutes _____ Miles
- Bike _____ Minutes _____ Miles
- Other: _____

3. How often do you go to farmers' markets in Lexington from June to August?

- More than once a week
- Once a week
- Two to three times a month
- Once a month
- Less than once a month

4. Why do you visit farmers' markets in Lexington? (Select all that apply)

- Support local farmers
- Fresher produce
- Produce tastes better
- Produce is grown with fewer pesticides
- Good prices
- Good service

- Quality of products
- Variety of products
- Consistency of products
- Convenient location
- Friendly atmosphere
- Other: _____

5. What keeps you from visiting farmers' markets in Lexington? (Select all that apply)

- Limited EBT (electronic benefits transfer)
- Mode of transportation (bus, walk, bike, and soon)
- Prices
- Extreme weather
- Parking
- Market days and hours
- Out of the way
- Other: _____

6. Do you currently participate in any nutrition programs, such as SNAP or WIC?

- Yes
- No

6a. If yes, what programs do you currently attend? (Select all that apply)

- WIC (Special Supplemental Nutrition Program for Women, Infants, and Children)
- SNAP (Supplemental Nutrition Assistance Program)
- SFMNP (Senior Farmers' Market Nutrition Program)
- Other: _____

6b. Are you able to apply benefits received from the program to farmers' markets in Lexington?

- Yes
- Sometimes
- No

B. Fruit and vegetable consumption

1. In general, how healthy do you consider your overall health?

- Excellent
- Very good
- Good
- Fair
- Poor

2. In general, how healthy do you consider your overall diet?
 - Excellent
 - Very good
 - Good
 - Fair
 - Poor
3. On a typical day, how many servings of fruits do you consume? This does not include fruit juice. (A serving of fruit is like a medium sized apple or half of a cup of fresh fruit.)
 - 1 serving
 - 2 servings
 - 3 servings
 - 4 servings
 - 5 or more servings
4. On a typical day, how many servings of vegetables do you consume? This does not include French fries. (A serving of vegetables is one cup of green salad or half of a cup of cooked vegetables.)
 - 1 serving
 - 2 servings
 - 3 servings
 - 4 servings
 - 5 or more servings
5. As a result of your shopping at farmers' markets in Lexington, have you been eating more fruits than before you started to shop here?
 - No change
 - A little more
 - Many more
 - This is my first time at the farmers' market
6. As a result of your shopping at farmers' markets in Lexington, have you been eating more vegetables than before you started to shop here?
 - No change
 - A little more
 - Many more
 - This is my first time at the farmers' market
7. As a result of your shopping at farmers' markets in Lexington, have you been eating a greater variety of fruits than before you started to shop here?
 - No change

- A few kinds
 - Many more kinds
 - This is my first time at the farmers' markets
8. As a result of your shopping at farmers' markets in Lexington, have you been eating a greater variety of vegetables than before you started to shop here?
- No change
 - A few kinds
 - Many more kinds
 - This is my first time at the farmers' markets

C. Shopping behaviors

1. On an average, what foods do you usually buy at farmers' markets in Lexington? (Select all that apply)
- Grains
 - Vegetables
 - Fruits
 - Meats
 - Dairy products
 - Juice
 - Premade products, such as jams, breads, honey...
 - Snacks, such as ice cream, pastries...
 - Non edible products
 - Other: _____
2. During a typical shopping trip, how much money do you spend at farmers' markets in Lexington?
_____dollars
3. Compared to other places you purchase food, how are average food prices at farmers' markets in Lexington?
- More expensive
 - About the same price
 - Less expensive
4. When you shop at farmers' markets in Lexington, what's your shopping behavior?
- Shop alone
 - Shop with family and/or friend
 - Shop with your pet
 - Shop with family and/or friends and pets
 - Others: _____

D. Demographic information

1. What is your gender?
 - Male
 - Female
 - Other
2. In what year were you born? _____
3. What is your current marital status?
 - Single, never married
 - Living with my partner (unmarried)
 - Married
 - Widowed
 - Divorced
 - Separated
4. What the highest education have you completed?
 - Less than high school
 - High school graduate
 - Some college
 - College degree
 - Graduate degree
5. What is your ethnicity?
 - African American or Black
 - American Indian
 - Asian
 - Caucasian or White
 - Hispanic or Latino
 - Native Hawaiian or Pacific Islander
 - Other: _____
6. Employment status: Are you currently?
 - Employed for wages
 - Self-employed
 - Out of work and looking for work
 - Out of work but not currently looking for work
 - A homemaker
 - A student
 - Military
 - Retired
 - Unable to work
 - Other: _____

7. What is annual household income?

- <20,000
- 20,000-40,000
- 40,001-60,000
- 60,001-80,000
- >80,000

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