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MOTIVATION FOR CONSUMERS PARTICIPATING IN A SUSTAINABLE FOOD SYSTEM

By

Brittney Albin

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MOTIVATION FOR CONSUMERS PARTICIPATING IN A SUSTAINABLE FOOD

Brittney Albin

University of Nebraska, 2012

Advisor: Dan Osborne

Abstract

This study explores what factors motivate consumers to choose foods in a sustainable food system and how those food choices can impact both health and the environment. A survey was conducted in Lincoln, NE asking consumers who are already participating in a sustainable food system about their motivations and priorities when selecting these foods. Survey participants were asked to rank the importance of 20 different aspects of food on a 5 point scale from not at all important to extremely important. Participants were then asked to rank nine priorities in order of importance when selecting food. Results indicate that health is the major motivation for these consumers, rather than environmental or economic concerns. This research indicates that the information presented about foods and a sustainable food system and efforts to promote a transition to this diet should focus on the benefits to personal health.

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Introduction

Currently there are trends for consumers to start choosing more sustainable options in every aspect of their life, including food. There are many negative consequences for both the environment and human health due to conventional industrial agricultural practices (Horrigan et al., 2002; Leitzman and Cannon, 2005). Sustainable agricultural practices are being promoted as part of a larger sustainable food system. As Leo Horrigan et al. describe it, "sustainable agriculture is not merely a package of prescribed methods. More important, it is a change in mindset whereby agriculture acknowledges its dependence on a finite natural resource base" (Horrigan et al., 2002: pg 454). A sustainable food system relies on consumers having the mindset that making a transition in their diets to focus more on foods that are local, plant-based and/or organic will have profound impacts on the environment and their health. There are various environmental and nutritional benefits associated with sustainable food systems. There have also been studies of what motivates consumers to choose specific foods in this system, such as organic foods (Lockie et al., 2002; Magnusson, 2008). This particular study will not focus on any one characteristic of sustainable foods, but instead will focus on the venues where foods that encompass multiple sustainable qualities can be purchased (e.g. farmers market, community supported agriculture, food co-ops). It is clear that a sustainable food system is needed, but it is important now to understand how to motivate consumers to choose foods that possess these sustainable qualities. Diet choices impact both health and the environment (Marlow, 2009; Feenstra, 1997), but consumers could be considering other factors such as economics. This research will help in understanding what consumers care about most when making their food choices and what specifically helped them transition to a sustainable food system.

This study will determine factors that are important for consumers when choosing foods in a sustainable food system. I hypothesize that consumers in Lincoln, Nebraska who are already participating in some sort of a sustainable food system will be more motivated by personal factors related to health rather than environmental factors. If supported, this will indicate that convincing the public to choose more sustainable food items should come from a place of personal benefit rather than the good of the environment, because this priority has already successfully convinced consumers to make a transition in their food choices.

Consumers who are already participating in a sustainable food system were selected, because people who have interest in sustainability and have a positive attitude towards these types of food are not necessarily reflecting that in their behavior. There is an attitude-behavioral intention gap discussed by Vermier and Verbeke (2006). To avoid this gap, the participants in this study were consumers who not only express favorable attitudes toward sustainable food, but actually implement that interest in their purchasing behavior.

Literature Review

Transitioning to a sustainable food system benefits both public health and the environment. Leitzman and Cannon (2005) detail the domains and principles associated with a more sustainable approach to food in their discussion of the New Nutrition Science. The New Nutrition Science paradigm suggests that biological, social, and environmental factors should be assessed in food choices. One of the principles listed by the nutrition scientists who advocate for this approach is "the overriding responsibility of nutrition science is to work to handing on to future generations an improved human, living and physical environment: healthy people, healthy population and a healthy planet" (Leitzman and Cannon, 2005: pg 791). This call for a focus on

this combination of factors can be explained by the lengthy list of environmental and health concerns associated with conventional industrial agricultural practices.

Horrigan et al. (2002) provide a detailed account of the consequences conventional food production has on both the environment and health. Some of the environmental impacts include fertilizers creating an excess of nitrogen in the soil that reduces plant biodiversity and production of biomass, pesticides resulting in a decline of bird and beneficial insect populations, soil erosion and destruction of soil health, and pollution of surface water and aquifers. The U.S. Environmental Protection Agency (EPA) has sited agricultural practices as the cause of 70% of pollution in streams and rivers (Horrigan et al., 2002). Horrigan and colleagues go on to describe the various health problems associated with industrial food production including: high saturated fat content in animal-based foods contributing to chronic diseases, pesticide residues entering the human body and increasing risk of some cancers, and the use of antibiotics in animal agriculture leading to increased resistance to antibiotics in humans. The United Nations estimates that 10,000 deaths each year can be attributed to pesticides entering the body through air, water, and food (Horrigan et al., 2002). Conventional livestock production involves feeding animals grain and this requires much more energy than grass-fed animals. Horrigan et al. recommend moving toward sustainable agricultural practices as well as personal efforts by consumers to make changes such as reducing meat consumption. Welch and Graham (1999) argue that environmental concerns associated with agriculture are being addressed, but there needs to be a larger focus on providing healthful and nutritional foods. However, the more common suggestion is that there needs to be a focus on combining these efforts in a sustainable food system.

Michael Hamm (2008) discusses the benefits of linking natural resource preservation goals and national public health goals. He focuses on community based food systems which he

describes as systems that "prioritize local resources and local markets, emphasize social equity and environmental sustainability, and rely on relationships among growers and eaters, retailers and distributors, processors and preparers of food within the community" (Hamm, 2008: pg 173). Hamm (2008) goes on to describe the ideal healthy community being framed by four dimensions: health, farming, economics, and environment. Recognizing the relationships among these different dimensions will contribute to a better overall food system.

The term food system is important, because it is more dynamic than the traditional food chain and encompasses all aspects of food from production to consumption and the associated impacts (Leitzmann and Cannon, 2005). One definition of a sustainable food system quite relevant to this study is a system that "would involve closer connections between producer and consumer, meaning more direct marketing of foods to local consumers (through farmers markets, community-supported agriculture farms, farmer cooperatives, etc.)" (Horrigan et al., 2002: pg 446). In striving for a sustainable food system, it is necessary to understand the many different factors and choices that make up such a system. A sustainable food and agriculture system is defined as

> One in which the fertility of the soil is maintained and improved; the availability and quality of water are protected and enhanced' biodiversity is protected; farmers, farm workers, and all other actors in value chains have livable incomes; the food we eat is affordable and promotes our health; sustainable businesses can thrive; and the flow of energy and discharge of waste, including greenhouse gas emissions, are within the capacity of the earth to absorb forever (Sustainable Food Laboratory, 2011).

Most, if not all, of these elements are supported by locally produced, organic, and plant-based foods. Many studies have focused on a single food type from this list, but my study focuses on all three options and their benefits to human health and the environment.

Local

Local food systems have received a great deal of interest lately, and they can take on many names and forms including food shed, urban agriculture, or regional food system, but they are all focused on connecting the rural farmer and the urban consumer (Feenstra, 1997). Due to rising interest in local food systems, Schneider and Francis (2005) conducted a study in Washington County, Nebraska that surveyed consumers about their interest in locally grown foods. Consumers ranked the importance of 12 different attributes of food products. The results indicated that quality, taste, nutrition and price were most important to the consumers surveyed (Nutritious and healthy was listed as a single category). The product being environmentally friendly was ranked the fifth most important attribute on average. Other studies have also found that health benefits and personal health are a major concern in addition to benefits to the community, economy, and environment (Leviten-Reid and Zepeda, 2004; Seyfang, 2006).

One of the major environmental benefits and typically most obvious benefit of purchasing local foods is the reduced distance the food has traveled from production to consumers. This in turn reduces demand for fossil fuels and reduces carbon dioxide emissions. While there is no exact distance that defines what makes a food local, a food that was grown or produced within 100 miles is a standard that is often used (Brown and Miller, 2008; Rose et al., 2008). Rose et al. (2008) studied the impacts of 19 people adhering to a local diet in Virginia for a four week time period in August or September, and they utilized the 100 mile definition for this research. It was found that this local diet increased fruit and vegetable consumption significantly, which could have positive health implications like a reduced risk of chronic disease. However, the study participants struggled to find healthy fats that met the local criteria such as vegetable oils, nuts, or fresh seafood, so they turned to less healthy local options like butter, lard, beef, and pork. So while advocating for local foods, it is also important to include a nutritional message to

improve both the human health and environmental aspects of the current food system (Rose et al. 2008).

Plant-based

Another aspect of a sustainable food system is placing more emphasis on consuming plant-based foods. Lea et al. (2006) surveyed consumers in Australia about perceived benefits to consuming a plant-based diet and found that the main benefits associated this diet were related to health. Such benefits identified were decreased saturated fat intake, increased fiber intake, and disease prevention. While it is easier for consumers to understand why plant-based foods such as fruits and vegetables are a healthy choice, what is it about plant-based foods that make them better for the environment? Meat production is very energy intensive because of the energy lost when grain is fed to livestock instead of directly to humans. Beef production has the worst energy conversion, because cattle require 7 kg of grain to produce 1 kg of beef, whereas chickens take only 2 kg of grain to produce 1 kg of meat (Horrigan et al., 2002). Grass fed livestock can help mitigate this problem, but the current proportion of livestock diets that are based on grain is much higher than those based on grass fed. Marlow et al. (2009) researched whether or not what a consumer eats matters in terms of the environment. Their specific focus was looking at a vegetarian versus nonvegetarian diet. They found that the nonvegetarian diet created a larger burden on the environment requiring 2.9 times more water, 2.5 times more energy, 13 times more fertilizer, and 1.4 times more pesticides when compared to the vegetarian diet. Their research was also consistent with previous studies in that beef was the biggest contributor to the differences in environmental impact of these two diets (Horrigan et al. 2002; White, 2000; Goodland 1997). However, studies that examine the energy inefficiencies of meat production rarely call for an outright change to vegetarianism. A simple reduction in the amount of meat

consumed each week could have a substantial impact in terms of resource consumption (Horrigan et al., 2002; Stehfest et al., 2009).

Boer and colleagues (2007) discuss the separation in motivational goals involving food between promotion-oriented and prevention-oriented goals. Both of these systems serve as survival functions, but in different ways. A promotion system is based on obtaining nourishing food as the main concern, while a prevention system is focused on security and avoiding negative outcomes. They surveyed Dutch consumers buying free-range meat or having diets low in meat found that those making sustainable food choices were selecting food based on prevention-oriented food choice motives such as avoiding risks to their health.

The "Mediterranean diet" is one example of the ideal diet that centers on plant-based foods and it has been promoted as a healthy diet by many nutritionists. This diet is defined as focused on various plant-centered foods and typically includes pasta, coarse breads, olive oil, beans, nuts and seeds, wine, and fresh fruit and vegetables (Gussow, 1995). Duchin (2005) addressed the impacts of changing one's diet for both the environment and health and how the two can overlap. After individually assessing the foods that make up environmentally preferred diet and the healthy diet, it was found that a Mediterranean-type diet would be able to address concerns in both these areas. Duchin (2005) found that fruits and vegetables and other plant-based foods provide the best of both scenarios and these elements are a major focus of the Mediterranean diet. Those foods are less resource-intensive while also offering health benefits like a reduced risk of cardiovascular disease and some cancers (Duchin, 2005). In Gussow's (1995) search for diets that can be considered sustainable, he took a closer look at the impacts of the Mediterranean diet. He states that the Mediterranean diet is likely more sustainable that the typical American diet, but some modifications are recommended to help the diet become more

regional (e.g. consuming fresh fruit and vegetables consumed when available seasonally, minimizing fat consumption, avoiding ecologically expensive oils).

Similarly, Bere and Brug (2008) set out to determine a regional diet that would promote health as well as contribute to environmental preservation in Nordic countries. They combine the elements of a local diet and a plant-based diet, arguing that the promotion of regionally defined diets will mitigate many diet-related diseases and health concerns as well as promote environmentally friendly eating. While a Mediterranean diet has been suggested to enhance health, the foods associated with this diet are not necessarily readily available on a local basis. Bere and Brug (2008) discuss the environmental impacts of food and indicate that affluent societies typically do not feed themselves in a sustainable manner. The authors were able to create a list of foods adjusted from the Mediterranean diet that they believe represent a regional diet that achieves their standards for health and the environment. They conclude that "a much more complicated challenge is how to get people to indeed eat these foods instead of the foods they grown accustomed to" (Bere and Brug, 2008: pg 11). This is the basis of my research – determining what motivates consumers to choose foods that make up an environmentally friendly diet.

Organic

Some researchers have been advocating for a combination of both local and plant-based diets, but there is also the organic aspect of food that receives a great deal of attention. McCullum (2004) describes how sustainable agriculture practices can be combined with efforts to promote human health through the use of organic farming systems. "Whole foods" are foods that are minimally processed and packaged and they are suggested as a method to bypass the

high energy demands of food processing and transportation. Organic foods relate to this description and organic farming systems conserve non-renewable resources by relying on "ecological based practices, such as biological pest management and composting, [and they] virtually exclude use of synthetic chemical, antibiotics, and hormone in crop [and] livestock production" (McCullum, 2004: pg 19). There are also specific health benefits to be gained by utilizing organic farming practices. McCullum (2004) describes the rising concern of phenolic compound levels being lower than the optimal level for human health when examining foods that are grown using conventional agriculture practices. Pesticides can reduce the natural production of these phenolic metabolites which typically enhance antioxidant activity. Organic foods exclude the use of pesticides and maintain the enhanced antioxidant activity which helps with disease prevention. This demonstrates the ability of organic foods to aid environment and health goals, but researchers have also explored what is motivating consumers to choose these food items.

Magnusson et al. (2008) distributed a questionnaire to consumers in Sweden to assess attitudes and behaviors towards organic foods as well as environmentally friendly behavior and the perceived consequences that purchasing these foods would have on human health, the environment, and animal welfare. The results suggest that perceived health benefits were more strongly related to choosing organic foods than perceived environmental benefits. Magnusson et al. (2008) conclude that consumer's purchase of organic foods is better predicted by egotistic motives (health) than altruistic motives (environment). Research conducted by Gambelli et al. (2003) found that information about products, ethical concerns, attention to health, and adequate income level were the main aspects attributed to consumption of organic animal products in

Italy. Additionally, they revealed that consumers were reluctant to make the transition to consume organic food products strictly for environmental concerns.

Stewart Lockie et al. (2002) found similar results in their survey of what motivates the consumption of organic foods. They surveyed 1,200 Australian consumers to find out whether or not they ate organic foods, and what factors influenced their choices. Their survey covered a broad range of topics including environmental concern, health, animal welfare, safety, quality, and taste. Survey questions asked about the importance of each factor, for example "How important is it to you that the food you eat on a typical day contains a lot of vitamins and minerals?" Responses ranged on a scale from 1 to 5 (5 being extremely important). Their study found that both groups ranked health above concerns about the environment when choosing their food (Figure 1). This finding is consistent with other research regarding motivations to purchase organic foods (Harper et al., 2002; Naspetti and Zanoli, 2002). They also found that although there was an association between those purchasing organic foods and those motivated by animal welfare and environmental impacts, it was a weak relationship. Lockie et al. (2002) conclude that consumers are least willing to compromise personal and family health when it comes to their food choices. I expect to find similar results when conducting my research here in Lincoln, NE in that consumers will be more motivated by health concerns rather than environmental concerns.

Although nutrition, health, and the environment were studied in several of these articles, it is also frequently found that price is one of the most important factors being considered. Concern for price may be driven by the global recession that will continue to be an issue into the foreseeable future. However, it is possible that future generations will demonstrate a different ranking of priorities when it comes to food choice. Nyrgard and Storstad (1998) studied how a global food market influences consumers' confidence in food products. They surveyed a sample

of the Norwegian population about their attitude towards imported foods which were associated with 'risks' such as the salmonella and other infections. They found that indeed other ethical interests, such as the environment and animal welfare, as well as individual interests such as quality and health were being considered. The authors concluded that consumers should not simply be regarded as economic rational actors who place emphasis solely on the price of a product.

The decision was made to focus on a variety of sustainable foods, because for most consumers it is difficult to consume an entirely local diet or to consume only organic foods or only plant-based foods. Some consumers are even requesting a combination of these elements (Brown, 2003), because relying on only one of these food types is not sufficient to meet the goals of a sustainable food system. Rose et al.'s (2008) study showed that strictly focusing on consuming local foods could have adverse health consequences. So, the benefits of reducing environmental impacts from transporting foods over long distances were achieved, but health consequences were an issue. If a consumer chooses to focus solely on plant-based, then the carbon dioxide emissions from transporting the food could still be of concern since fruits and vegetables could come from anywhere. However, if a diet is focused on these different elements overall, then this will aid in the transition to a sustainable food system. As mentioned previously, the goal is not a perfect system, just a transition toward a dietary mindset that is focused on these different sustainable options.

Materials and Methods

The survey used for this study incorporated a variety of questions pertaining to different aspects of foods and how various characteristics that influence consumer choices are prioritized. The studies done by Lockie et al. (2002) and Schneider and Francis (2005) were used as models

for developing the questions. Some modifications were made to their questions used in order to focus on sustainable foods as a whole and to reduce the number of overall questions for the survey. Shorter surveys are more likely to maintain the attention of participants and ensure focus and completion. The survey was created using an online source called Survey Monkey (surveymonkey.com). The population surveyed was customers from a food cooperative grocery store, farmers markets, and participants in community supported agriculture (CSA). Due to the involvement of humans in this study, human subject approval was acquired from the Institutional Review Board (IRB) at the University of Nebraska—Lincoln Office of Research prior to survey distribution. Small flyers were distributed at the food cooperative grocery store and the farmers markets, which stated the purpose of the study and provided a link to follow in order to participate. The food cooperative grocery store is called Open Harvest and the farmers markets that were visited included the Old Cheney Road Farmers Market and the Haymarket Farmers Market. Flyers were distributed at these three locations on multiple occasions over 1-2 hour time increments. The CSA farm participants were contacted via e-mail from a coordinating member of each program, and those e-mails contained the same information as the flyers that were handed out. E-mails were sent out to those participating in the CSA programs of Robinette farms, Community Crops, and Common Good Farm.

Participants

The different populations sampled for my survey represent consumers who are already participating in a more sustainable food system (n = 189). Very similar to the sustainable food system Horrigan et al. (2002) described, I surveyed individuals at a cooperative grocery store (n=10), two farmers markets (n = 47), and three CSA farms (n= 132). Due to the small number

of responses in the grocery store group, the farmers market and grocery store responses were compiled into a single group called the Customer Group.

Open Harvest is a cooperative grocery store focusing on natural foods. Their mission statement reads as follows:

> "The goal of Open Harvest is to provide good health through good nutrition. Open Harvest provides high quality and natural foods with a high level of service and a reasonable price to the community of Lincoln. Open Harvest is a member-owned retail cooperative dedicated to equitable employment practices, support of local producers, consumer education, and sustainable agricultural practices." (www.openharvest.coop)

As a cooperative or co-op grocery store this business belongs to member-owners who share equally in its control. The products available at Open Harvest have all been selected with an interest in sustainability of its production and the support of local producers. In the store, there are large signs displaying information about various local farms that provide an array of food items to the store. The signs include the location of the farm, a picture of the owners, and a brief description of their particular sustainable practices and/or the values they hold at their farm. The origins of most products are clearly visible and unnecessary packaging is avoided to prevent excess waste. There are also numerous products labeled as organic or chemical free. The sustainable interests of the co-op are quite transparent to any customer at the store.

Community supported agriculture (CSA) is a system where a local farm sells “shares” to its consumers before planting begins, and consumers are typically provided with a portion of produce each week, and the particular foods available depends on the time of the growing season (Brown and Miller, 2008). The consumers that participate in a CSA program are not certain exactly what foods will be provided and they are also sharing in the risks of farming if there is a bad growing season. Brown and Miller (2008) reviewed the available research of CSA farms and found that those who participated in CSA farms were eating more, fresher, and greater varieties

of vegetables in addition to shopping less, and moving towards healthier eating habits overall. They also found that a greater emphasis was placed on the freshness of their food and the quality associated with the CSA produce over supermarket produce may be worth paying more for their food (Brown and Miller, 2008).

Robinette Farms' CSA program provides vegetables, meat, and gelato shares. The vegetable shares are offered for varying numbers of people at different costs ($300 a season for a share that feeds 1-2 people a week), and they are available for pick up on a weekly basis. Meat shares are available for pick up once a month and according to their website the participants are provided with "fresh, seasonal, locally produced meats from animals with happy lives and a humane slaughter." The farm is located southwest of Lincoln in Martell, NE.

The Community Crops CSA program provides vegetable shares that are available for pick up on a weekly basis. There are options to add on shares of eggs, cheese, and flowers. There is also a CSA program provided by Community Crops in the winter as well. All of these products are grown at the Sunset Community Farm which is located just west of Lincoln. At this farm, sustainable agricultural practices are utilized and the CSA program also focuses on using recycled packaging options whenever possible (www.communitycrops.org/csa).

The Common Good farm is located in southeast Nebraska just 15 miles northwest of Lincoln. The farm utilizes sustainable agricultural practices and provides certified organic and certified biodynamic goods. Their CSA program has two options: a summer harvest share that is picked up weekly and a fall harvest box that is available for a one time pick up at the farm. In addition to produce, shares can include grass-based meat and eggs from hens that are on pasture.

Old Cheney Road Farmers' Market is located in south Lincoln and is held on Sunday each week from the end of April to the end of October. According to the market website, some of their goals include fostering environmental stewardship, connecting local, small family farmers with local, urban consumers and building a healthy community that is food secure (oldcheneyroadfarmersmarket.com). The Haymarket Farmers' Market is located in downtown Lincoln and takes place every Saturday from the beginning of May to mid-October.

One limitation to my study is that it is assumed that those individuals who responded to the survey were in fact participating in the sustainable food system: they are actually purchasing shares from the CSA farms, they purchase food items from Open Harvest, and they purchased food items at the farmers' market. It is possible that the e-mails sent out to the different CSA farm groups were actually reaching people who participated in the past but are not currently, or they might have signed up to receive information and have never actually participated. The subjects at Open Harvest may not shop there on a regular basis and they may have just walked in and not purchased anything. At the farmers' market, survey flyers may have been handed to people who were just walking through the area and do not actually purchase food from the market. There are non-foods items for sale at farmers markets as well. However, the fact that these individuals were at Open Harvest or a Farmers Market, or are somehow connected to a CSA farm indicates that they are likely thinking more about factors such as health, environment, and sustainability than the average consumer.

The survey questions focused on ranking the importance of different priorities when buying food, and they were broken down into two sections. The first section asked for a ranking of importance about specific food characteristics such as "how important is it that your food be environmentally sustainable?" Responses were recorded as a rank from 1 to 5 with 1 being "not

at all important" and 5 being "extremely important." The next section asked the survey participant to rank a list of 9 factors on importance when compared to the rest of the list. Those factors include health, environmental protection, price, quality, natural content, animal welfare, weight control, fitness, and convenience.

The responses collected were analyzed using SPSS. The responses from the first portion of the survey were analyzed using a series of Chi-square tests that compared the frequency of responses for health, environmental protection, and environmentally friendly packaging to the frequency of responses for the remaining variables. This test determines if there is a relationship between those subjects ranking one variable as extremely important and the way they ranked another variable. The strength and direction of association was assessed using the phi coefficient. This coefficient is used to determine the strength and association between categorical variables. The responses from the second part of the survey were analyzed using a Jonckheer-Terpstra (JT) Test. This test determines if there is a deviation in the priority ranking of factors relevant to a sustainable food system in independent samples. The JT test offers more power than the Kruskall-Wallis test when variables are ranked. Mann-Whitney U test was used to compare the summed priority rankings between CSA and customer participants. Alpha levels were 0.05 for all tests.

Results

The Chi-square test comparing the *keeps you healthy* responses to the other variables found that there was significant relationship in the ranking of importance for the variables *contains vitamins, nutritious, high in protein, high in fiber, provides energy for exercise, high quality, contains no additives, contains natural ingredients, is chemical free, unprocessed,*

preserves natural goodness, produced in a way that animals did not experience pain, produced while respecting animal rights, prepared in an environmentally friendly way, and *grown locally* ($p<0.05$). The only variables that did not have a significant relationship in this comparison were *controls weight, readily available, not expensive,* and *good value for the price*. Separate tests were run for the CSA group and the remaining variables to compare priorities. There were some differences in results when the CSA group and customer group were tested separately. In the customer group, *contains protein, provides energy for exercise, is high quality, is unprocessed, is packaged in an environmentally friendly way,* and *is grown local* no longer have a significant relationship with *keeps you healthy*. The variable *chemical free* is no longer has a significant relationship with *keeps you healthy* in either group once they are separated. The CSA group is largely similar to the all responses test, but when the groups are separated, *keeps you healthy* is reported as significantly more important than *controls weight* as well. These results indicate that when a significant relationship was present a weak to strong positive association was also found. A strong positive association was indicated between *keeps you healthy* and *nutritious* for all three tests ($phi \geq 0.73$). Also, for all three tests, a moderate positive association was found when comparing *keeps you healthy* and *contains vitamins* ($phi \geq 0.61$).

Chi-square test compared the ranking of importance of food *prepared in an environmentally friendly* way to the ranking of the other variables. This test found that there was a significant relationship between *prepared in an environmentally friendly way* and *contains vitamins, keeps you healthy, is nutritious, high in fiber, high quality, readily available, contains no additives, contains natural ingredients, chemical free, unprocessed, preserved natural goodness, produced in a way that animals did not experience pain, produced while respecting animal rights,* and *is grown locally* ($p<0.05$). People who ranked *prepared in an environmentally*

friendly way as extremely important differed significantly in their ranking of importance of these variables when compared to those who ranked *prepared in an environmentally friendly way* lower. A moderate positive association was found for the ranking *of prepared in an environmentally friendly way* and *no additives, natural ingredients, chemical free, unprocessed, preserves natural goodness and grown locally* (phi ≥ 0.508).A strong positive association was found between *prepared in an environmentally friendly way* and no animal and animal rights(phi ≥ 0.73). In contrast, there were no significant relationship in the ranking of importance of *prepared in an environmentally friendly way* and the variables *high protein, controls weight, provides energy for exercise, not expensive,* and *a good value for the price*. The customer group and the CSA group did differ somewhat from the test of all responses. There was no longer a significant difference found for the importance of food *prepared in an environmentally friendly way* and the importance of food being *high fiber* and *readily available* for the customer market group only. There was no longer a significant difference found for the importance of *food prepared in an environmentally friendly way* and the importance of food *containing vitamins, being nutritious*, and *being high in protein* for the CSA group.

The Chi-square test comparing the ranking of importance of *food packaged in an environmentally friendly way* to the ranking of the remaining variables found that there was a significant difference in importance for *keeps you healthy, is nutritious, high in fiber, provides energy for exercise, high quality, contains no additives, contains natural ingredients, chemical free, unprocessed, preserved natural goodness, produced in a way that animals did not experience pain, produced while respecting animal rights,* and *is grown locally* ($p<0.05$). People who ranked *packaged in an environmentally friendly* way as extremely important differed significantly in their ranking of importance of these variables when compared to those who

ranked *packaged in an environmentally friendly way* lower. A moderate positive association exists between the rankings of packaged in an environmentally friendly way and no additives, natural ingredients, unprocessed, and preserves natural goodness (phi $\geq$ 0.55). A strong positive association is found when comparing the rankings of packaged in an environmentally friendly way and no animal pain, animal rights, and grown local (phi $\geq$ 0.704). In contrast, there were no significant differences in the ranking of importance of p*ackaged in an environmentally friendly way* and the variables *contain vitamins, high protein, controls weight, readily available, not expensive,* and *is a good value for the price*. Once the groups were separated into customer and CSA responses there were several changes in significance. There was no longer a significant difference found for the importance of food being *packaged in an environmentally friendly way* and the importance of food being *high in fiber, provides energy for exercise, high quality, contains no additives,* and *chemical free* for the customer group only. Neither the CSA group nor the customer group had a significant difference in importance of food being *nutritious*. When the CSA group responses were tested, there was a significant difference in the ranking of *packaged in an environmentally friendly way* and the variable *high in protein*.

The results of the JT test indicate which of the 9 factors being ranked had significantly different distributions across the ranking system. Results for the entire sample revealed significant differences in the distribution of ranks for *health*, *natural content*, *animal welfare*, *convenience*, *weight control*, *fitness and quality*. Results of the CSA participant responses were identical to results for the entire sample. The results varied slightly for the customer group in that natural content and weight control no longer have a significantly different distribution of rank. Figures 3-5 below demonstrate the overall trend in the groups and demonstrate the significant differences in their distribution of the ranking from 1-9. Health was most often ranked as the

number 1 priority when choosing foods with quality as another high priority. Based on the distribution of results in the figures 3-5 it appears that natural content was not necessarily selected as most important, but 82% of subjects ranked it in the top 5 in terms of importance. Fitness, weight control, convenience, and animal welfare were most often selected as lower ranking priorities. Environmental protection and price were the only variables to have no significant difference in their distribution of the ranking, and this is the case for the entire sample as well as the sub-samples. This is demonstrated by figures 3-5, which do not show any particular ranking as standing out from the rest for those two variables.

The Mann-Whitney U test determined that CSA participants ranked price, animal welfare, and environmental protection as more important than customer participants ($p \leq 0.02$). Health and the rest of the variables were not ranked significantly differently between the two groups.

Discussion

Based on the results of the tests for both sections of questions, health is the main concern for these consumers when contemplating a sustainable diet. After examining the results from the Chi-square tests and Figure 2, it is clear that the effects of food on health are more important than most other factors. Figure 2 demonstrates that healthy food was often ranked as extremely important while the two environmental categories were often ranked as important. One issue with the questions asking for a rank of importance is that people could choose to rank everything as important. So, to get a clearer image of what consumer's priorities look like, they were asked to rank a list of factors. This forced survey participants to think about what is most important about sustainable food, and according to the results of the JT test, health is their number one

priority. The results support the original hypothesis that those who are already consuming foods in a sustainable food system are choosing those foods largely because of health concerns rather than concern for the environment. This is consistent with previous research exploring the individual characteristics of a sustainable food system (Boer et al., 2007; Lockie et al., 2002; Schneider and Francis, 2005). The results of the JT test also indicate that the attitudes of consumers varied toward the importance of environmental protection. Consumers participating in this food system have knowledge of the products whereas conventional food buyers are characterized by lack of knowledge and lack of information seeking about these foods (Gambelli et al., 2003; Zepeda and Deal, 2009). Consumers who have the information about these different products and are educated about their benefits are being motivated by impacts on health. While there are many important benefits to be gained from making the suggested transitions in diet, narrowing the promotional focus to health concerns will decrease the negative associations by those who might still be skeptical about environmental benefits.

Interestingly, price was not ranked as one of the top priorities, and a surprising number of survey participants indicated that they did not care about food being a good value for the price or not being expensive—some even indicated that it was not at all important. There could be two different factors contributing to these results. The first is that many of the survey participants are likely in a financial situation where the cost of food is not a concern. Price certainly influences food choice to some degree, but cost is a higher priority for people with low incomes when compared to those that are better off (Steptoe et al., 1995). Those who are more concerned about personal health will place greater importance on other factors such as nutrition and quality (French, 2003). However, it is important to note that some of the CSA farms offer discounted shares to some participants who meet the requirement. Also, the Old Cheney Road Farmers

Market accepts Supplemental Nutrition Assistance Program (SNAP) benefits. So, these different venues for local foods are becoming more flexible to accommodate a wider array of financial situations. The second factor that could explain this seeming lack of concern for price is that these consumers are considering the wider array of costs associated with food. The lower prices of standard food at a grocery store can be deceptive, because they do not include externalities like the cost of cleaning up farm pollution (Horrigan et al., 2002). It is possible that these consumers are more aware of the costs to the environment and public health, and this is why price is not their most important priority.

There are various limitations to this research due to the survey distribution methods. The sample size overall is small and the sample size from the grocery store and farmers markets in particular were quite small. This could result in type II errors wherein significant relationships may not be detected but actually are present. Also, the survey was only available online, so this limited participation to those people who have access to a computer. CSA participants were contacted via e-mail, so internet access would not be an issue, but the farmers market and grocery store customers that were given a survey link on a flyer may not have had access to a computer.

While these findings are useful, the population sampled for this research was quite small and further research is needed to determine if this priority is consistently on the mind of consumers participating in sustainable food systems. Making the transition to a sustainable food system is critical, and regardless of the reasoning, the benefits to both the environment and human health will be experienced if that transition is made.

Conclusion

A sustainable food system is necessary for a variety of reasons related to the environment, human health, and communities. A sustainable food system incorporates local foods from farms practicing sustainable agriculture and has a larger focus on plant-based and organic foods. A transition in the dietary choices of consumers will promote a sustainable food system, but the difficult task ahead is figuring out how to actually get consumers to participate in that system and make changes in their diet. This study has found that consumers who are already interested in this type of food system are choosing to purchase sustainable foods largely because of health concerns. Because health is the main priority, and not environmental protection, efforts to promote a sustainable food system should be focused on health benefits. More research is needed on samples who do not participate in a sustainable food system to evaluate their opinions in comparison to people already participating in a sustainable food system. Additionally, future research should explore the attitudes towards sustainable food systems in minority and low SES groups. If there is a general consensus wherein personal factors related to health are more important than environmental factors, this will better inform advocates in promoting sustainable food systems.

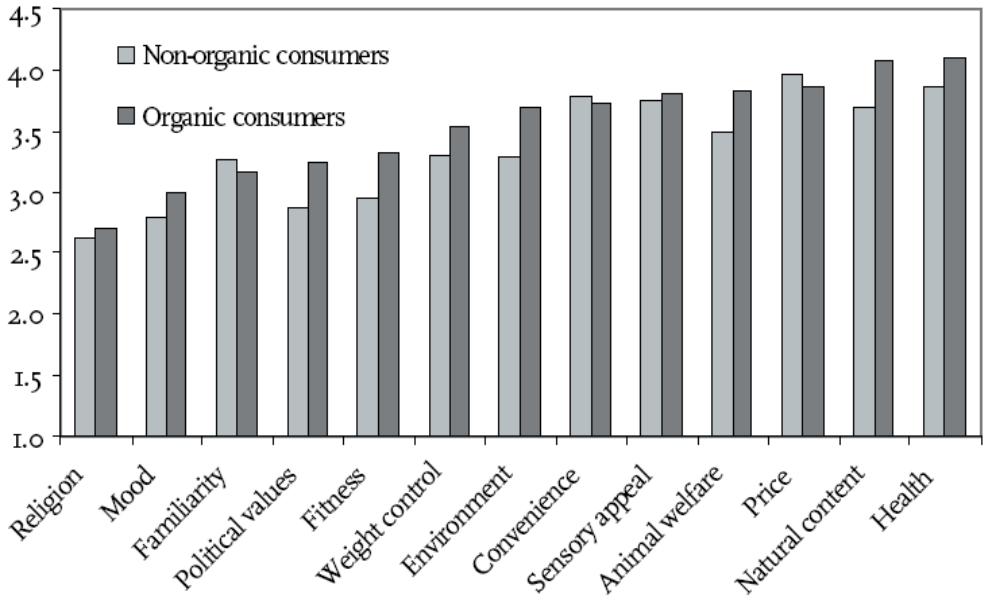


Figure 1. Motivating factors behind food choice in consumers of non-organic and organic diets (From Lockie et al., 2002).

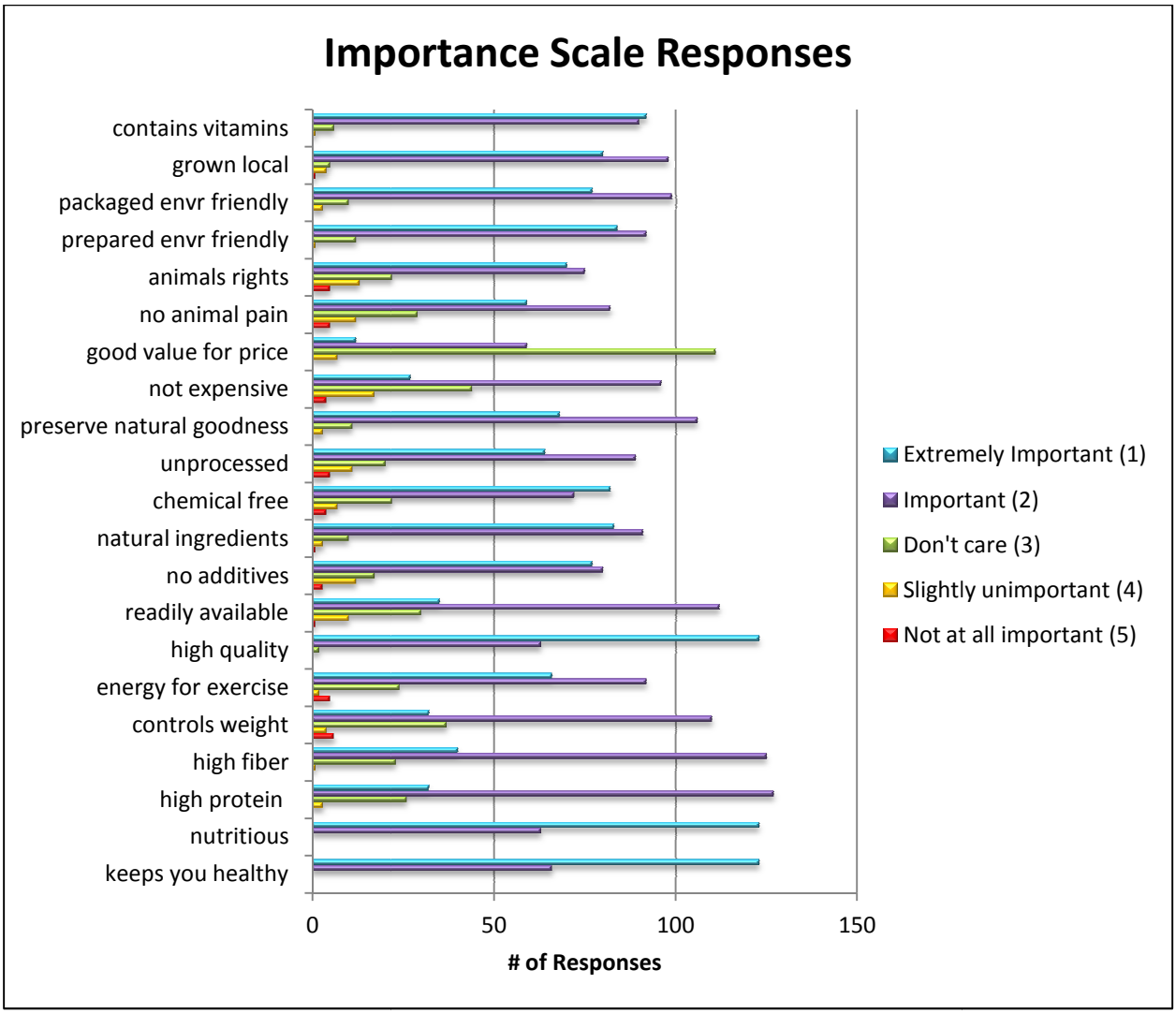
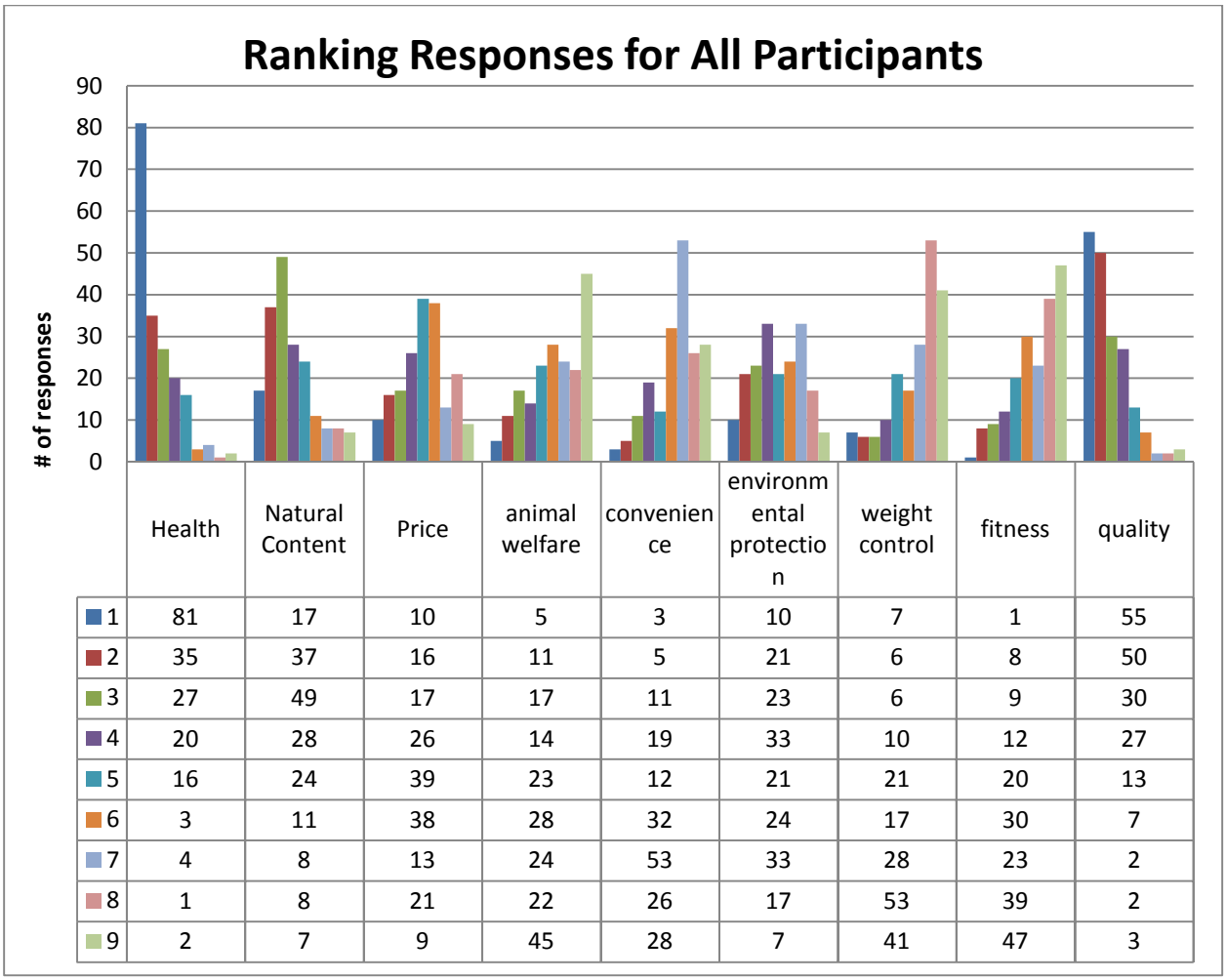
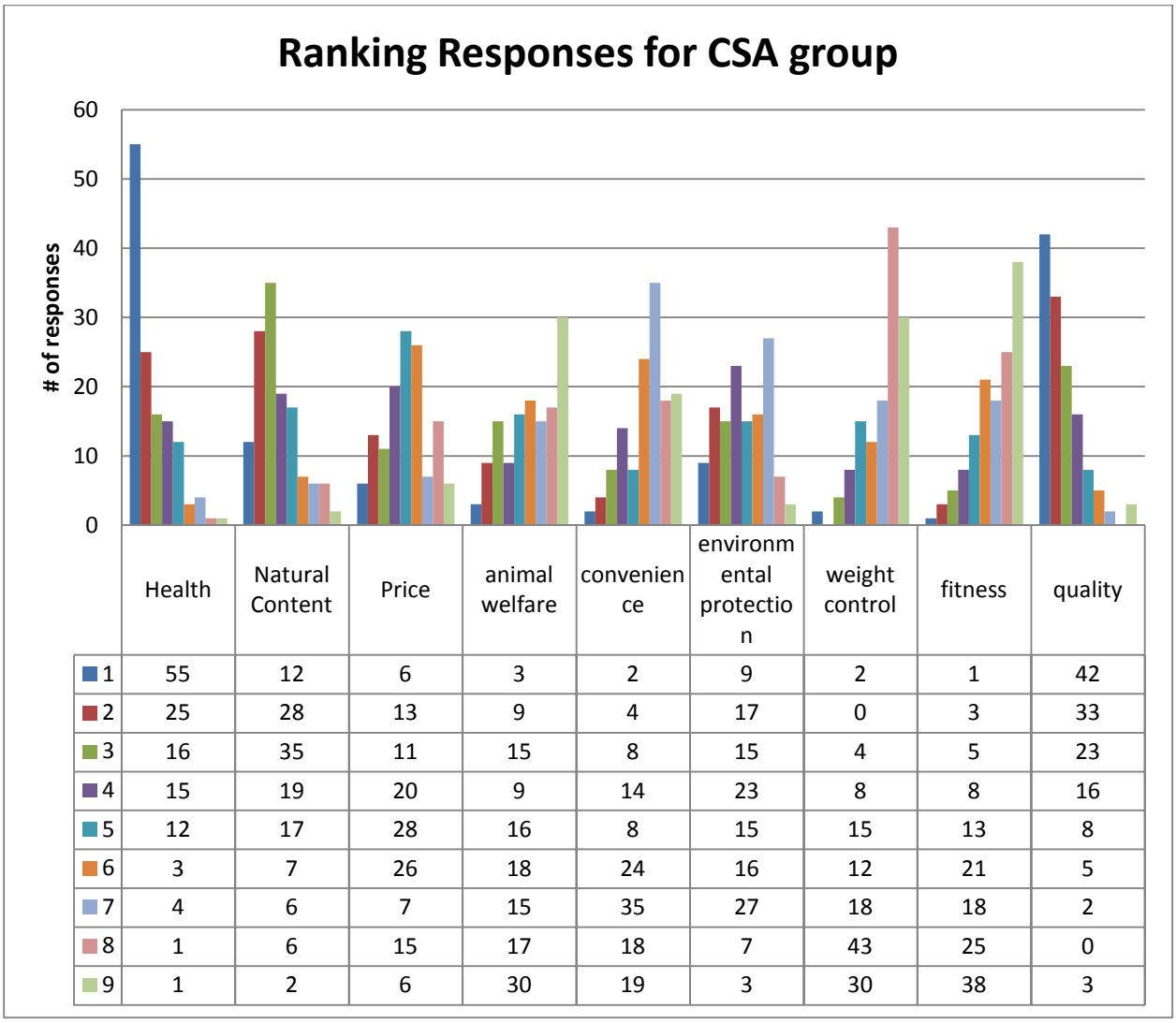


Figure 2. Rank of importance for 20 different factors related to food.



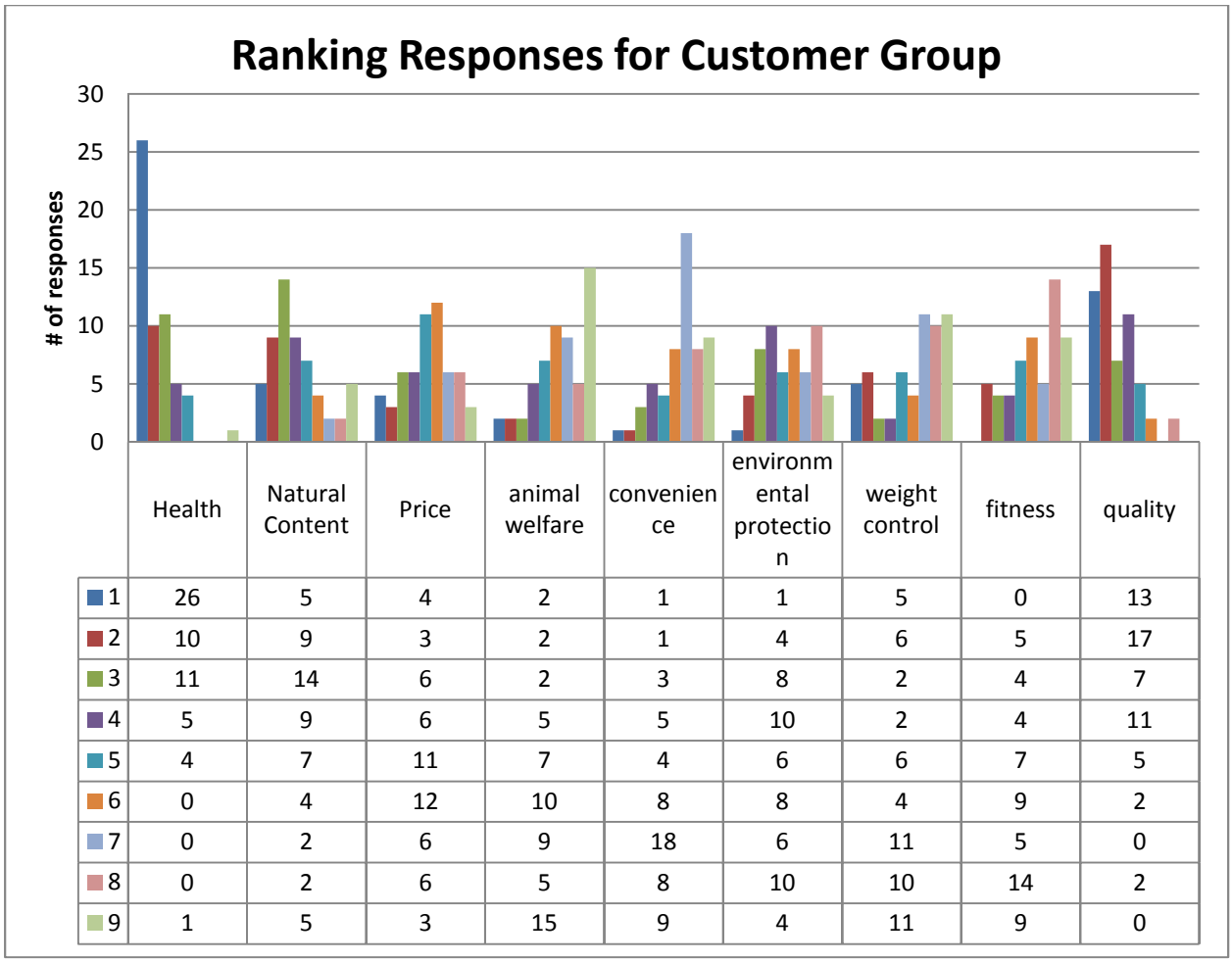
	Health	Natural Content	Price	animal welfare	convenience	environmental protection	weight control	fitness	quality
1	81	17	10	5	3	10	7	1	55
2	35	37	16	11	5	21	6	8	50
3	27	49	17	17	11	23	6	9	30
4	20	28	26	14	19	33	10	12	27
5	16	24	39	23	12	21	21	20	13
6	3	11	38	28	32	24	17	30	7
7	4	8	13	24	53	33	28	23	2
8	1	8	21	22	26	17	53	39	2
9	2	7	9	45	28	7	41	47	3

Figure 3. Results from all survey participants for the ranking of 9 factors related to food sustainability.



	Health	Natural Content	Price	animal welfare	convenience	environmental protection	weight control	fitness	quality
1	55	12	6	3	2	9	2	1	42
2	25	28	13	9	4	17	0	3	33
3	16	35	11	15	8	15	4	5	23
4	15	19	20	9	14	23	8	8	16
5	12	17	28	16	8	15	15	13	8
6	3	7	26	18	24	16	12	21	5
7	4	6	7	15	35	27	18	18	2
8	1	6	15	17	18	7	43	25	0
9	1	2	6	30	19	3	30	38	3

Figure 4. Results from the CSA group survey participants for the ranking of 9 factors related to food sustainability.



	Health	Natural Content	Price	animal welfare	convenience	environmental protection	weight control	fitness	quality
1	26	5	4	2	1	1	5	0	13
2	10	9	3	2	1	4	6	5	17
3	11	14	6	2	3	8	2	4	7
4	5	9	6	5	5	10	2	4	11
5	4	7	11	7	4	6	6	7	5
6	0	4	12	10	8	8	4	9	2
7	0	2	6	9	18	6	11	5	0
8	0	2	6	5	8	10	10	14	2
9	1	5	3	15	9	4	11	9	0

Figure 5. Results from customer group survey participants for the ranking of 9 factors related to food sustainability.

References

Boer, J et al. 2007. Towards more sustainable food choices: value priorities and motivational orientations. Food Quality and Preference 18: 985-996.

Brown, C. 2003. Consumers' preferences for locally produced food: A study in southeast Missouri. American Journal of Alternative Agriculture 18(4) 213-224.

Brown, C. and Miller, S. 2008. The impacts of local markets: a review of research on farmers markets and community supported agriculture (CSA). American Journal of Agriculture and Economics 90 (5): 1296-1302.

Duchin, F., 2005. Sustainable consumption of food. Journal of Industrial Ecology 9 (1-2) 99-114.

Feenstra, G., 1997. Local food systems and sustainable communities. American Journal of Alternative Agriculture 12 (1) 28-36.

French, S. 2003. Pricing effects on food choices. Journal of Nutrition 133 (3) 841S-843S.

Gambelli, D. et al. 2003. Why are consumers buying organic meat and milk? A qualitative study of the Italian market. Proceeding of the 1st SAFO workshop, Florence, Italy: 125-142.

Goodland, R. 1997. Environmental sustainability in agriculture: diet matters. Ecological Economics 23: 189-200.

Hamm, M., 2008. Linking sustainable agriculture and public health: opportunities for realizing multiple goals. Journal of Hunger and Environmental Nutrition 3 (2-3) 169-185.

Harper, C. and Makatouni, A. 2002. Consumer perception of organic food production and farm animal welfare. British Food Journal 104 (3,4,5) 287-299.

Horrigan, L. et al. 2002. How sustainable agriculture can address the environmental and human health harms of industrial agriculture. Journal of Environmental Health Perspectives 110(5): 445-454.

Lea, E. et al. 2006. Public views of the benefits and barriers to the consumption of a plant-based diet. European Journal of Clinical Nutrition, 60: 828-837.

Leitzmann, C. and Cannon, G. 2005. Dimensions, domains and principles of the new nutrition science. Journal of Public Health Nutrition 8(6A) 787-794.

Leviten-Reid, C. and Zepeda, L. 2004. Consumers' views on local food. Journal of Food Distribution Research 35(3) 1-6.

Lockie, S. et al, 2002. Eating 'green': motivations behind organic food consumption in Australia. Sociologia Ruralis 42 (1) 23-40.

Magnusson, M. et al, 2008. Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behavior. Appetite 40 (2) 109-117.

Marlow, H. et al., 2009. Diet and the environment: does what you eat matter? The American Journal of Clinical Nutrition 89: 1699S-16703S.

McCullum, C. 2004. Using sustainable agriculture to improve human nutrition and health. Journal of Community Nutrition 6 (1) 18-25.

Naspetti, S. and Zanoli, R. 2002. Consumer motivations in the purchase of organic food: a means-end approach. British Food Journal 104 (8) 643-653.

Nygard, B. and Storstad, O. 1998. De-globalization of food markets? Consumers perceptions of safe food: the case of Norway. Sociologia Ruralis 38 (1) 35-53.

Rose et al., 2008. The 100-Mile diet: a community approach to promote sustainable food systems impact dietary quality. Journal of Hunger and Environmental Nutrition 3(2-3): 270-282.

Schneider, M. and Francis, C., 2005. Marketing locally produced foods: consumer and farmer opinions in Washington County, Nebraska. Renewable Agriculture and Food System 20 (4) 252-260.

Seyfang, G. 2006. Ecological citizenship and sustainable consumption: examining local organic food networks. Journal of Rural Studies 22: 383-395.

Stehfest, E. et al. 2009. Climate benefits of changing diet. Climate Change, 95:83-102.

Steptoe, A. et al. 1995. Development of a measure of the motives underlying the selection of food: the food choice questionnaire. Appetite 25: 267-284.

Sustainable Food Laboratory. 2011. Home. http://sustainablefoodlab.org/ Viewed November 21, 2012.

Vermier, I. and Verbeke, W. 2006. Sustainable food consumption: exploring the consumer "attitude-behavioral intention" gap. Journal of Agricultural and Environmental Ethics 19: 169 -194.

Welch, R. and Graham, R. 1999. A new paradigm for world agriculture: meeting needs productive, sustainable, nutritious. Field Crops Research 60: 1-10.

White, T. 2000. Diet and distribution of environmental impact. Ecological Economics 34 (234) 145-153.

Zepeda, L. and Deal, D. 2009. Organic and local food consumer behavior: alphabet theory. International Journal of Consumer Studies 33(6) 697-705.