



2009

AN INTERACTION BETWEEN RISK PERCEPTION AND TRUST IN RESPONSE TO FOOD SAFETY EVENTS ACROSS PRODUCTS AND REGIONS, AND THEIR IMPLICATIONS FOR AGRIBUSINESS FIRMS

Jonathan D. Shepherd

University of Kentucky, jdshepherd@uky.edu

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ABSTRACT OF THESIS

AN INTERACTION BETWEEN RISK PERCEPTION AND TRUST IN RESPONSE TO FOOD SAFETY EVENTS ACROSS PRODUCTS AND REGIONS, AND THEIR IMPLICATIONS FOR AGRIBUSINESS FIRMS

Food safety events receive substantial media coverage and can create devastating economic losses for agribusiness firms. It is unclear what factors influence consumers' purchasing decisions before or after a food safety event occurs. The objectives of this study is to identify these factors that influence purchasing decisions, determine how consumers respond to hypothetical food safety events, and compare these findings across different products and geographical regions. The data for this research was obtained from two surveys. One survey concerned fresh produce while the second focused on meat products. The SPARTA model, based on the Theory of Planned Behavior, is used to determine the impact of probable factors that influence consumers' purchasing decisions. The result of this research suggests that consumers have clearly-defined levels of trust regarding sources of food safety information. In general, a food safety event occurring in the fresh produce market seems to affect purchasing decisions more than the same event occurring in the meat market. Comparison of findings across geographical regions is less clear. Agribusiness firms can use these results to form a basic strategic response plan for food safety events.

KEYWORDS: Consumer behavior, consumer attitudes, food safety, risk and trust, ordered probit.

Jonathan D Shepherd

August 1st, 2009

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IN RESPONSE TO FOOD SAFETY EVENTS ACROSS PRODUCTS AND
REGIONS, AND THEIR IMPLICATIONS FOR AGRIBUSINESS FIRMS**

By
Jonathan D Shepherd

Sayed Saghaian
Director of Thesis

Michael Reed
Director of Graduate Studies

August 1, 2009

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THESIS

Jonathan David Shepherd

The Graduate School

University of Kentucky

2009

**An Interaction between Risk Perception and Trust
In Response to Food Safety Events across Products and Regions, and their
Implications for Agribusiness Firms**

THESIS

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

By

Jonathan David Shepherd

Lexington, Kentucky

Directors: Dr. Michael Reed, Professor of Agricultural Economics

Lexington, Kentucky

2006

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I dedicate this work to my loving wife, Claire and my two wonderful sons, Charles Conor
and Elijah.

ACKNOWLEDGMENTS

I would like to acknowledge and offer my sincere appreciation for Dr. Sayed “Mehdi” Saghaian who served as my Director of Thesis. His direction and insights were most helpful through this process. I would also like to thank all the faculty and staff in the department that were so helpful to me during my Masters’ work.

Most of all I thank my family for all of their loving support, and all of the sacrifices my wife had to make while I was working on this degree. If it were not for them, I would not be where I am today.

I would also like to thank Lobb, Mazziocchi, and Traill for the use of their survey instrument.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction and Background

Substantial media attention given to recent food safety events has increased consumers' awareness and further complicated the marketing aspects of agricultural products. Recently, *E. coli* outbreaks in ground beef and fresh spinach and *Salmonella*-tainted fresh tomatoes have captured news headlines nationwide. Prior to these concerns, Bovine Spongiform Encephalopathy (BSE) and Avian Influenza dominated media coverage. Food safety events such as these have detrimental economic impacts on agribusiness firms in these markets. Brand images can be destroyed and entire industries can be affected. Economic losses associated with food safety events are not limited to domestic and local markets. Rather, the effects can be long-reaching and create barriers to trade with international partners. Theoretically, food safety events can open competitive opportunities for individual firms within an affected industry. Firms can differentiate their products' attributes and market safer production methods in an attempt to capture a larger market share (Bruhn and Schutz, 1999). Understanding consumers' actions in the wake of food safety events is of paramount importance, as better understanding is the cornerstone of effective strategic responses that minimize economic losses.

Sociological researchers argue that, generally, a food safety event receives prominent media coverage with consumers initially over-reacting by avoiding the identified item (Mazzocchi, Stefani, and Henson, 2004). Media coverage of food safety events can also be confusing to consumers. Confusion intensifies with time lapses in

coverage and conflicting stories within or between media sources during the information discovery process (Caswell, 2006). Research suggests that consumers rely primarily on media coverage for information concerning food safety events (Wade and Conley, 1999). This is a particular concern for agribusiness firms, as the media will likely complicate economic restoration activities, at least in the early stages. Although substantial media attention is given to food safety events, little is devoted to changes in food safety legislation (Baker, 1998). All of these factors complicate and increase the cost of obtaining information for consumers. Lack of attention given to changes in food safety standards creates challenges for agribusiness firms in restoring consumer confidence or promoting proactive safety measures.

The life cycle of a food safety event is a dynamic process in which consumers often change consumption patterns during the scare, returning to pre-scare consumption patterns after the event. It is unclear how long the cycle takes or what signals are most effective to persuade consumers to return to their pre-scare behavior. Further, it is not known if consumer response is the same across products and geographical regions. Strategic response plans that work in one market or product area may not be as effective in others. International markets are usually more sensitive to food safety events than local and domestic markets.

Barriers to trade arising from food safety events can be long-term and create substantial economic losses for entire industries. The length of trade complications varies depending on many dynamic forces. Food safety events can provide justification for policies that are really intended to protect domestic producers. In 2003, South Korea banned imports of U.S. beef over BSE concerns. Five years later, citizens and trade

unions protested in the streets to the lifting of the ban on U.S. imports. Reactions such as these show the complexity of factors and emotional ties of food safety events and their worldwide impact.

Economic theory indicates that demand is affected negatively following a food safety event, at least in the short-run. In the 1990s, the EU experienced a BSE outbreak that resulted in a decline in the demand for beef as a whole. However, some individuals actually increased their demand (Henson and Northern, 2000). Exceptions like this highlight the dynamics of food safety events. They also suggest a need for governments and producers to understand how society conceptualizes food risk in order to have effective policies (Lobb, Mazzocchi, and Traill, 2006). Long-run implications are not as clear. Consumers may turn to other products they perceive to have safer attributes (McCluskey et al. 2005). Depending on the scenario, consumers may substitute completely away from affected markets.

Many factors differentiate food safety risks from other risks. Food safety aspects, in part, define the status of agricultural products as credence goods. Credence goods are goods in which the product attributes cannot be determined before or after a product is purchased (Caswell and Modjaska, 1996). For example, food-borne pathogens or pesticide residue cannot be detected through sight, smell, or taste. Consumers must rely on brands, labels, or testimonial advertising as a basis for determining the value of these products. Some risky endeavors can be eliminated simply by not participating in said activity. Absolute reduction in food risk is not possible because it is impossible to completely substitute away from food (Frewer et al. 1998). Since eating is essential to life, there will always be a risk associated with food consumption. When a consumer is

determining what food products to consume, the decision is based on their personal taste and preferences that may be influenced by the types of food and attitudes they have been exposed to in their upbringing (Fife-Shaw and Howe, 1996). Future generations are likely to be affected by their parents' perception of foods. Therefore, if a parent avoids certain foods because of perceived risks, it is possible that their children's future purchasing decisions will reflect these beliefs.

Food risk outbreaks are not foreseen and often unclear (Caswell, 2006). This is partly because consumers expect food to be safe (Loader and Hobbs, 1999). Most consumers feel that they should be able to purchase any food item without concern for the risks that may be involved. Extensive literature exists on food safety events, with much of it focusing on willingness to pay for increased safety attributes. Oftentimes, consumers are not willing to pay enough to justify costs incurred by firms to create safer products. The empirical evidence on willingness to pay often results in extremes on both sides of the spectrum (Baker, 1998). Some studies suggest consumers are willing to pay more for increased safety attributes. On the other hand, other studies indicate that consumers are not willing to pay more for increased safety. This varies across geographical regions. Japan, for example, is an exception where consumers are willing to pay for the exceptional quality they are accustomed to (Saghaian and Reed, 2004). Lacking accurate information concerning willingness to pay is of concern because increased safety attributes are costly. New food safety legislation can potentially crowd out markets. Smaller firms are often hardest hit because they lack economies of scale in production and marketing. It has also been argued that increased prices associated with

increased safety attributes could negatively affect consumption by the poor (Baker, 1998).

1.2 Recent Food Safety Events

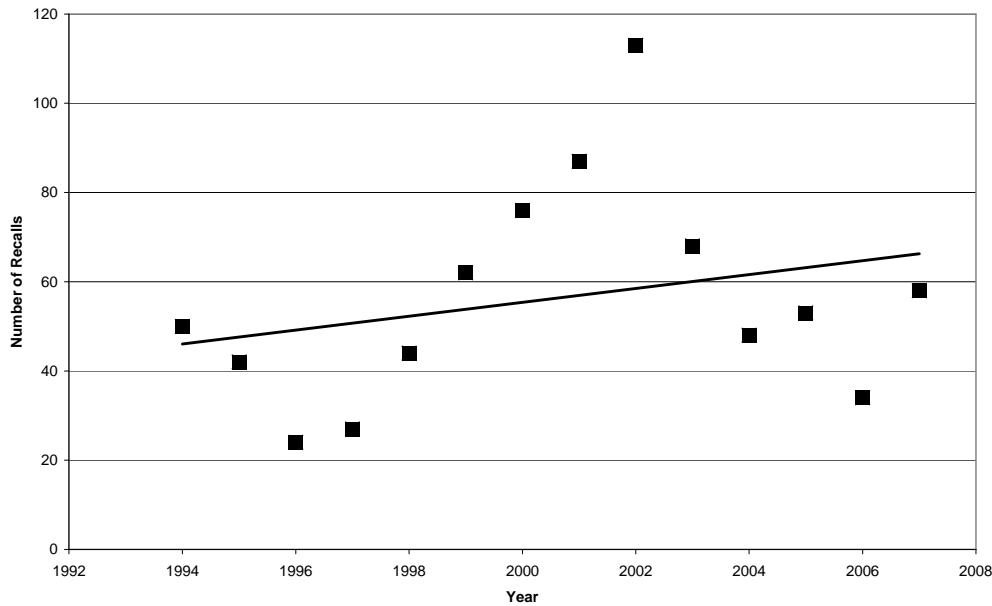
An upward trend in the number of meat recalls by the United States Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) can be seen between 1994 and 2007 (Figure 1.1). In 2006, an outbreak of *E. coli* in pre-packed spinach resulted in a Food and Drug Administration (FDA) recall nationwide from a California grower. Animal waste contamination via irrigation or direct contact was cited as the most probable source of the outbreak. In the same year, the popular fast-food chain, Taco Bell, also faced a daunting marketing recovery task. An outbreak of *E. coli* ultimately believed to be linked to lettuce temporarily closed a few stores and grabbed headlines nationwide. Greg Creed, Taco Bell President, reacted quickly with television commercials that addressed the fears of consumers and pledged the company's cooperation with officials to determine the cause.

Topps Meat Company suffered the second largest meat recall in US history for *E. coli* contaminated ground beef in 2007. An October 6, 2007 New York Times article reported that Topps Meat Company had to shut down operations as a result of the recall. The article also mentioned the chief operating officer for the company lamenting that the scale of the recall was too large to recover the business losses (Belson and Fahim, 2006).

Westland Hallmark Meat Packing Company received worldwide attention following an undercover video released to the media that showed inhumane treatment of animals and allowing non-ambulatory animals into the food supply. With over 143 million pounds of ground beef recalled, it was the largest meat recall in US history at that

time. The nature of this situation not only sparked concerns over the safety of the US food supply but also outrage from animal rights advocates. Most recently, an outbreak of *Salmonella* linked to fresh tomatoes has received substantial media attention. At the time of this publication, the source of contamination was still under investigation.

Figure 1.1 FSIS Food Recalls 1994-2007.



*Data source: FSIS Recall Case Archive.

Although businesses closing as a result of a food safety event are not common, the economic losses associated with such can be detrimental. Food safety risks have prompted more collaboration among those in the food supply chain in attempts to minimize risks. Firms often initiate their own standards and acceptable practices with potential suppliers in order to mitigate risks. Food safety risks can be borne at any point along the supply chain. Contamination can happen on the farm, in packing or storage, or even in the transportation of goods. Therefore, many firms have relied on third party certifications to mitigate risks and hopefully boost consumer confidence associated with food safety concerns (Baker, 1998). This is of particular concern for end-users of a

product. In the case of food retailers, blame is often placed on their final product even if ingredients were contaminated somewhere along the supply chain. Traceability is a huge concern for policy and decision makers. This important step is essential for determining the cause of an outbreak and helps prevent future outbreaks.

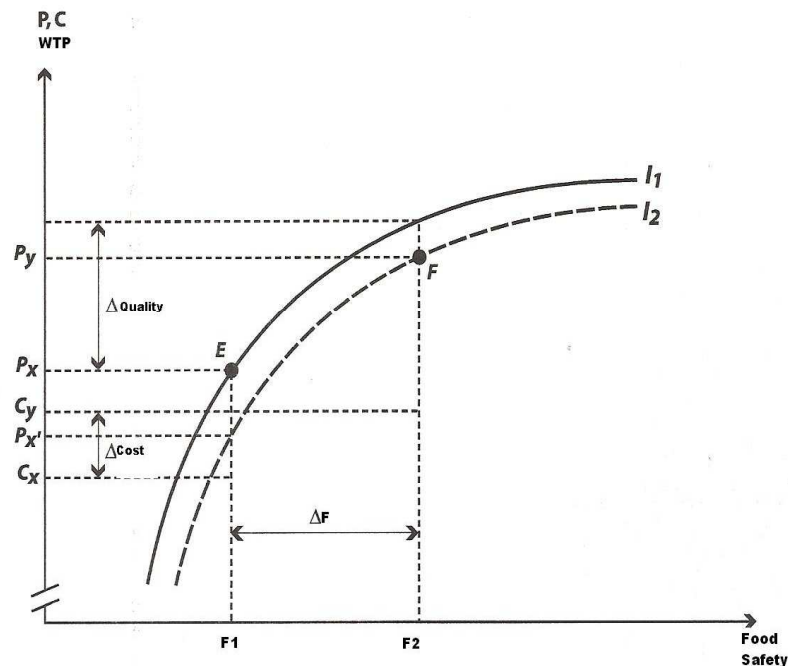
1.3 Competitive Advantage: Creating Consumer Surplus

Agribusiness firms can create and sustain competitive advantage via consumer surplus. Consumer surplus can be broken down into two simple components; the benefits that are received from consuming that product and the cost of that product. As alluded to earlier, increased food safety attributes come at some costs. Agricultural products that increase benefits will create more consumer surplus. One way in which to increase benefits is by increasing the safety attributes of products. Undoubtedly, increases in benefits will also increase the cost of the product. Therefore, realized benefits must surpass increased costs resulting in more consumer surplus. Agribusiness firms can capture more of the market share by potentially increasing product benefits in the areas that consumers in this research have indicated as being important to their food purchasing decisions. Obtaining a first mover advantage and becoming an industry leader is a possibility for firms that can increase consumer surplus for agricultural products, especially in areas of increased safety attributes.

Figure 1.2 offers a graphical representation of this idea. In this illustration, I_1 represents an indifference curve of a consumer. The curve illustrates the trade-off between the “level” of food safety and the price of the product. Consumer surplus is constant along I_1 and the concavity is a result of price and food safety being imperfect

substitutes (Wilson and Thompson, 2003). Product X is offered with price P_X and food safety attribute level of F_1 . Product Y is available at price P_Y and food safety level of F_2 . Both products, X and Y, are homogenous with exception to the level of safety attributes. As a result of the higher level of food safety in product Y, a higher level of utility can be achieved seen by indifference curve I_2 . Producers of product X can reduce the price of their product to P_X' and create the same level of consumer surplus. However, producers of product Y will still make a higher profit margin (Wilson and Thompson, 2003). The benefits of first-mover advantage can also be realized in this scenario. The firm that first successfully increases the food safety attributes of their product has the potential to capture and sustain a larger portion of the market.

Figure 1.2 Competitive Advantage¹



¹ Graph adapted from Wilson and Thompson (2003). "Time Integration: Agribusiness Structure for Competitive Advantage." *Review of Agricultural Economics*. 25:1 30-43.

1.4 Objectives

In this research I examine the impact of food safety events on consumers' behavior in the fresh produce and meat markets (specifically chicken and beef). The objectives of this study are as follows: 1) determine what factors influence consumers' purchasing decisions, 2) determine how consumers respond to hypothetical food safety events, and 3) compare the finding of the first two objectives across products and geographical regions.

This is in part accomplished by identifying information sources that are most trusted by consumers. I also examine other determinants such as socio-demographics factors and consider their impact on consumers' purchasing decisions.

Hypothetical food safety events are used to elicit consumer behavior in the face of a food safety crisis. After key aspects of consumer behavior are identified, results are compared between two different markets to see if generalizations can be made across agricultural products.

1.5 Interdisciplinary Links

The study of economics is evolving to realize that concepts such as consumer behavior are dependent upon sociological factors as well as psychological parameters of individuals. This study relies heavily on interdisciplinary links to sociology and psychology. While this study recognizes the importance and well substantiated axioms and theorems of economics theory, it also relies heavily upon the psychological research put forth by Ajzen and other sociological researchers.

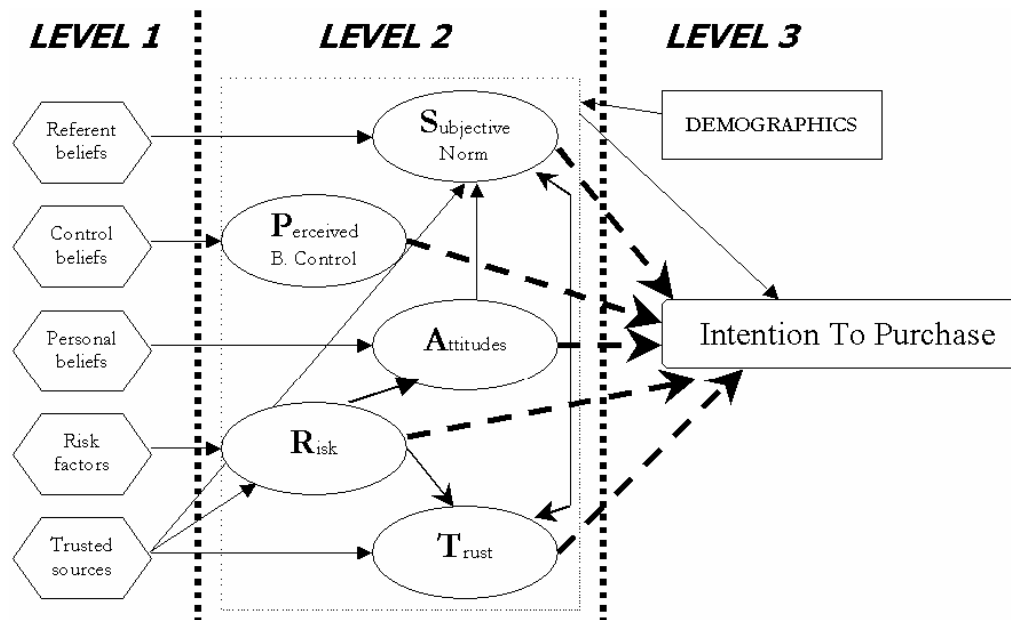
CHAPTER TWO

METHOD

This research was conducted via survey through the United States Postal Service. The survey instrument is comprehensive and constructed in a manner that allows consumer behavior to be traced before and after a food safety event occurs (Lobb, Mazzocchi, and Traill, 2007). This allows us to determine what factors influence consumers' decisions to purchase items in both scenarios (before and after a hypothetical food safety event). *E. coli* and *Salmonella* were the hypothetical food safety events used. The decision to use these food risks was based on recent media coverage of such events and the assumption that most consumers were aware of these food borne pathogens. Most of the 63 questions on the survey were measured with a seven point Likert scale. For ease of explanation, most results reported have been condensed into fewer categories.

The survey instrument was constructed under the SPARTA model based on the Theory of Planned Behavior (TPB) (Lobb, Mazzocchi, and Trail, 2007; Ajzen, 1991). TPB is an extension of the Theory of Reasoned Action and links attitude and beliefs to actions through intentions (Ajzen 1991). This approach has been used in several studies, including the meat market in the UK (McEachern and Shroder, 2004), as well as evaluating food choices of adolescents (Dennison and Shepherd, 1995).

Figure 2.1 SPARTA Model.



*Source: Lobb, Mazzocchi, Traill, 2007.

The SPARTA model (Figure 2.1) represents subjective norm, perceived behavioral control, attitudes, risk, trust, and *alia* (all other variables) (Lobb, Mazzocchi, and Trail, 2007). Subjective norm is the peer pressure individuals feel to participate or not participate in a certain behavior. These actions are influenced by normative beliefs which are behavioral expectations a consumer may feel from referents they consider close to them such as family and friends (Ajzen, 1991). These referent beliefs directly influence how individuals behave. For example, family and friends could impose opinions that purchasing organic produce will reduce food safety risks and is more ethical. Therefore, an individual may feel pressured by these referent beliefs to purchase such products for themselves. Referent beliefs differ depending on the situation (Ajzen, 1991). In the workplace, referent beliefs could come from bosses or co-workers. Family,

friends, and colleagues are considered to be possible sources of referent beliefs for this study.

Perceived behavioral control is how a person sees their ability to perform a certain activity. Control beliefs are factors that make behaving in a certain manner easier or more difficult (Ajzen, 1991). When considering food products there are a limited number of control beliefs to measure. For this study, two different control factors that addressed potential impediments to purchasing decisions were identified. Whether or not a person will purchase a certain product may depend on how much of that product the person has already consumed in the current time period or if they have a lot of that product on hand (Lobb, Mazzocchi, and Traill, 2007).

Attitudes are simply the perception that an individual has towards a certain activity such as it being good or bad. Attitudes are influenced by behavioral beliefs which are the expected outcomes of the behavior in question (Ajzen, 1991). A person's attitude towards a certain behavior will likely be negative if the expected outcome of that behavior will have unfavorable consequences. Food safety risks may promote a negative attitude because consumers are considering the negative affects of consuming a food that is potentially risky.

The risk component is simply risk factors that are common to food safety concerns such as *Salmonella*, *E. coli*, etc. Health attributes such as cholesterol and fat content are also considered risk factors because of long-term health consequences.

Trust is measured by identifying sources of information from whom consumers trust to receive food safety information. In order for agribusiness firms to effectively communicate information, it has to be conducted through trusted mediums.

The *alia* component in this study measures demographic variables. These factors are important to analyze as they influence purchasing decisions. Poor consumers are usually concerned with maximizing caloric intake and minimizing food expenditures. When faced with a food safety event, they may not be able to substitute to other goods. Education is likely to influence a person's ability to more accurately interpret food safety information. Presence of young children may also make a household more risk averse to certain food safety concerns. All of these factors interact and influence consumers' intentions to purchase food.

CHAPTER 3

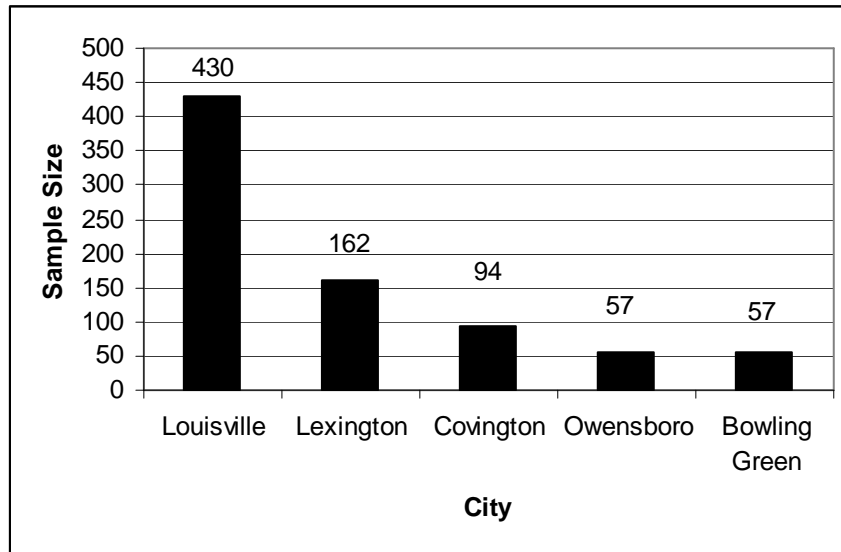
SURVEY

The data for this research was obtained from two surveys that targeted the heads of households in the five counties that contained the five largest cities in Kentucky. One survey focused on fresh produce in general while the second focused on chicken and/or beef products. The city size was determined by population as reported in the 2003 U.S. Census County Data Book. The city and counties are as follows in descending order according to population: Louisville (Jefferson County), Lexington (Fayette County), Owensboro (Daviess County), Bowling Green (Warren County), and Covington (Kenton County). A weighted average of the counties' population was used to determine the share of surveys sent to each respective city for the fresh produce survey (Figure 3.1). For the meat survey, each of the five counties were sent an equal share of the total number of surveys, or 400 each. The use of the county's population as the weighted average basis was a result of Louisville-Jefferson County having a merged city and county governance. This was not reflected in the 2003 Census data.

The survey instrument used was developed by Lobb, Mazzocchi, and Traill (2006) with changes made to better fit Kentucky's population and targeted products. One survey concerned fresh produce in general while the second centered on meat (specifically, chicken and beef). The sample sizes were 800 and 2,000 Kentucky households, respectively.

The fresh produce survey was administered first and a small response rate was realized. In an attempt to ensure an adequate response rate on the meat survey, a \$2 token of appreciation was offered upon completion.

Figure 3.1. Fresh Produce Sample Size by City



Response rates were affected by the number of surveys sent to each city. In the fresh produce survey, each respective county that received more surveys accounted for more responses. This is true except the case of Covington. In this case, Covington received the third highest number of survey but accounted for the smallest number of response. The reason for this is unclear. Response rates were closer together in the meat survey where each respective city received an equal share of the total sample size.

Figure 3.2. Fresh Produce Survey: Response Rates by City

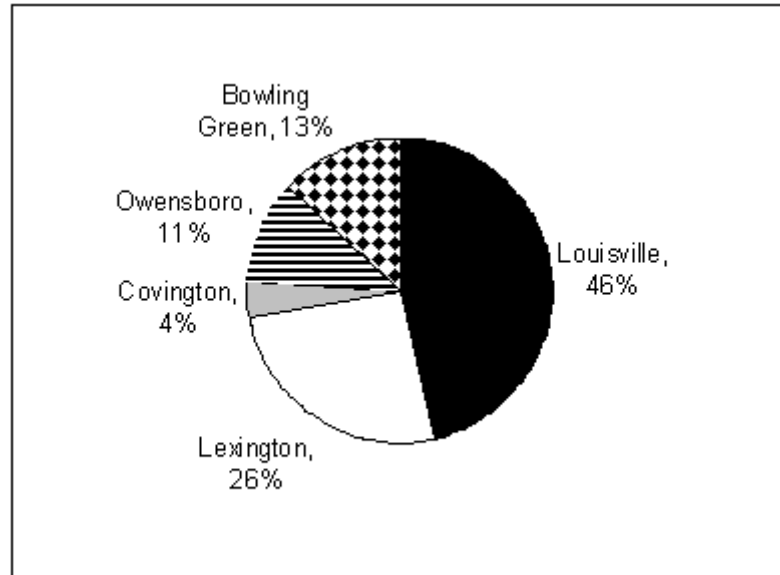
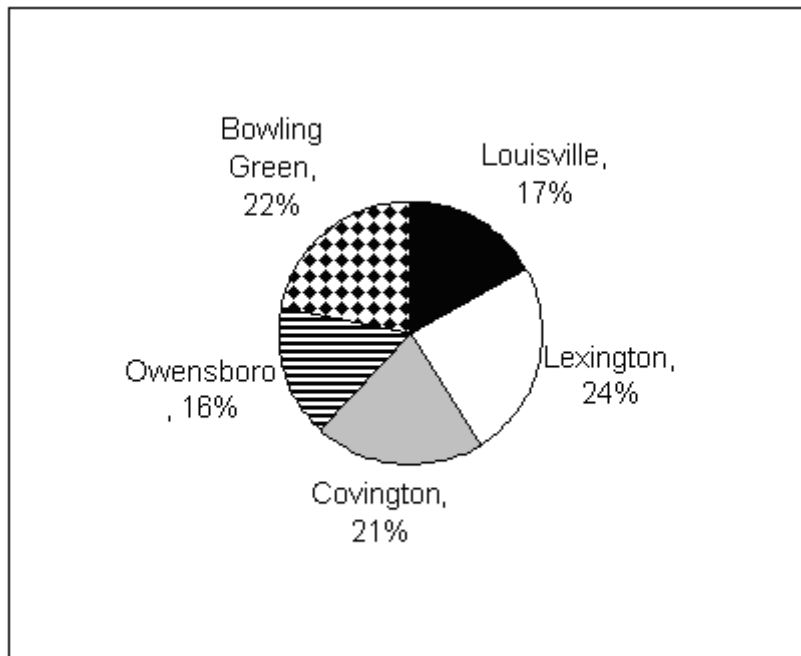


Figure 3.3. Meat Survey: Response Rates by City



Average ages of respondents were compared across products and to the county's census data (Table 3.1). In both surveys, the average age of respondents far exceeded the average age of the population for the county in which it belongs. This was as expected

because the surveys were targeted to the head of household. Looking at the descriptive statistics for each survey, it can be seen that no persons under the ages of 27 and 20 responded to the fresh produce and meat surveys, respectively (Figures 3.2 and 3.3). The census data accounts for all people in the county regardless of their age. It is important to note that the higher average age may be response bias. It may be the case that relatively older individuals completed and returned the survey because they had more “disposable” time (i.e. retired individuals).

Table 3.1. Average Age of Respondents by County and County Average

	Average Age of Respondents:		Average Age of Population Reported in 2003 U.S. County Data Book
	Fresh Produce Survey	Meat Survey	
Louisville	51.9	55.8	36.7
Bowling Green	51.2	59.6	32.3
Covington	60.5	47.1	34.5
Lexington	49.1	54.8	33
Owensboro	48.4	53.9	36.8

Table 3.2 Fresh Produce Survey Descriptive Statistics

	Mean	Median	Std Dev	Min	Max
Number of People in Household	2.47	2	1.21	1	6
Age of Respondents	52.8	56	14.1	27	84
Average Weekly Fresh Produce Purchases (LBS)	4.5	4	3.27	0	12
Average Weekly Expenditure on Fresh Produce (\$)	16.8	10	17.3	0	100

Table 3.3. Meat Survey Descriptive Statistics

	Mean	Median	Std Dev	Min	Max
Number of People in Household	2.38	2	1.29	1	7
Age of Respondents	54.24	55	14.36	20	97
Average Weekly Chicken and/or Beef Purchases (lbs)	5.32	3	6.53	0	40
Average Weekly Expenditure on Chicken and/or Beef (\$)	15.45	10	16.75	0	125

Average weekly expenditures on in-home consumption of the target products are seem consistent across products (Table 3.4). The majority of respondents indicated spending between \$45 and \$119.99 each week on the target product.

Table 3.4. Average Weekly Expenditures on In-Home Consumption of Target Product

	< \$45	\$45-74.99	\$75-119.99	\$120-150	>\$150
Fresh Produce Survey	6.3%	29.2%	41.7%	12.5%	10.4%
Meat Survey	13.34%	28.6%	31.7%	19.2%	7.1%

A striking difference between this study and the Lobb et al study is the use of a mail survey instead of face-to-face interviews. A mail survey was used in this study to serve as a pilot study for future research into the objectives of this study. A limiting factor of using the mail survey was relatively low response rates. This is as expected because the survey instrument is quite lengthy and requires a commitment of time by the respondents. Future research needs to address the trade-offs between lengthy mail surveys, sample size, and ensuring an adequate response rate.

CHAPTER FOUR

MODEL

The first three variables S , P , and A are formulated under Fishbein and Ajzens' (1976) expectancy value formulation. Following Lobb, Mazzocchi, and Traill (2007) the construction of the variables appear below:

$$S \propto \sum_{j=1}^g n_j m_j$$

Where S is subjective norms and is constructed by n_i and m_i which are normative beliefs and motivations to comply, respectively. This component accounts for the “peer pressure” individuals may feel when making food purchasing decisions. Normative beliefs were obtained by asking respondents about how they perceived others perceptions on whether or not the target product is considered “very bad” or “very good” in the diet (on a seven point Likert scale). Motivations to comply were measured via a question that asked the respondent to indicate whether or not they take others opinions into consideration when making food purchasing decisions about the target products.

$$P \propto \sum_{k=1}^q c_k p_k$$

Where P is perceived behavioral control and contains c_i , control beliefs and p_i , power of control beliefs. Perceived behavioral control measure the individuals' perceptions concerning the amount of control they have over their decision. This element was measured by asking respondents to indicate if already having the target product in the freezer would affect their decision to purchase the product the following week. Power of control beliefs was measured by asking the respondents to indicate the

likelihood of purchasing the product next week if they had already consumed a lot of that product in the survey week.

$$A \propto \sum_{i=1}^n b_i e_i$$

Where A is attitude and contains b_i , behavioral beliefs and e_i , outcome evaluations of these beliefs. The attitude component simply accounts for attitudes respondents have certain factors that may influence their purchasing decisions. Outcome evaluations were based on 11 beliefs where the respondent indicated the importance of each belief in their purchasing decision. Behavioral beliefs were measured by asking how important are each of the 11 beliefs were to the household.

The risk component, R, is formed similarly to the variables above using the expectancy-value formulation (Lobb, Mazzocchi, and Traill, 2007):

$$R \propto \sum_{l=1}^u r_l k_l$$

where r_i are specific risk factors and k_i are weights given by respondents stating their knowledge of each risk factor. This component accounts for how risk affects consumers purchasing decisions. Risk factors were obtained by asking the respondents to rate the risks of any one person in the household experiencing long-term health problems due to consuming the target product from a list of potential health problems. The weights were given by the respondents indicating their level of knowledge associated with each specific risk factor.

Following Lobb, Mazzocchi, and Trail (2007) the trust component is as follows:

$$T_z = \sum_{w=1}^s \alpha_{zs} t_s, z = 1, \dots, Z$$

where t_s are the specific trust factors, α_{zs} are the loading factors and T is the principal component score where Z is the total number of components measured across. This component of the model accounts for levels of trust consumers have towards potential information sources of hypothetical food safety events.

alia=socio-demographics

Age, income, education, and gender were used as socio-demographic variables.

The T component in the meat survey was achieved by asking respondents to indicate their level of trust with 20 entities that hypothetically provided information about food safety risks. Principal component analysis with varimax rotation was used to account for correlations that may exist between these categories (Lobb, Mazzocchi, and Traill, 2007). This reduced the number of variables in this component for the meat survey into 4 categories: Suppliers, Government/University, Organizations, and Media; T₁, T₂, T₃, and T₄, respectively. Television news/current events category was dropped because it loaded on more than one factor.

The Suppliers category includes shopkeepers, supermarkets, organic shops, and processors. All of these categories cover the same concept of where a consumer may obtain a food product. The Government/University category contains doctor/health authority, university scientist, USDA, state and federal government. These sub-categories are all entities that consumers would most likely consider possessing an authoritative or policy influencing voice.

Organizations contain the sub-categories of political groups, environmental groups and animal welfare organizations as well as the category of “television documentary”. On first glance, television documentary sub-category seems non

applicable. However, there is a common thread among the sub-categories in that they all have a primary focus or cause. Arguably, television documentaries focus on one subject or cause, allowing their inclusion into this category. Lastly, the Media category contains typical forms of communication, newspaper, internet, radio, magazines, and product label (Table 4.2).

Interpretation of these results is as follows. A consumer who trusts one of the sub-categories also trusts the other sub-categories within each respective group. For example, respondents who trust shopkeepers also trust supermarkets, organic shops and processors. The same is true for the case of distrust.

Principal component analysis was not conducted on the results from the fresh produce survey as the number of responses did not meet the minimal criteria for this data analysis tool. Instead a simple average of the 20 trust categories was used in the case of fresh produce. Using a simple average of all trust dimensions measured puts serious limitations on this variable. Determining what potential sources of information are trusted most by respondents is a major focus of this study. The simple average does not allow for in-depth analysis of how trust influences purchase decision in the empirical results.

Following Lobb, Mazzocchi, and Traill (2007), four models were estimated for each target product; consumers' intention to purchase the target product next week in general (FP₁ and MEAT₁) and consumers' intention to purchase the target product next week following a hypothetical *E. coli/Salmonella* outbreak (FP₂ and MEAT₂). These models were also estimated using socio-demographic variables to determine if such variances have an effect on the probability of purchasing decisions (FP_{1SD}, FP_{2SD},

MEAT_{1SD}, and MEAT_{2SD}, respectively). An ordered probit regression was used to estimate these models because of the ordered structure of the data and appears below (Lobb, Mazzocchi and Traill, 2007):

$$I_b = \beta_0 + \beta_1 S + \beta_2 P + \beta_3 A + \beta_4 R + \sum \lambda_z T_z$$

The inclusion of socio-demographic variables is as follows:

$$I_b = \left(\beta_0 + \sum_{i=1}^d \gamma_{0i} D_i \right) + \left(\beta_1 + \sum_{i=1}^d \gamma_{1i} D_i \right) S + \left(\beta_2 + \sum_{i=1}^d \gamma_{2i} D_i \right) P + \left(\beta_3 + \sum_{i=1}^d \gamma_{3i} D_i \right) A + \left(\beta_4 + \sum_{i=1}^d \gamma_{4i} D_i \right) R + \sum_{i=1}^Z \left(\lambda_z + \sum_{i=1}^d \gamma_{gi} D_i \right) T_z$$

Where D_i is the i th socio-demographic variable

4.1 Hypothesized Impacts of Sparta Variables

Subjective norms should have a positive impact on the likelihood of purchasing the target product. This is because increases in the normative belief component are consistent with consumers perceiving other opinions about the target product in their diet as being “good”. Further, increases in motivations to comply are analogous to consumers taking others opinions into their purchasing decisions to a large extent. Perceived behavioral control should have a positive impact on the likelihood to purchase. An increase in this variable is consistent with consumers indicating they are “more likely” to purchase the target product if they already had some of that item in the freezer. Increases in the other component of this variable indicate that consumers are “more likely” to purchase the target product even if the household had consumed a lot of that product in the week of the survey.

Attitudes should also have a positive impact on the likelihood of purchasing the target product. If consumers have a positive attitude towards purchasing a product, their

indicated purchasing decision should reflect this belief. Risk perception should have a negative impact on the likelihood of purchasing because increase in the risk associated with the product should deter consumption. Increases in trust should positively affect the likelihood of purchasing the target products. It is hypothesized that socio-demographic variables will have both positive and negative impacts on the likelihood of purchasing

Table 4.1. Hypothesized Impacts of Sparta Variables

<u>S</u> ubjective norms	+
<u>P</u> erceived behavioral controls	+
<u>A</u> ttitudes	+
<u>R</u> isk perception	-
<u>T</u> rust	+
<u>A</u> lia-(socio-demographics)	+/-

Table 4.2. Trust Component Factor Loadings for Respondents' Trust of Food Safety Information for 20 Different Sources

	Suppliers(T₁)	Gov't/Univ (T₂)	Organizations (T₃)	Media (T₄)
Shopkeepers	0.76	0.09	0.06	0.1
Supermarkets	0.7	0.23	0.1	0.06
Organic Shop	0.74	0.08	0.19	0.08
Farmers	0.75	0.11	0.16	0.09
Processors	0.61	0.07	0.27	0.24
Doctors/ health authority	0.18	0.53	-0.34	0.29
University scientists	0.22	0.62	0.14	0.24
USDA	0.08	0.8	0.18	0.05
State Government	0.17	0.78	0.27	0.1
Political groups	0.17	0.27	0.63	0.22
Environmental organizations	0.22	0.15	0.72	0.31
Animal welfare organizations	0.22	0.06	0.8	0.12
Federal Government	0.08	0.65	0.38	0.07
Television documentary	-0.03	0.27	0.62	0.21
Television news/current events	0.05	-0.66	-0.05	0.21
Newspapers	0.13	0.38	0.06	0.61
Internet	0.12	0.19	0.2	0.54
Radio	0.23	0.22	0.22	0.73
Magazines	0.06	-0.13	0.06	0.68
Product label	0.04	0.12	0.2	0.54

*Values in bold are greater than or equal to .40 through Varimax Rotation.

*Television news/current events was dropped from the analysis because it loaded on more than one factor

CHAPTER FIVE

DESCRIPTIVE RESULTS

Response rates were 5.9% and 11.2% for the fresh produce and meat surveys respectively. Female response rate accounted for about 60% of completed surveys. This magnitude of female responses was as expected because females are still the primary household food purchasers (Lobb, Mazzocchi, and Traill, 2006). Individuals with at least some college education accounted for over 50% of responses as well. This is likely because people with relatively more education can appreciate the necessity of research. Average household size for meat survey respondents was 2.29 persons and 2.38 persons for fresh produce survey respondents. The majority of respondents in both cases indicated spending \$45-\$119.99 per week on food for in-home consumption. 25.5% and 18.8% indicated annual incomes of \$45,000-\$69,999 for fresh produce and meat survey respondents, respectively.

To identify whom consumers trust with food safety information, respondents were asked to indicate on a seven point Likert scale their level of trust associated with 20 entities that had hypothetically provided information about risks associated with *E. coli/Salmonella* in food (Table 5.1). For ease of discussion, the seven categories have been condensed into four; distrust, neither, trust, and don't know. In general, the results show that consumers in both surveys rate the entities with relatively the same level of trust. Political groups received the highest number of responses for distrust in both cases. Politicians are often stereotyped with being dishonest in general. Consumers may feel as though politicians are willing to protect business at the cost of consumers. Animal welfare organizations received the second highest selection of distrust in both surveys as

well. Resultant of political and economic forces, it is rational for animal welfare organizations to focus on information that will further their cause. Organizations such as these have transparent agendas and are perceived as disseminating biased information. When products are analyzed separately, more fresh produce respondents indicated trusting animal welfare organizations than distrusting them. Animal welfare organizations often voice the benefits of non-animal based food consumption in efforts to deter animals being killed for food. Therefore, information disseminated about fresh produce from these organizations is likely not to be seen as biased as when it is about meat consumption.

Less than 50% of respondents indicated processors as a trustworthy information source. Asymmetric information is likely the culprit. Literature on the subject has identified that information asymmetry in favor of those along the supply chain can create a barrier for consumers to collect information (Loader and Hobbs, 1999). Providing consumers information on product specific risks is not in the best interest for firms as consumers may not know how to properly interpret this information. In the case where new “safer” methods are used by producers, it can lead consumers to retroactively question the “safety” they received from a particular supplier before the change in practices was announced. Theoretically, this could drive consumers away from the product. In other words, marketing safer production methods could actually deter consumers as opposed to increasing the demand for their product.

State government received more responses for being considered trustworthy than did the Federal government. Agribusiness firms could align themselves with State government agencies to address food safety concerns with more success than Federal

government alliances. Often times, consumers are more in touch with state government and results of local government policies and communication are easier to observe.

Responses show that doctors/health authority and university scientists are the most trusted sources of information listed between both surveys with close to 90% of respondents indicating them as being trustworthy. These results are as expected, as doctors and university scientists are seen as impartial sources of information that are based in the scientific process. Of the typical media sources listed, television news and newspapers received the highest number of responses as being trusted sources. Newspapers were ranked more trusted than the television news category. Written news reports may be seen as less sensationalized than television news, eliciting more trust from consumers

Table 5.1. Percentage of Respondents Level of Trust to 20 Entities Which Hypothetically Provided Information about Risks Associated with E. coli/Salmonella in food.

Entities	Distrust		Neither		Trust		Don't Know	
	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce
Shopkeepers	9.8	10.6	21.9	23.4	56.7	57.5	11.6	8.5
Supermarkets	8.1	4.2	15.6	19.1	71.8	72.3	4.5	4.3
Organic Shop	11.6	8.5	19.6	17.0	52.2	65.9	16.5	8.5
Farmers	7.1	6.4	15.6	23.4	68.3	66.0	8.9	4.3
Processors	25.0	27.7	19.2	21.3	45.1	44.7	10.7	6.4
Doctors/Health Authority	2.6	4.2	3.6	2.1	92.0	89.3	1.8	4.3
University Scientist	4.4	4.2	9.8	6.4	79.4	85.1	6.3	4.3
USDA	7.6	6.4	11.1	8.5	77.2	82.9	4.0	2.1
State Government	12.1	6.4	16.1	14.9	66.1	76.5	5.8	2.1
Political Groups	49.1	40.4	23.7	38.3	19.2	18.9	8.0	2.1
Environmental Groups	29.4	23.4	21.4	21.3	41.6	53.2	7.6	2.1
Animal Welfare Organizations	41.1	31.9	20.1	27.7	30.0	36.2	8.9	4.3
Federal Government	21.0	14.9	18.3	21.3	54.9	61.7	5.8	2.1
Television Documentary	17.3	8.5	18.8	17.0	58.4	70.2	5.4	4.3
Television News	10.7	2.1	15.6	17.0	71.0	78.7	2.7	2.1
Newspapers	8.5	2.1	13.4	10.6	72.9	85.2	5.4	2.1
Internet	13.0	8.6	16.5	17.0	60.2	72.3	10.3	2.1
Radio	10.3	4.3	20.5	17.0	59.9	74.4	9.4	4.3
Magazines	12.5	8.5	26.3	17.0	51.8	70.2	9.5	4.3
Product Label	15.2	8.6	21.0	19.1	58.6	68.0	5.4	4.3

Trust in informational sources can also be analyzed by looking at simple averages of the same entities discussed above (Table 5.2). In general, fresh produce respondents indicated trusting all entities listed more than meat survey respondents. Doctors and health authorities was the only category where meat survey respondents' averaged higher trust levels than fresh produce respondents. An overall average level of trust was calculated across all entities listed for both survey data. The average level trust for fresh produce respondents was 5.01 and the average for the meat survey was 4.61 on a seven point scale. The greatest difference in the average levels of trust between the two survey groups was the radio category. On average, fresh produce respondents indicated trust levels that were .76 points on the scale more than meat respondents for the category.

Average levels of trust across products indicate that in general, consumers associate the same level of trust with the groups listed.

To compare results across regions, the responses from both the meat and fresh produce survey were averaged. In general, EU respondents are more trustworthy of the entities listed than the average US respondents. One of the largest differences between regions is animal welfare organizations. In this area, the EU respondents are over a full point more trust worthy, on the Likert scale, than the US respondents. The second largest difference between regions is environmental organizations where the difference is over a half of a point on the Likert scale. However, the simple average over all potential information sources and across products is extremely close to the average of the EU study.

Table 5.2. Averages of 20 Entities that Hypothetically Provided Information about Food Safety Risks Across Products and Regions

	Fresh Produce	Chicken/Beef	US Average	EU Average²
Shopkeepers	4.57	4.41	4.49	4.69
Supermarkets	5.21	5.12	5.16	4.64
Organic Shop	4.83	4.14	4.49	5.01
Farmers	5.02	4.90	4.96	4.97
Processors	4.28	4.03	4.15	3.74
Doctors / health authority	5.96	6.08	6.02	5.99
University Scientists	5.62	5.45	5.53	5.77
USDA	5.57	5.48	5.53	5.79
State Governments	5.36	4.83	5.10	4.50
Political Groups	3.55	3.06	3.31	3.52
Environmental Organizations	4.51	3.94	4.23	4.86
Animal Welfare Organizations	3.96	3.40	3.68	4.70
Federal Government	4.96	4.48	4.72	5.21
Television documentary	5.06	4.59	4.83	4.98
Television News	5.55	5.11	5.33	5.19
Newspapers	5.66	4.99	5.32	4.94
Internet	5.15	4.44	4.80	4.54
Radio	5.30	4.54	4.92	4.97
Magazines	5.04	4.53	4.78	4.49
Product Label	5.11	4.60	4.85	5.03
Average	5.01	4.61	4.81	4.88

² Average Levels of Trust taken from taken from Lobb, Mazzocchi, and Traill 2005

Table 5.3 Percent of Responses to Whom Participants Trusted More between Respective Pairs.

Source of Information	Meat	Fresh Produce
University Scientist more than Family	67.8	72.3
Public Authorities more than Family	61.1	59.6
Media more than Family	43.1	57.4
Producers more than Family	45.1	46.8
University Scientist more than Public Authorities	60.7	53.2
University Scientist more than Producers	74.1	74.5
University Scientist more than Media	67.0	66.0
Public Authorities more than Producers	70.5	72.3
Media more than Producers	52.2	55.3

Another measure of trust was obtained by asking respondents to assume they had heard rumors of a food safety event. They were then asked to indicate who they trusted more between respective pairs of potential informational sources. Collaborating previously discussed measures of trust, the university scientists category was chosen to be trusted more than family and public authorities in both cases (Table 5.3). Parity almost exists between both survey instruments when respondents were prompted to choose between university scientists and producers. In both cases, responses were slightly higher than 74% in favor of university scientists. The largest difference between responses occurred when participants were prompted to choose between media and family. Respondents indicated more trust in media, 57.4%, in the meat survey. Only 43.1% of fresh produce respondents indicated trusting the media more. These results suggest that consumers may not trust sources of information the same when forced to choose between pairs of sources. Family and media categories were trusted more than processors in both survey cases. Once again, the results show that, in general, consumers do not consider processors as being trust worthy when concerning food safety

information. Consumers realize that processors have incentives to minimize information about risks associated with their products. Lack of trust of processors complicate agribusinesses consumer confidence restoration policies and highlight the need to potentially include a third non-biased party to communicate food safety information.

One result of food safety events is the increase in food safety legislation (Loader and Hobbs, 1999). Prior to the Pathogen Reduction Hazard Analysis Critical Control Point (HACCP) legislation, food safety inspection was conducted via sight, smell and touch (Loader and Hobbs, 1999). Now, technological changes, commonly accepted practices and food safety legislation attempt to provide more assurance and protection to consumers as well as provide traceability and accountability to firms. Respondents were asked to indicate whether or not they felt that recent changes in the food supply chain (agricultural techniques, food processing, trade, etc) resulted in better quality food. Over 60% of responses indicated that these changes have resulted in better quality food. Not only do these results indicate that these technological changes have increased consumers perception of food quality, but they also provide proof that consumers may react positively to further technological changes. Attempts by individual firms to differentiate their products based on new technologies that increase the benefits to consumers are also likely to be seen by consumers as increasing food quality. As with any product, the utility derived from the consumption of that product is directly related to consumer surplus.

Food safety risk reduction is not only a priority for agribusiness firms but is also a concern for individual households as well. Extensive efforts have been made by public agencies such as the USDA, FDA, and the Center for Disease Control to educate consumers how their actions can reduce food safety risks. All USDA inspected meats

carry safe handling and cooking instructions. Most family and consumer science sectors of the Cooperative Extension Service and courses in public schools have material devoted to proper cooking temperatures, safe handling, and storage. Respondents in both surveys were asked to indicate to what extent their actions, such as listed above, can reduce food safety risks. Almost 98% of fresh produce respondents and nearly 94% of meat respondents indicated that their actions can reduce risks to a large extent. Clearly, these educational measures have been successful in educating the public at large. Implications for agribusiness firms indicate that consumers are aware of their responsibility in the food safety risk reduction process. Consumers who take proper precautions with their food and still face a food safety event are likely to shift blame to agribusiness firms.

Agribusiness firms can create more informative precautionary handling and storing instructions to ensure consumers are following all food safety guidelines. It could be the case that consumers think they are following all guidelines when in fact they are not.

Attitudes are important influencing factors in food purchasing decisions. To shed light on the importance of some of these, consumers were prompted with a list of 11 factors to indicate in general, how important each was to their household (Table 5.4). Surprisingly, “tasty food” was selected as being most important in both cases followed closely by food safety. This is likely because, as mentioned above, consumers expect food safety. Although food safety was not selected to be the most important reason, the high level of responses indicates that it still an important factor to households. The categories, value for money, food variety, and food safety tied with 87.2% of respondents in the fresh produce survey responses. 49.6% of meat and 57.4% of fresh produce

respondents concluded ethical food production methods were important. 42.8% and 55.3% for the meat and fresh produce surveys respectively, indicated animal welfare was important in their food purchasing decisions. This shows that different factors influence consumers decisions based on what product is being considered. When answering questions about fresh produce, it is likely that consumers have differing views on what factors influence that purchasing decision compared to other products.

Consumer perceptions of distinctions that make food safe was measured by asking respondents to indicate from a list of 12 potential factors that may reduce risks associated with food (Table 5.5). Majority of respondents indicated that safe food is produced in the United States. This is reassuring to domestic producers. Even though the US has had recent food safety events, it seems as though consumers, in general, still have confidence in the US food supply. Likely as a result of many ground beef recalls, whole chicken and/or non-ground beef was also considered to be safe to respondents in the meat survey. Two other categories, in both surveys, where over 50% of respondents agreed contributed to food safety was target products “being fresh” and “being recognizable by color, taste, or smell.”

These results are intuitive. 41.5% of meat survey respondents and 34% of fresh produce respondents disagreed that the target product being produced in Mexico was safe. Meat survey responses to this distinction were interesting as little meat is imported from Mexico. Many fresh produce items are imported from Mexico, especially in the U.S. “off-season”. Therefore, roughly one third of responses disagreeing that fresh produce originating from Mexico is safe is surprising. On the other hand, a 2003

Hepatitis A outbreak linked to green onions from Mexico may help explain these responses (Calvin et al, 2004).

Table 5.4 Percent of Responses to How Important Each Statement is to Participants Household.

Statements	Unimportant		Neither		Important	
	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce
Tasty food	2.7	6.4	1.8	0.0	95.5	93.6
Value for money	4.6	8.5	6.3	4.3	89.2	87.2
Ease of preparation	4.5	8.5	6.7	6.4	88.8	85.1
Food safety	3.6	6.4	1.3	6.4	95.1	87.2
Food everyone likes	3.1	6.4	6.3	8.5	90.6	85.1
Food variety	5.4	6.4	6.7	6.4	88.0	87.2
Fat content	6.3	6.4	9.4	10.6	84.4	83.0
Cholesterol content	7.6	12.8	11.6	10.6	80.8	76.6
Ethical food production methods	24.1	17.0	26.3	25.5	49.6	57.4
Local community livelihood	17.4	10.6	27.2	21.3	55.4	68.1
Animal welfare	31.8	17.0	25.5	27.7	42.8	55.3

For the supermarket category, 64.3% of meat survey respondents agreed that this distinction was a safe attribute. Only 46.8% of fresh produce respondents were in agreement with the same statement.

Fresh produce is often available via farmers' markets with more frequency than meat products. Meat products also require more careful handling. These results suggest that the relative complexities associated with proper storage and handling of meat products is considered safest when conducted by food retailers.

Organic distinction received less than 50% of responses agreeing that the target product was safe if in this manner. Recent growth in the availability of organic products

has yet to convince consumers that they are safer substitutes. However, consumption of organic products provides other benefits to consumers who are concerned about issues other than food safety. Organic food purchasing decisions may be based on ethical and environmental concerns.

Table 5.5 Percent of Respondents’ Agreement to “Safe [target product] is.”

	Disagree		Neither		Agree		Don’t Know	
	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce
Packaged	8.9	14.9	16.5	38.3	66.5	38.3	8.04	8.5
Clearly labeled	7.2	12.8	11.6	25.5	75.0	53.2	6.3	8.5
Whole chicken and/or non-ground beef	8.9	N/A	25.0	N/A	54.1	N/A	12.1	N/A
From the butcher	13.8	N/A	24.6	N/A	43.3	N/A	18.3	N/A
From the supermarket	8.0	10.6	17.9	38.3	64.3	46.81	9.8	4.3
Produced in the United States	5.5	12.8	13.8	27.67	67.9	55.2	13.0	4.3
Produced in Canada	19.7	12.8	23.2	36.2	26.3	25.5	30.8	25.5
Produced in Mexico	41.5	34.0	22.8	31.9	7.6	12.8	28.1	21.3
Expensive	30.8	36.2	27.2	31.9	32.1	27.7	9.8	4.3
Organic	17.0	23.4	21.0	25.5	39.7	44.7	22.3	6.4
Recognizable by color, taste or smell	12.1	14.9	14.3	23.4	64.3	61.7	9.4	0
Fresh	9.0	8.5	13.8	21.2	67.9	68.1	9.4	2.1

When respondents were asked to indicate the level of risk associated with consumption of different foods, all were considered not risky by the majority of respondents in both surveys (Table 5.6). Genetically modified (GM) foods are one

exception. Existing literature highlights that consumers' food purchasing decisions include all risks associated with foods including food born pathogens and genetic modification (Wade and Conley, 1999). Food borne pathogen outbreaks have happened with frequency not realized by complications associated with GM food. Strategic marketing plans need to include educating consumers on studies and risks associated with GM foods. In fact, many foods that are commonly accepted as being safe have undergone some type of genetic modification. Levels of genetic modification vary from product to product. Some of the more "extreme" types of modification are relatively new to consumers. Global attitudes towards GM products often times conflict, further confusing consumers on true risks associated with these products. The results show a lot more uncertainty and varying opinions about consumers on this issue. It is important to note that these results likely show the consequences of lacking consumer education in this area as opposed to providing concrete evidence that consumers have stanch preferences against GM foods.

Where consumers turn for information about food safety events is of paramount importance to agribusinesses and policy/decision makers. Respondents were prompted with a hypothetical situation where they were preparing the target product for dinner when they suddenly remembered an article in the newspaper the day prior about an outbreak of *E. coli/Salmonella* in their area. The scenario continued to state that several people in the respondent's area had been hospitalized as a result of this outbreak. Respondents were then asked to indicate all sources of further information they would turn to from a list of 10 possible sources. A follow-up question asked respondents to indicate which of these sources of information they considered to be the most important.

Table 5.6 Percent of Respondents' Risk Rating of Listed Food to Their Health in General.

		Risky	Neither	Not Risky
Lamb	Fresh Produce	17.0	23.4	59.6
	Meat	10.2	34.8	54.9
Pork	Fresh Produce	17.0	19.1	63.8
	Meat	18.3	22.3	59.4
Chicken	Fresh Produce	10.6	17.0	72.3
	Meat	8.0	20.9	71.0
Beef	Fresh Produce	17.0	21.3	61.7
	Meat	12.4	20.9	66.5
Prepared Meals	Fresh Produce	14.9	23.4	61.7
	Meat	20.6	24.1	55.3
Fish	Fresh Produce	6.4	17.0	76.6
	Meat	14.3	19.6	66.1
Eggs	Fresh Produce	8.5	19.1	72.3
	Meat	13.4	21.0	65.6
Dairy	Fresh Produce	8.5	19.1	72.3
	Meat	9.4	19.6	71.0
Fresh Produce	Fresh Produce	2.1	14.9	83.0
	Meat	3.1	9.8	87.1
Genetically Modified Food	Fresh Produce	31.9	21.3	46.8
	Meat	29.9	37.2	33.1
Organic Foods	Fresh Produce	8.5	10.6	80.9
	Meat	8.1	20.9	70.9

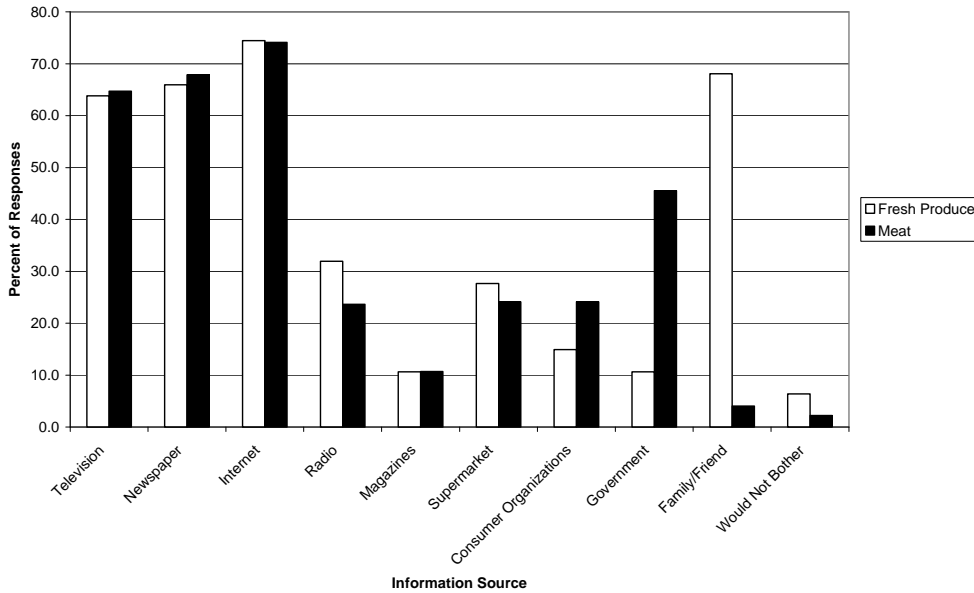
The responses between both surveys were very similar. The majority of respondents indicated the internet as being a source of information to which they would turn to. Newspapers and television were the next two most selected categories. These results were as expected as the internet allows consumers to instantaneously obtain information about food safety events even if they have not made national headlines yet. Newspapers are most likely to have information that affects local areas as well as national and worldwide reports. Television is a common source of information.

When respondents were asked to indicate the most important of these sources, television received the majority of responses in both surveys followed by newspapers and internet. I suspect that television was deemed most important because of its ease of use and common availability. This is represented in Census data that indicated 98.2% of households surveyed in 2001 had at least 1 TV (US Census, 2004). Some individuals do not have internet access or do not regularly surf the net. Further, not everyone has a newspaper subscription. Part of a strategic food safety event response plan should include listing updated information on the internet followed by notifying pertinent newspapers and television news stations. It is important to note that these information sources could be used not only to notify consumers of a food safety event and risks associated with such, but could also be targeted by affected firms to communicate the end of the event to consumers. Confidence restoration activities could exploit these identified information sources to minimize economic losses (Figure 5.1).

It is also important to understand whom consumers would relay information to following a food safety event. Consumers were prompted with a different hypothetical scenario where they were to assume they saw a report on an outbreak of *E. coli/Salmonella* in the target product from a specific supplier on the television. The scenario continued to explain that the store at which the respondent shops sells the target product from the supplier they had seen on the news. Respondents were asked to indicate whom they would inform of this news from a list of potential people who would benefit from knowing about this discovery. The follow-up question asked respondents to indicate what entity would be the most important to inform. Under both surveys, the majority of respondents indicated they would notify their family/friends followed by their

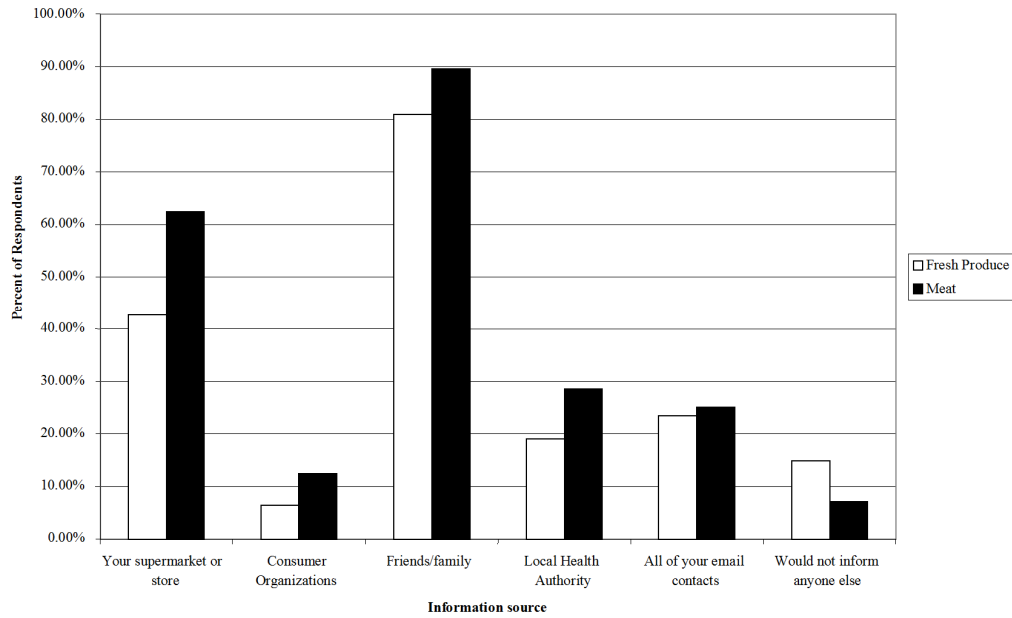
supermarket/store. Consumer organizations received the smallest percentage of responses indicating that consumers do not feel it is an important source to inform.

Figure 5.1 Information Sources Respondents Would Turn to for More Information.



When consumers hear about a food safety event, most likely they are going to relay that information to those individuals whose health and safety is highly regarded. If the information that is being passed among family and friends is incorrect, firms stand to have a more detrimental economic impact. Relaying correct information to media outlets in a timely manner is important to combat this problem. Consumers may be inclined to contact supermarkets or stores to verify whether or not they have the product of concern. It may also be that consumers feel a civic duty to notify their supermarket or store. The majority of respondents indicated that notifying family and friends was the most important of the categories to inform. These results show that referent beliefs are important considerations when trying to determine factors that influence food purchasing decisions (Figure 5.2).

Figure 5.2 Whom Respondents Would Inform After Hearing about a Food Safety Event.



Many factors influence consumers’ decisions to purchase food products. Survey respondents were asked to identify their level of agreement with statements that influenced their decision to purchase the targeted product the week following completion of the survey. When prompted with a statement about the target product being a safe food, over 72% of fresh produce respondents and 71% of meat respondents agreed that this was an influencing factor in their purchasing decision. Ease of preparation, taste, value for money, and health attributes were all indicated as influencing purchasing decisions (Table 5.7).

Social norms can influence consumers’ behavior. Respondents were asked to indicate how important others’ opinions about the target product were to them. Over 50% of meat respondents and about 47% of fresh produce respondents indicated that others’ opinions about the targeted products was not important to them. Another question

analyzed, in general, how others' opinions were accepted by respondents when making decisions whether or not to buy the target product. In both scenarios, over 50% of respondents indicated that others' opinions were not important in their decision to purchase the target product. Respondents were also asked to indicate their perception of how others perceived the target product in the diet as being good or bad on a 7 point scale.

Table 5.7 Percentage of Respondents' Agreement to Statements that Influence Their Decision to Purchase Target Product the Week Following Survey Completion.

	Disagree		Neither		Agree		Don't Know	
	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce	Meat	Fresh Produce	Meat
Product tastes good	2.1	2.7	4.3	3.6	93.6	93.3	0.0	0.5
Product is good value for money	4.3	4.9	25.5	11.2	70.2	83.5	0.0	0.5
Product is not easy to prepare	55.3	77.7	21.3	10.7	23.4	11.2	0.0	0.5
Product is a safe food	10.7	11.2	14.9	12.5	72.3	71.0	2.1	5.4
Everyone in the family likes the product	8.9	4.9	4.3	1.8	87.2	92.4	0.0	0.9
Product works well with lots of other ingredients	2.1	2.2	4.3	1.8	89.4	95.5	4.3	0.5
Product is low in fat	0.0	15.2	4.3	19.6	91.5	63.4	4.3	1.8
Product is low in cholesterol	4.3	21.9	8.5	21.4	78.7	46.0	8.5	10.7
Product lacks flavor	80.9	88.4	4.3	4.9	14.9	5.8	0.0	0.9
Product helps the local farmers and economy	14.9	12.1	23.4	19.6	53.2	56.7	8.5	11.6
I do not like the idea of how product is produced	61.7	75.9	17.0	12.5	19.2	9.4	2.1	2.2
Products is not produced taking animal welfare/environment into account	46.8	37.1	21.3	21.0	17.0	23.2	14.9	18.8

These results show the outcome of recent health initiatives that highlight benefits of certain foods has been successful. Almost 77% of fresh produce respondents indicated that they perceived others opinions about fresh produce being in the diet as good. On the other hand, only 42% of respondents indicated that they perceived others opinions about meat being in the diet as good. Health initiatives have highlighted the benefits of increased fruit and vegetable consumption and potential negative health affects of meat consumption. This can also be seen in agreement to statements that address fat and cholesterol content in the target products and their influence on purchasing decisions.

Respondents were asked to indicate from a list of possible sources of referent beliefs, who influenced their food purchasing decisions. 32% of fresh produce respondents and 29% of meat survey respondents indicated that none of their relatives influenced their purchasing decisions. About 50% of respondents in both cases indicated at least one or two relatives influenced their food purchasing decisions. We then asked respondents to indicate which relative's opinion they valued the most. 51% of fresh produce respondents and 49% of meat survey respondents indicated that their partner/spouses' opinion was valued the most. Referent beliefs can have powerful influence over consumers' decisions. These results indicate that about 50% of respondents take their relatives' opinions into consideration and that partners/spouses are influential in this process (Figures 5.3 and 5.4.)

Figure 5.3 Number of Relatives That Influence Purchasing Decisions.

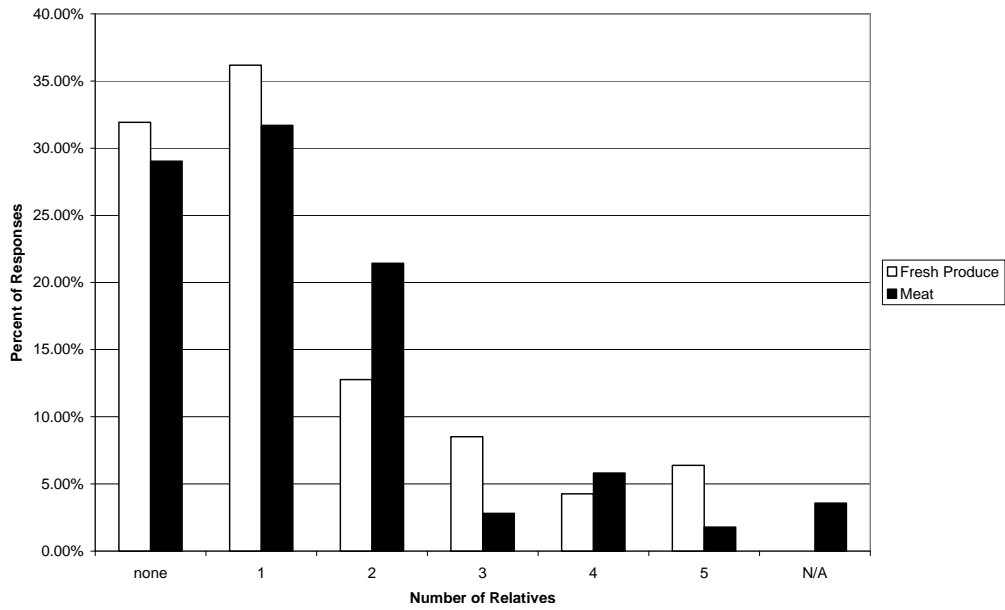
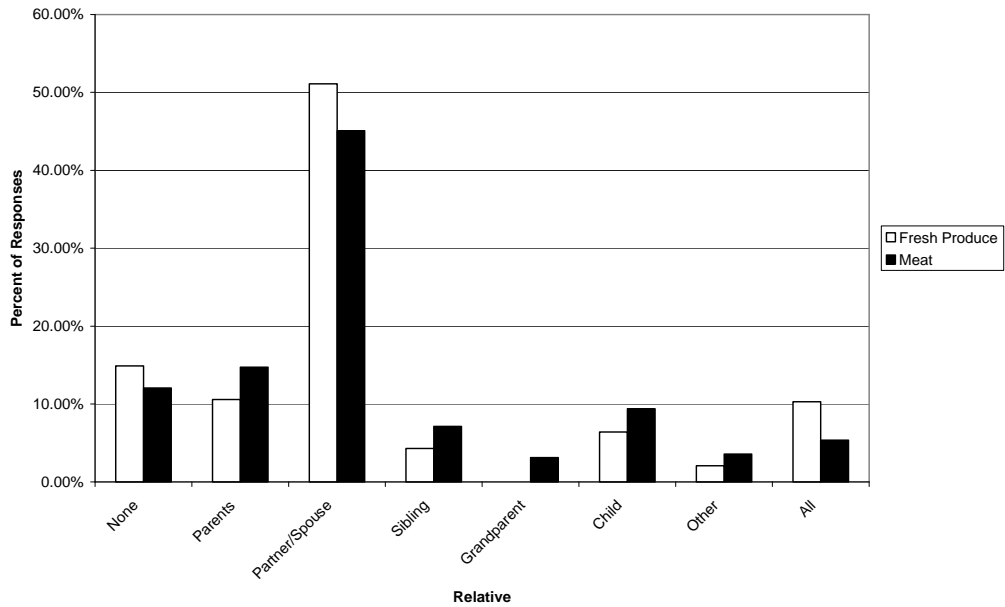


Figure 5.4 Relative's Opinion Valued Most.



In order to determine the impact of a food safety event, respondents were asked to indicate their likelihood of purchasing the target product the week following the survey. Prior to a hypothetical food safety event, 78.7% of fresh produce respondents indicated it was likely they would purchase fresh produce the following week. 70.1% of meat survey responses indicated a planned purchase the following week. To determine the impact of a food safety event, respondents were prompted with another hypothetical situation. In this situation, participants were asked to assume they had just read an article in the newspaper that *E. coli/Salmonella* had been found in the target product in their area and several people had been hospitalized as a result. The prompt continued to ask respondents to indicate their likelihood of purchasing the product the following week. 68.4% of meat survey respondents indicated that it was likely they would purchase the product the following week. 55.3% of fresh produce respondents indicated that it would be likely they would purchase fresh produce the following week.

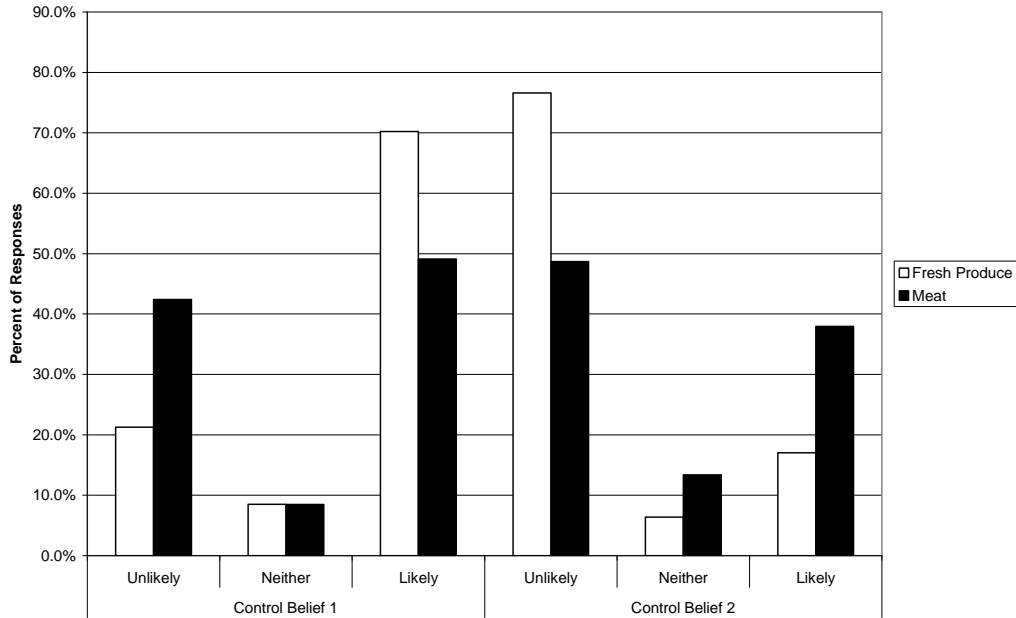
These results show that consumers are more sensitive to food safety events in fresh produce than they are to the same occurring in the meat sector. Differences between the two products and the manner in which they are commonly consumed prove these results are intuitive. Fresh produce is often purchased so that it can be consumed in its current fresh state. Even if proper handling guidelines are followed, contaminated fresh produce will not be riden of its pathogen by simple washing. Meat on the other hand, is usually cooked before consumption. If proper internal meat temperatures guidelines are followed, consumers are likely not to be affected by food borne pathogen contaminated meat products. Agribusiness firms in the raw meat industry are less likely to be affected by food safety events relative to their fresh produce counterparts.

Most respondents indicated that they bought the “standard” version of the target product as opposed to an “organic” or “value/discounted” version. In fact only 4.46% of meat survey respondents and 6.38% of fresh produce respondents indicated that they typically bought organic versions of the target product for in-home consumption. Further, under both survey scenarios, the majority of consumers typically shopped at the supermarket rather than other food retailers such as farmers’ markets and discount supermarkets. These results show that the consumers question fit the typical consumer profile.

Two behavioral control beliefs were measured by asking respondents to assume two different scenarios. The first scenario asked respondents to indicate the likelihood of them purchasing the target product the following week if they had already had some of that product in their refrigerator (Control Belief 1). The second scenario asked respondents to indicate the likelihood of them purchasing the target product the following week if they had already consumed a lot of the product the week prior (Control Belief 2). Under the first scenario, 42% of meat respondents and 21% of fresh produce respondents indicated that it would be unlikely they would purchase the target product the next week. In general, individuals consume more fresh produce items with meals than meat products. A typical meal may consist of one meat product and a few fresh produce products. In the second scenario, almost 77% of fresh produce and 49% of meat survey respondents indicated that a purchase next week would be unlikely. In general consumers prefer a varied diet. Therefore an attempt to vary the diet is consistent with behaviors of avoiding heavily consumed food items within a given time period. These control beliefs are important when considering consumer response to food safety events. Not taking these

measures into account can lead to incorrect assumptions to why consumers respond in certain ways (Figure 5.5).

Figure 5.5 Perceived Behavioral Control Beliefs.



Respondents were asked to indicate the rate of risk of any one person in the household suffering from a list of potential food risks associated with consuming the target product. In both survey scenarios, the majority of respondents indicated the rate of risk associated with any one suffering from these food pathogens was negligible. Respondents were also asked to state their level of knowledge of risks associated with a list of potential food safety risks. In general, more than 50% of respondents indicated they were knowledgeable of the listed risks. One exception was *Listeria*, which is often found in lunch meats. *Listeria* has not received as much media attention as *E. coli* and *Salmonella*.

Consumers expect food safety information to be given to them. This can be seen with responses to a question that asked if participants had actively searched for food safety information in the two week prior to taking the survey. About 92% of fresh produce respondents and 86% of meat respondents indicated that they had not searched for food safety information in the past two weeks. To minimize the scope of food safety events, agribusiness firms must provide this information in a timely fashion because consumers are, in general, not actively searching for this information on their own.

CHAPTER SIX

EMPIRICAL RESULTS

6.1 Ordered Probit Coefficients

A consequence of using an ordered probit regression model is the sign on the coefficients do not depict the effect of that coefficient on the likelihood to purchase the target product. Instead, marginal effects have to be analyzed before any conclusions can be drawn about the effect of certain variables on the model (Greene, 2000). Coefficient estimates can be seen in Table 6.1. Marginal effects can be seen in Table 6.2.

6.2 Fresh Produce Survey

In the fresh produce model of purchasing the product next week in general (FP₁), the model was not statistically significant. Inclusion of socio-demographic variables (FP_{1SD}) resulted in the model being statistically significant with a chi squared value of 48.45 significant at the 5% level. Subjective norms had a negative impact on the likelihood of respondents purchasing fresh produce in general the week following the survey. A negative impact was also seen with this variable when coupled with the socio-demographic variable income. Both of these results are as expected. When the level to which consumers value the opinions of other are increased, these social pressures will influence decisions made by the consumer. Increases in income allow consumers to be more selective in their purchasing decisions. Higher level of income also allows consumers to participate in purchasing trends. When the subjective norm variable was combined with level of education, the result was positive. Intuitively, higher levels of education allow people to make more scientific decisions about food purchasing decisions and not rely on referent beliefs as much.

Perceived behavioral control coupled with education and with income had positive impacts on the likelihood to purchase. Increases in consumers' perceived behavioral control over purchasing a product should increase the likelihood of said purchase occurring. This is because this determinant is based on whether large consumption of the product in the week prior to the survey or having a lot of the product on hand influence decisions to purchase. It is reasonably assumed that consumers that had consumed a lot of the fresh produce or had a lot on hand would not be as likely to hypothetically purchase fresh produce in the week following the survey.

Attitude with education had a negative impact. Education is likely to influence attitudes. Attitudes are simply how consumers feel about consuming a product. If consuming a product is considered good, then a positive attitude will result. This result is counterintuitive. A positive increase in likelihood to purchase was realized with attitude and income. This result seems reasonable as positive increases attitudes and income should increase the likelihood to purchase.

Average trust positively impacted the likelihood to purchase, while the inclusion of level education and income changed the impact to negative. Interestingly, education and income change the impact of trust of informational sources on purchasing decisions. Increases in income allow for a larger selection of substitutes and may negate the importance of trust. Further, relative higher education levels allow for more self directed information discovery that may offset the importance of trust. In the third fresh produce model, FP₂, the model was not statistically significant.

The fourth fresh produce model, FP_{2SD}, was statistically significant with a chi square value of 55.65 significant at the 1% level. Subjective norm with education had a

negative impact. Comparing this result to the FP_{1SD} , the impacts are opposite. Following a food safety event, consumers that are relatively more educated will likely follow further information discovery process. It is important to note that in the hypothetical food safety event questions, participants were asked if a food safety event would affect their purchasing decision for purchasing fresh produce the following week. The construct of the question limits the time period from which the consumer learns of the food safety event and their purchasing decision to period of seven days or less. It is likely that the information in this time period was lacking full details. These results show that following a food safety event, consumers with relatively higher levels of education will have a lower likelihood to purchase fresh produce.

Attitudes and income had a positive impact on the likelihood to purchase. This is consistent with what was seen in the fresh produce model that evaluated purchasing decisions in general. Risk on the other hand was positive in this model. This is counterintuitive and of opposite effect of what was realized in FP_{1SD} . Risk and income in both fresh produce models had a negative impact (Table 6.2).

6.3 Meat Survey

In the first model, $MEAT_1$, was statistically significant at the 10% level with a chi squared value of 15.37. The marginal effects indicate that subjective norms have a negative impact on the likelihood of purchasing. In the second model, $MEAT_{1SD}$, the model was not statistically significant.

In the model, $MEAT_2$, the model had a chi squared value of 17.06 significant at the 5% level. Trust in government/universities had a positive impact and trust media had a negative impact. Generally, consumers trust university scientists and other

authoritative entities. Trust in media is likely to be negative as media is often biased and heavily focused on sensationalized stories (Baker, 1998).

The fourth model, MEAT_{2SD}, was statistically significant at the 1% level with a chi squared value of 66.51. Subjective norms had a negative impact on the likelihood to purchase. However, when this variable was coupled with socio demographic variables education, income and gender, the results became positive. Risk had a negative impact but coupling it with age and income changed it to positive as well. Suppliers and age media and income had a negative impact while government/university and education, media and age and media and education had a positive impact. These results are intuitive. Trust in media with age and with education, subjective norms with education, with income, and with gender, risk perception with age and with income all had a positive impact on the likelihood of purchasing. It may be the case that relatively older consumers trust the media more than younger consumers. Further, increases in education may override the negative impacts of the media as those with higher education may be better able to decipher the bias and sensationalism (Table 6.2)

Table 6.1 SPARTA Parameter Estimates

Chicken/Beef Survey					Fresh Produce Survey				EU ³			
Parameter	Demographic Shifter	MEAT ₁	MEAT ₂	MEAT _{2SD}	Parameter	Demographic Shifter	FP _{1SD}	FP _{2SD}	Parameter	Demographic Shifter	ITP1 ⁴	ITP2
S		-0.0085***		-0.0704**	S		-0.3584**		S		-0.17***	-0.23***
S	Education			0.0082***	S	Education	0.1012**	-0.0383***	S	Education		0.07***
S	Income			0.0061***	S	Income	-0.0566**		S	Income	0.08**	
S	Gender			0.0454*	P	Education	0.4963**		A	Income	0.19**	
P		0.1388**			P	Income	1.0705*					
R				-0.0207**	A	Education	-0.0102*					
R	Age			0.0003***	A	Income		0.0053***				
R	Income			0.0017***	R			0.3893*				
Supplier	Age			-0.0019**	R	Income		-0.0506*				
Gov't/Univ			0.0384**		Avg Trust		6.124**					
Gov't/Univ	Education			-0.0247**	Avg Trust	Education	-0.5189***					
Media			-0.0254**		Avg Trust	Income	-1.3874*					
Media	Age			0.002***								
Media	Education			0.0238**								
Media	Income			-0.0249**								
Chi Squared		15.37***	17.06**	66.51*			48.45**	55.65*				
Log Likelihood		-385.11	-372.65	-347.92			-68.17	-87.25				
Number of Observations		224	224	224			47	47				
Degrees of Freedom		40	40	40			25	25				

Level of significance: * 1% ,** 5%,*** 10%

Only models that were at least 10% significant and only variables in those models that were at least 10% significant are reported in table above

³ Parameter estimates taken from Lobb, Mazzocchi, and Traill 2007.

⁴ ITP1 = the intention to purchase in general. ITP2= the intention to purchase following a food safety event. In both cases, these models included socio-demographic shifters.

Table 6.2 SPARTA Marginal Effects

	Unlikely		Neither			Likely	
Meat₁							
S	0.0022	0.0006	0.0001	0.0002	0.0002	-0.0004	-0.003
P	-0.0139	-0.001	-0.0002	-0.004	-0.004	0.0007	0.0049
Meat₂							
Gov't/Univ	-0.004	-0.0046	-0.003	-0.0019	-0.0015	0.0001	0.0148
Media	0.0026	0.003	0.002	0.0013	0.001	-0.0001	-0.0098
Meat_{2SD}							
S	0.0049	0.0079	0.0062	0.0044	0.0037	-0.0001	-0.0271
S * Education	-0.0006	-0.0009	-0.0007	-0.0005	-0.0004	0	0.0032
S * Income	-0.0004	-0.0007	-0.0005	-0.0004	-0.0003	0	0.0024
S * Gender	-0.0032	-0.0051	-0.004	-0.0028	-0.0024	0	0.0175
R	0.0014	0.0023	0.0018	0.0013	0.0011	0	-0.008
R * Age	0	0	0	0	0	0	0.001
R * Income	-0.0001	-0.0002	-0.0002	-0.0001	-0.0001	0	0.0007
Suppliers * Age	0.0001	0.0002	0.0002	0.0001	0.0001	0	-0.0007
Gov't/Univ * Education	0.0017	0.0028	0.0022	0.0015	0.0013	0	-0.0095
Media * Age	-0.0001	-0.0002	-0.0002	-0.0001	-0.0001	0	0.0008
Media * Education	-0.0017	-0.0027	-0.0021	-0.0015	-0.0013	0	0.0091
Media * Income	0.0017	0.0028	0.0022	0.0015	0.0013	0	-0.0096
FP_{1SD}							
S	0.0076	0.0129	0.0085	0.0101	0.0743	0.0287	-0.1421
S * Education	-0.0021	-0.0036	-0.0024	-0.0029	-0.021	-0.0081	0.0401
S * Income	0.0012	0.002	0.0013	0.0016	0.0117	0.0045	-0.0224
P * Education	-0.0105	-0.0179	-0.0118	-0.014	-0.1028	-0.0398	0.1968
P * Income	-0.0226	-0.0386	-0.0253	-0.0302	-0.2218	-0.0858	0.4244
A * Education	0.0002	0.0004	0.0002	0.0003	0.0021	0.0008	-0.004
A * Income	-0.0001	-0.0002	-0.0001	-0.0001	-0.0011	-0.0004	0.0021
R	0.0016	0.0028	0.0018	0.0022	0.0161	0.0062	-0.0308
R * Income	0.0001	0.0002	0.0002	0.0002	0.0013	0.0005	-0.0026
AT	-0.1295	-0.2206	-0.145	-0.1727	-1.269	-0.4911	2.428
AT * Education	0.011	0.0187	0.0123	0.0146	0.1075	0.0416	-0.2057
AT * Income	0.0293	0.05	0.0328	0.0391	0.2875	0.1113	-0.5501
FP_{2SD}							
S * Education	0.0001	0.0006	0.001	0.0035	0.0058	0.0034	-0.0145
A * Income	0	-0.0001	-0.0001	-0.0005	-0.0008	-0.0005	0.002
R	-0.001	-0.0065	-0.0105	-0.0354	-0.0595	-0.0347	0.1475
R * Income	0.0001	0.0008	0.0014	0.0046	0.0077	0.0045	-0.0192

6.4 Comparisons across products

Comparisons across products in the empirical sense are limited to both models that addressed intention to purchase following a food safety event with the inclusion of socio demographic factors (Meat_{2SD} and FP_{1SD}). In both cases subjective norms and education were statistically significant factors but of opposite signs. Risk perception also had opposite signs when compared across products. The meat survey showed that risk perception had a negative impact while the fresh produce survey suggested the opposite. These results are counterintuitive. These results do not offer any concrete generalizations across products. In fact, some of the common statistically significant factors across the two survey models offer opposite impacts on the likelihood to purchase. This may be because of the fundamental differences in the two products. For example, fresh produce is often consumed in its current state, fresh. On the other hand, most meat products are cooked. If the proper cooking temperatures are achieved in this process, the risk of becoming ill from a food borne pathogen is significantly reduced. Simply washing fresh produce prior to consumption does not offer the same level of risk reduction. Therefore, consumers are likely to be influenced differently by food safety events in these two different markets. There are likely other factors that influence how consumers respond to food safety events across products.

6.5 Comparisons across regions

Comparison of marginal effects across regions is limited to the statistically significant variables and models in which both this study and the EU have in common. Subjective norms have a negative impact on the likelihood to purchase prior to a

hypothetical food safety event in both in the EU and in the US in the case of fresh produce. In both cases, as increases in subjective norms increase, the likelihood the average consumer in these studies would purchase the fresh produce decreases. Here increases in subjective norms would be the combination of how influential referents were to the average respondent and if they took this information into account before making a purchasing decision.

Attitude coupled with the income shifter was statistically significant in both the EU study and the fresh produce survey before a hypothetical food safety event. In both cases, this resulted in increased likelihood of the respondent purchasing the product the following week. This is intuitive. Increases in attitudes suggest the respondent would “feel” better about a particular purchase. Increase in income is not as clear with their role in this variable having a positive effect on the likelihood to purchase said products. (Table 6.3).

Table 6.3. Marginal Effects Comparison of Common Statistically Significant Variables between US and EU Studies

Variable	FP _{1SD}							EU ⁵						
	Unlikely		Neither			Likely		Unlikely		Neither			Likely	
S	0.0076	0.0129	0.0085	0.0101	0.0743	0.0287	-0.1421	0.01	0	0.01	0.01	0.03	0.01	-0.07
S * Income	0.0012	0.002	0.0013	0.0016	0.0117	0.0045	-0.0224	0	0	0	-0.01	-0.01	-0.01	0.03
A * Income	-0.0001	-0.0002	-0.0001	-0.0001	-0.0011	-0.0004	0.0021	-0.01	0	-0.01	-0.01	-0.03	-0.01	0.08

⁵ Selected from Lobb, Mazzocchi, and Traill 2007

CHAPTER SEVEN

CONCLUSIONS

In general, no conclusive arguments can be made about generalizations across products. Even though no concrete conclusions can be made, the results uphold what is intuitive about food safety events. Referent beliefs are a strong influence on consumers' purchasing decisions. Subjective norms showed a negative impact in all cases where the factor was statistically significant. The implication for agribusiness firms is that information needs to be disseminated in a timely manner. It needs to be available to the public at large. It seems as though talking over the "water cooler" is where consumers obtain information about food safety events. Trust in food safety informational sources is paramount for effective restorative strategies. Further, socio-demographic variables are an influencing factor in consumer behavior as well. Higher incomes will most likely affect purchasing decisions in a negative manner as the relatively higher income allows for more substitution. Also, gender plays an important role in the effects of food safety events. Therefore, any strategic response plans should ensure they are targeting those who are most prevalent in making food purchasing decisions. Higher levels of education also seem to minimize the effects of food safety events.

Agribusiness firms can incorporate these results into their strategic food safety response plans. These results suggest that agribusiness firms that include measures that relay the risk perception of a food safety event are likely to minimize the economic losses associated with such events. Individuals firms may attempt to address consumers to protect a brand image in the occurrence of a food safety event. Or, entire industries may form strategic alliances amongst themselves to communicate perceived risks of food

safety events to protect the entire industry that may often not be branded. Risk perception also indicates that unaffected firms could potentially tout their products as being safer in a food safety crisis in an attempt to capture more market share. Although interesting conclusions can be drawn from these results, more observations from different areas and products are needed before conclusive arguments can be made about generalizations across products and regions.

The results from these surveys indicate that generalizations about consumer response to food safety events can be made across products in some areas. In general, consumers have clearly defined preferences for sources they trust in receiving food safety information. University scientists and doctors/health authorities are two sources that agribusiness firms could align themselves with to provide food safety information to consumers during and after a food safety crisis. Strategic relationships between firms and these sources could be established prior to food safety events to boost firm or industry image. Restoring consumer confidence following a food safety event can be difficult and could be impeded by firms' alliances with political groups or animal welfare organizations. Also, consumers show distrust towards processors. Agribusiness firms that are looking to restore consumer confidence without the help of trusted entities may find it a difficult task. Results show that consumers have more trust in information from state governments than the federal counterpart. Involving government officials on the state level is likely helpful in communicating food safety events.

Consumers believe that technological changes in the agricultural product sectors have created higher quality foods. Firms can also rely on the information that future technological changes are likely to be accepted as increasing food quality. Creating new

technologies that increase safety attributes can be a source of competitive advantage if consumer surplus is increased. Further, consumers are aware that their personal actions have impacts on risks associated with foods. Agribusinesses should make efforts to reaffirm these beliefs and ensure that consumers know proper handling and storage procedures to minimize risks. This can be achieved by public service announcements or labeling that provides information that is not only easily understood but engaging. In general, consumers believe that food items produced in the U.S. are safe.

Typical media sources such as the Internet, television and newspapers should be used to provide consumers with information following a food safety event. Since consumers rely on these sources for information, it may be in the best interest of agribusiness firms to have public relations personnel who can give pertinent information to these agencies in a timely manner. Further, consumers not only expect food safety, they also expect to be informed of food safety events. Information concerning the end of food safety events or steps being taken by firms to handle the situation needs to be provided to consumers. Otherwise, this information will not be effective because consumers will likely not search for it. Subjective norms play a role in consumers' purchasing decisions. Consumers take friends and family members' opinion into consideration when making decisions. Further, consumers indicated that informing family and friends was important when hearing of a food safety event. These factors highlight the need for correct and timely information to be given to consumers. Every strategic response plan should emphasize timely dissemination of correct information to minimize the scope of events.

Impacts on the likelihood of purchasing a product the week following a food safety event seem to be product dependent. Therefore, not all responses can be generalized. Food safety events that affect products that are commonly consumed in the state in which they are purchased will likely be more affected than products that require cooking. Even though food safety events have captured substantial attention, consumers are still concerned about food having good taste and being of good value for the money. In general, consumers may feel that they are able to properly evaluate food risks, and that the risk of anyone in the household suffering from a food-born pathogen is negligible.

This research shows that, in general, consumer response to food safety events is consistent. Agribusiness firms can use this information to create a base strategic response plan to food safety events. Caution should be exercised in sweeping generalization in all areas, as the results show that consumers react differently depending upon the product. More research is needed across more products and geographical regions before concrete conclusions can be drawn and before adopting a blanket-type strategic response nationwide. More work is warranted in this area covering more products and over a larger geographical area.

APPENDIX

Section 1

1. Including yourself, how many people do you regularly buy food for consumption inside your home? _____
2. In a typical week, how often do you buy (Mark the box that best represents your answer **for each** statement below.)

	Never	Not every week	Once	Twice	Three times	Four Times	More than four times
Food for in home consumption							
Any type of chicken or beef for your household's in home consumption							
Fresh or frozen chicken or beef							
Frozen chicken or beef							
Fresh or frozen chicken or beef as part of a prepared meal							
Processed chicken or beef							
Cooked chicken or beef							
Fresh or frozen chicken or beef as a meal outside your home							

3. How many vegetarians/vegans are there in your household?
None(0)____One(1)____Two(2)____Three(3)____Four(4)____Five(5)____More(6)____

If you NEVER buy chicken or beef OR you don't buy fresh or frozen chicken or beef for your household please go to question 9.

4. In a typical week, approximately how much fresh or frozen chicken or beef do you buy for your household's in home consumption? ____ (lbs)
5. In a typical week, approximately how much does your household spend on fresh or frozen chicken or beef for your household's in home consumption? _____ (\$)
6. In a typical week, what type of fresh or frozen chicken or beef do you buy for your household's in home consumption?
(Mark the most applicable box. Mark only 1.)
I don't know ____ "Standard" chicken or beef____ "Luxury" chicken or beef____
"Value" chicken or beef____ "Organic" chicken or beef____

7. How likely or unlikely is it that you will buy fresh or frozen chicken or beef for your household's in home consumption at least once in the next week? **Circle the number that best reflects your response**

Extremely Unlikely			Neither			Extremely Likely
1	2	3	4	5	6	7

8. In a typical week where do you purchase your fresh or frozen chicken or beef? **Please mark all that apply.**

Discount supermarket ____ Local shop ____ Market (i.e. farmers' market) ____
 Supermarket ____ Farmer ____ Online shopping/home delivery ____
 Other (please specify) _____

Please answer all remaining questions regardless of whether you buy chicken or beef for your household or not.

Circle the number that best reflects your level of agreement for each statement below.

	Completely Disagree	Neither				Completely Agree	
9. In my household we like chicken and or beef:	1	2	3	4	5	6	7
10. A good diet should include chicken and or beef:	1	2	3	4	5	6	7

11. Personally, I think that buying chicken or beef for my household is: **(Circle the response that best reflects your opinion for EACH line below)**

Good	1	2	3	4	5	6	7	Bad
Disagreeable	1	2	3	4	5	6	7	Agreeable
Convenient	1	2	3	4	5	6	7	Inconvenient
Ethical	1	2	3	4	5	6	7	Unethical

12. My decision whether or not to buy chicken or beef next week is based on the fact that: **(Circle the response which best reflects your opinion for EACH line below.)**

		Completely Disagree	Neither				Completely Agree	I Don't Know	
A	Chicken and or beef tastes good	1	2	3	4	5	6	7	0
B	Chicken and or beef is good value for money	1	2	3	4	5	6	7	0
C	Chicken and or beef is not easy to prepare	1	2	3	4	5	6	7	0
D	Chicken and or beef is a safe food	1	2	3	4	5	6	7	0
E	Everyone in the family likes chicken and or beef	1	2	3	4	5	6	7	0
F	Chicken and or beef works well with lots of other ingredients	1	2	3	4	5	6	7	0
G	Chicken and or beef is low in fat	1	2	3	4	5	6	7	0
H	Chicken and or beef is low in cholesterol	1	2	3	4	5	6	7	0
I	Chicken and or beef lacks flavor	1	2	3	4	5	6	7	0
J	Chicken and or beef helps the local farmers and economy	1	2	3	4	5	6	7	0
K	I do not like the idea of chickens or cows being killed for food	1	2	3	4	5	6	7	0
L	Chicken and or beef is not produced taking into account animal welfare	1	2	3	4	5	6	7	0

13. Which three (3) of the reasons listed above in question 12 are the MOST important to you when buying beef (1 is most important, **please list a letter for all three**)?

Importance	Reason (letter A-L)
1	
2	
3	

14. Others' opinions about chicken and or beef are important to me.

Not at all important	Neither				Extremely important	
1	2	3	4	5	6	7

15. I take others' opinions into account when making decisions about whether or not to buy chicken and or beef.

Completely disagree	Neither				Completely agree	
1	2	3	4	5	6	7

16. Other people suggest chicken and or beef in the diet is?

Very bad				Neither				Very good
1	2	3	4	5	6	7		

17. Please rate the risk of any one person in your household suffering from the following as a result of eating chicken or beef.

Circle the best response for EACH category below).

Risk From:	I don't know	Negligible						Extremely high
E-coli	0	1	2	3	4	5	6	7
Salmonella	0	1	2	3	4	5	6	7
Listeria	0	1	2	3	4	5	6	7
Allergy from food additive	0	1	2	3	4	5	6	7

18. Please rate the risk of any one person in your household experiencing long-term health problems due to eating chicken or beef.

(Circle the best response.)

Risk From:	I don't know	Negligible						Extremely high
Cholesterol	0	1	2	3	4	5	6	7
Health problems from pesticides	0	1	2	3	4	5	6	7
Health problems from antibiotics	0	1	2	3	4	5	6	7
Health problems from growth hormones	0	1	2	3	4	5	6	7
E. coli/Chicken Flu	0	1	2	3	4	5	6	7

19. Assume that you have just read an article in the newspaper that high rates of E-coli/Salmonella in chicken or beef have been found in your area, resulting in several people being hospitalized. How likely or unlikely is it that you will buy fresh or frozen chicken or beef for your household's consumption at least once next week? **(Circle the number that best reflects your response.)**

Extremely Likely				Neither				Extremely Unlikely
1	2	3	4	5	6	7		

20. Please state your level of agreement with the following sentences **(Circle the number that best reflects your opinion for each statement below.)**

	Completely Disagree	Neither						Completely Agree
I typically store chicken or beef in my freezer	1	2	3	4	5	6	7	
We eat too much chicken or beef	1	2	3	4	5	6	7	

	Extremely Unlikely	Neither						Extremely Likely
Assume that you do have chicken or beef in the refrigerator. Is it likely you would buy more next week?	1	2	3	4	5	6	7	
Assume last week you ate a lot of chicken or beef. Is it likely you would not buy chicken or beef at all next week?	1	2	3	4	5	6	7	

21. Safe chicken or beef is: (Circle the number that corresponds to your level of agreeing with each statement below.)

	Completely Disagree			Neither			Completely Agree		I Don't Know
Packaged	1	2	3	4	5	6	7	0	
Clearly labeled	1	2	3	4	5	6	7	0	
Whole chicken or non-ground beef	1	2	3	4	5	6	7	0	
From the butcher	1	2	3	4	5	6	7	0	
From the supermarket	1	2	3	4	5	6	7	0	
Produced in the U.S.	1	2	3	4	5	6	7	0	
Produced in Canada	1	2	3	4	5	6	7	0	
Produced in Mexico	1	2	3	4	5	6	7	0	
Expensive	1	2	3	4	5	6	7	0	
Free range, organic or corn-fed	1	2	3	4	5	6	7	0	
Recognizable by color, taste or smell	1	2	3	4	5	6	7	0	
Fresh	1	2	3	4	5	6	7	0	

SECTION 2

22. In general, how much do you know about the risks associated with the following items in food? (Circle the number that best corresponds to your level of knowledge for EACH statement below.)

	Not at all knowledgeable						Extremely knowledgeable
	1	2	3	4	5	6	7
E-coli							
Salmonella							
Listeria							
Cholesterol							
Allergy from food additives	1	2	3	4	5	6	7
Health problems from pesticides	1	2	3	4	5	6	7
Health problems from antibiotics	1	2	3	4	5	6	7
Health problems from growth hormones	1	2	3	4	5	6	7
Chicken flu	1	2	3	4	5	6	7

23. To what extent do you think you can reduce the risk associated with food safety by taking appropriate actions, such as thoroughly cooking; thoroughly washing; safely handling; proper food storage; choice of retail outlets; purchasing higher quality products, etc.

To a minimal extent	Neither					To a large extent
1	2	3	4	5	6	7

24. In general, how important are each of the following to your household? **Circle the response that best reflects your opinion for each statement below.**

	Extremely Un- important		Neither			Extremely Important	
Tasty food	1	2	3	4	5	6	7
Value for money	1	2	3	4	5	6	7
Ease of preparation	1	2	3	4	5	6	7
Food safety	1	2	3	4	5	6	7
Food everyone likes	1	2	3	4	5	6	7
Food variety	1	2	3	4	5	6	7
Fat content	1	2	3	4	5	6	7
Cholesterol content	1	2	3	4	5	6	7
Ethical food production methods	1	2	3	4	5	6	7
Local community livelihood	1	2	3	4	5	6	7
Animal welfare	1	2	3	4	5	6	7

25. Please indicate the extent to which you agree or disagree with each of the statements you find below by circling the number for each statement below that best describes your personal view.

	Completely Disagree		Neither			Completely Agree	
I like foods from different countries	1	2	3	4	5	6	7
I don't like the way ethnic food appears	1	2	3	4	5	6	7
I like to try new ethnic restaurants	1	2	3	4	5	6	7
I like to purchase the best quality food I can afford	1	2	3	4	5	6	7
At parties, I often will try a new food	1	2	3	4	5	6	7
I am constantly sampling new and different foods	1	2	3	4	5	6	7
I don't trust new foods	1	2	3	4	5	6	7
I will eat almost anything	1	2	3	4	5	6	7
If I don't know what is in a food, I won't try it	1	2	3	4	5	6	7
I am afraid to eat things I have never eaten before	1	2	3	4	5	6	7

26. Please indicate the extent to which you agree or disagree with each of the statements you find below by circling the number that best describes your personal views for each statement below.

	Completely Disagree		Neither			Completely Agree	
I usually try to eat natural foods	1	2	3	4	5	6	7
I am willing to pay more for a better quality product	1	2	3	4	5	6	7
Quality is decisive for me when purchasing foods	1	2	3	4	5	6	7
I always aim for the best quality	1	2	3	4	5	6	7
When choosing foods, I try to buy products that do not contain residues of pesticides	1	2	3	4	5	6	7
I am willing to pay more for foods containing natural ingredients	1	2	3	4	5	6	7
For me, wholesome nutrition begins with the purchase of high quality foods	1	2	3	4	5	6	7

27. With regards to the scale below, what do you think describes you best?

I am a risk taker				Neither				I avoid taking risks
1	2	3	4	5	6	7		

28. How would you rate these activities in terms of risk to health?

Risk from:	Negligible						Extremely high
Smoking cigarettes	1	2	3	4	5	6	7
Driving	1	2	3	4	5	6	7
Eating beef	1	2	3	4	5	6	7
Eating chicken	1	2	3	4	5	6	7
Taking illegal drugs	1	2	3	4	5	6	7
Scuba diving	1	2	3	4	5	6	7
Swimming	1	2	3	4	5	6	7

29. Generally, what do you think of the risk for your health, of the following foods?

	Very risky			Neither			Not at all risky	
Lamb	1	2	3	4	5	6	7	
Pork	1	2	3	4	5	6	7	
Chicken	1	2	3	4	5	6	7	
Beef	1	2	3	4	5	6	7	
Prepared meals	1	2	3	4	5	6	7	
Fish	1	2	3	4	5	6	7	
Eggs	1	2	3	4	5	6	7	
Dairy	1	2	3	4	5	6	7	
Fruit and vegetables	1	2	3	4	5	6	7	
Genetically modified (GM) foods	1	2	3	4	5	6	7	
Organic foods	1	2	3	4	5	6	7	

30. Assume that you were preparing chicken or beef for dinner when you suddenly remembered an article in the newspaper yesterday which reported that there were particularly high rates of e-coli/salmonella found in chicken or beef in your area. Several people had been hospitalized as a result. You cannot remember which type of chicken or beef (i.e. ground beef, whole chickens, etc) the article was referring to. Where would you go for further information? **Tick all that apply.**

A	Television	
B	Newspaper	
C	Internet	
D	Radio	
E	Magazines	
F	Your supermarket or store	
G	Consumer organizations	
H	Government	
I	Family / friends	
J	I would not bother to find anymore information	
K	Other (please state)	

31. Which of these (listed in Question 30 above) are the MOST important to you? Please list no more than three (3) using the letter that corresponds to the information source(s) which you feel to be the MOST important to you.

Importance	Source
1	
2	
3	

32. Assume that you saw a report on the incidence of e-coli/salmonella in chicken or beef from a specific supplier on the television last night. You remember that the store you shop at sells chicken or beef from this supplier. Whom would you inform? **Tick all that apply.**

A	Your supermarket or store	
B	Consumer organization	
C	Friends/Family	
D	Local health authority	
E	All your email contacts	
F	I would not inform anyone	
G	Other (please specify)	

33. Which of these (listed in Question 32 above) would you attach the MOST importance to informing? **Please list no more than three (3) using the letter that corresponds to the MOST important of these.**

Importance	Persons/Organizations
1	
2	
3	

34. Have you actively searched any information on food safety in the last two weeks? Yes _____
No _____

35. How many hours per day do you watch TV?
 I do not watch TV More than 2 and up to 4 hours More than 6 hours
 Up to 2 hours More than 4 and up to 6 hours I don't know

36. How many hours per day do you listen to the radio?
 I don't listen to radio More than 2 and up to 4 hours More than 6 hours
 Up to 2 hours More than 4 and up to 6 hours I don't know

37. How many hours per day do you surf the internet?
 I don't surf the internet More than 2 and up to 4 hours More than 6 hours
 Up to 2 hours More than 4 and up to 6 hours I don't know

38. How many different newspapers do you read in a typical week?
 I don't read newspapers More than 2 and up to 4 More than 6
 Up to 2 More than 4 and up to 6 I don't know

For questions 39-42 please mark only one response for each question.

39. How many relatives influence your food purchasing decisions?
 None__ One__ Two__ Three__ Four__ Five__
 More(please specify how many)_____ Not applicable__

40. Which relatives' opinions do you value the most?
 None__ Parents__ Partner/wife/husband__ Sister/brothers__
 Grandmother/grandfather__
 Daughter/son__ Other__ All__ Not applicable__

41. How many friends influence your food purchasing decisions?
 None__ One__ Two__ Three__ Four__ Five__
 More(please specify how many)_____ Not applicable__

42. How many colleagues influence your food purchasing decisions?

None__ One__ Two__ Three__ Four__ Five__
 More (please specify how many)_____Not applicable_____

43. Suppose that each of the following has provided information about potential risks associated with e-coli/salmonella in food. Please indicate to what extent you would trust that information for each category below.

	Completely Distrust		Neither				Completely Trust		I Don't Know
Shopkeepers	1	2	3	4	5	6	7	0	
Supermarkets	1	2	3	4	5	6	7	0	
Organic Shop	1	2	3	4	5	6	7	0	
Farmers	1	2	3	4	5	6	7	0	
Processors	1	2	3	4	5	6	7	0	
Doctors / health authority	1	2	3	4	5	6	7	0	
University scientists	1	2	3	4	5	6	7	0	
United States Department of Agriculture	1	2	3	4	5	6	7	0	
State Government	1	2	3	4	5	6	7	0	
Political groups	1	2	3	4	5	6	7	0	
Environmental organizations	1	2	3	4	5	6	7	0	
Animal welfare organizations	1	2	3	4	5	6	7	0	
Federal Government	1	2	3	4	5	6	7	0	
Television documentary	1	2	3	4	5	6	7	0	
Television news /current events	1	2	3	4	5	6	7	0	
Newspapers	1	2	3	4	5	6	7	0	
Internet	1	2	3	4	5	6	7	0	
Radio	1	2	3	4	5	6	7	0	
Magazines	1	2	3	4	5	6	7	0	
Product Label	1	2	3	4	5	6	7	0	

44. Suppose on Monday, someone tells you about a food safety incident that may potentially affect people living in your area.

(a). How many people, in your area, do you think will have heard about this incident by Wednesday?

No one__ Less than half the people__ About half the people__
 More than half the people__ Everyone_____

(b). How many by Sunday?

No one__ Less than half the people__ About half the people__
 More than half the people__ Everyone_____

45. Please assume that you hear rumors about a food safety incident. Regarding the respective pairs, whom do you trust more? **Please circle one (1) group from each pair that you trust most.**

Family	or	University scientists
Family	or	Public authorities
Family		Media
Family	or	Producers
University scientist	or	Public authorities
University scientist	or	Media
University Scientist	or	Producers
Public authorities	or	Media
Public authorities	or	Producers
Media	or	Producers

54. Job status:
 Employed full-time Employed part-time Retired
 Unemployed Student House keeper
55. What is your occupation
 I am not employed Self-employed
 Non-manual employee Farmer/ agricultural worker
 Manual employee Employer / Entrepreneur
 Executive Other
56. Number of people currently living in your household (including yourself) _____
57. If you have children in your household, how many in each age bracket?
a.) None _____ c.) 3-10 years _____
b.) Less than 3 years _____ d.) 11-16 years _____ e.) greater than 16 years _____
58. Are there other members of the household who are dependant on you (i.e. elderly or disabled)?
a.) Yes _____ No _____ b.) If yes, how may _____
59. On average, how much does your household spend on food each week?
 Less than \$45 \$75-119.99 more than \$150
 \$45-74.99 \$120-150
60. Please indicate your gross annual household income range:
 Less than \$15,000 \$30,000-44,999 60,000-89,999 More than
120,000
 15,000-29,999 45,000-59,999 90,000-120,000 No response
61. How would you describe the financial situation of your household?
 Not very well off
 Difficult
 Modest
 Reasonable
 Well off
62. Do you belong to any consumer or environmental organizations?
Yes _____ No _____
If yes, which one(s) _____
63. Approximately how many people live in your town?
 Less than 10,000 people
 10,001-100,000 people
 More than 100,000 people

THANK YOU! YOUR RESPONSES ARE GREATLY APPRECIATED AND ARE VERY IMPORTANT TO OUR RESEARCH!!

***This survey instrument was originally designed by A. E. Lobb, M. Mazzocchi, and W.B. Traill at the University of Reading. Minor changes have been made by the authors conducting this research and the permission to use this instrument is greatly appreciated.**

COMMENTS:

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VITA

Place of Birth

Lexington, KY

Education

Bachelor of Science University of Kentucky, Lexington, KY	Agricultural Economics 2006
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Experience

Research Assistant, University of Kentucky	October 2006-December 2009
--	----------------------------

Graduate Student President, Dept Ag Econ	October 2006-October 2007
--	---------------------------

UPS, Lexington, KY	October 2001-August 2006
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