

FACTORS INFLUENCING CONSUMER DECISIONS
RELATED TO NATURAL BEEF

By

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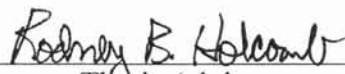
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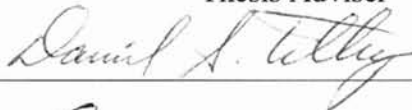
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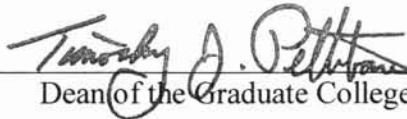
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CHAPTER I

INTRODUCTION

Problem Statement

According to Purcell, the beef industry has experienced major changes during the past 25 years. From the mid-1970's to 1990, beef demand has experienced a continuous drop. Per-capita beef consumption declined from 95 lbs in 1976 to about 65 lbs in 1990. The estimate for per-capita beef consumption in 2000 is approximately 69 lbs, a slight increase from 1990. The beef industry faces tremendous challenges due to this major shift in demand. Consumer tastes and preferences have changed and producers need to market their beef products to meet the changing consumer demand.

The decline in beef demand may be attributed to several factors including increased health information, food safety concerns, and changing consumer demographics (Schroeder, Marsh and Mintert). In addition to these factors, changes in relative prices, product convenience and offering, product quality and consistency, and changing consumer preferences may have also contributed to the decline (Boland and Schroeder). Beef demand has been negatively affected because of a lack of convenient and "quick" beef products (Schroeder, Marsh, and Mintert).

Currently, the beef industry is commodity-oriented instead of consumer-oriented (Givry). Beef marketing activities are not well coordinated because producers are not targeting their products toward changing consumer preferences. As a result, consumers are purchasing fewer beef products. Beef producers are now looking for alternative ways

to market their cattle. One alternative for beef producers is the natural beef (no hormones or antibiotics) market.

The natural and organic food markets have grown significantly in recent years and continue to gain market share (Grannis, Hooker, and Thilmany). “Organic” foods often refer to horticultural crops and grains and are generally defined as having no manufactured fertilizers or pesticides used in production. In the past, various organizations developed their own standards and would certify crops or grains as “organic”. However, the USDA recently implemented strict guidelines that must be met for foods to be labeled as “organic”. In comparison, “natural” is a term typically applied to livestock products and indicates that no hormones or antibiotics were administered to the animals. The term “natural” developed because many livestock producers do not ensure that their pastures and feed grains meet “organic” standards.

The natural beef market appears to be growing, with the greatest growth occurring on the coasts, and more producers of natural beef are emerging. However, no data exists on natural beef’s market share. Recent work by Lusk and Fox indicates that consumers are willing to pay a higher price for quality-differentiated beef products to offset the increased production costs for natural beef producers. The costs to produce natural beef are higher because more feed per pound of gain is required when no hormones or antibiotics are used in the production process. According to Mayer, natural beef costs 25 percent more to produce than regular beef. Therefore, producers need to focus on marketing efforts that will generate higher revenues to offset these increased production costs (Boland, Boyle, and Lusk). Several successful natural beef alliances have been formed to lower production costs for individual producers (Sartwelle).

However, in the Southern Plains states of Kansas, Oklahoma, and Texas where considerable beef production occurs, natural beef marketing efforts have been relatively limited. Little information exists related to consumer tastes and preferences for natural beef in the Southern Plains. As more producers consider marketing natural beef to meet the changing consumer demand, such information is essential for successful venture development.

This project may positively affect the economics of rural ranching areas in Oklahoma, Kansas, and Texas by providing the necessary information for beef producers to effectively market natural beef products. This study will help to determine the feasibility of producers in Oklahoma, Kansas, and Texas marketing natural beef products using a cooperative network of producers and packers.

Natural beef producers may be able to meet the changing tastes and preferences of consumers. To increase the profitability and efficiency of the beef market, producers can market products to specific consumer segments. The information from this study will also be used by the Kerr Center for Sustainable Agriculture to promote sustainable production practices.

Objectives

The overall objective of this study is to examine consumer preferences for natural beef products in the Southern Plains states of Kansas, Oklahoma, and Texas. The information will be used to provide marketing recommendations to those interested in producing natural beef in the Southern Plains region.

The specific objectives are:

1. Determine demographic and socioeconomic factors affecting consumer tastes and preferences.
2. Examine perceptions of natural beef in Oklahoma, Kansas, and Texas.
3. Determine supermarket respondents' willingness to pay for natural beef.

Plan of Research

Procedures

Consumer purchasing behavior is assumed to be a function of several demographic factors, which include age, gender, education, income, and household size. Preferences for natural beef and willingness to pay for natural beef may be related to consumers' demographic characteristics. Consumers' meat purchasing behavior and perceptions of natural beef may be related to willingness to pay for natural beef.

Survey

To examine the impacts of consumer characteristics on willingness to pay for natural beef in the Southern Plains, the Dichotomous Choice Contingent Valuation Method (DC-CVM) was used in a survey of supermarket customers. The dichotomous choice method seems to better approximate markets with which consumers are familiar with since the prices appear to be set by the seller and are not usually negotiable (Calia and Strazzeria). It also lowers the possibility of respondents exaggerating their expressed willingness to pay.

For this study, researchers surveyed consumers in supermarkets catering to consumers of natural foods as part of an effort funded by USDA's Sustainable Agriculture Research and Education (SARE) program. Following the guidelines of the SARE project, consultants began the surveys in November 2000 and finished in March 2001. The time frame for completion of the surveys may have caused a limitation since the surveys were not administered during the primary beef consumption times, which are generally May through September. It also important to note that this was not a random sample from the Southern Plains states because we specifically tried to get responses from consumers who buy natural products or shop in stores that carry natural foods. Consumers who purchase natural products represent the best market segment for natural beef. Supermarkets chosen for this study were ones that maintain a section of their stores for "natural foods". Stores from three geographic locations were chosen: two stores in the Oklahoma City metropolitan area, three stores in the Dallas/Ft. Worth metroplex, and three stores in the Kansas City metroplex (two in Kansas, one in Missouri). The surveys took place in stores that agreed to allow consumer sampling at their meat counters. One hundred responses were received from each store, although some of these were incomplete and thus not useable in statistical evaluations.

Survey administrators asked store customers, or more specifically those customers who were the primary shoppers for their households, to voluntarily participate in the survey, which usually took less than three minutes to complete. The questions addressed consumer meat purchasing behaviors, perceptions and preferences for natural beef, indicators of willingness-to-pay for natural beef cuts, and demographic characteristics of the household.

Model

The multinomial logit procedure was used to assess the effect of consumers' demographic characteristics on their willingness to pay for natural beef. However, since demographic factors alone may not fully explain consumers' purchasing decisions, the effects of consumers' meat purchasing behavior and perceptions of natural beef on their willingness to pay were also determined. The multinomial logit model is useful for analyzing the effect of independent variables on a finite number of choices and has been used extensively in recent studies (Schupp, Gillespie, and Reed; Caffey and Kazmierczak; Luzar et al; Moutou and Brester; Zepeda).

In the random utility model, a consumer's utility derived from a choice is specified as a linear function of the consumer's characteristics and the specific attributes of the choice, in addition to an error term. The probability that a consumer will select a certain choice is equal to the probability that the utility derived from that choice is greater than the utility derived from all other choices. The multinomial logit model results when the random utility error terms are assumed to be independently and identically distributed as a log Weibull distribution (Kennedy).

Following Greene (1993), the general multinomial logit model is:

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j x_i}}{\sum_{k=1}^J e^{\beta_k x_i}} \quad \text{for } j = 1, 2, \dots, J.$$

where Y is the dependent variable corresponding to the choice made by the i th consumer with vector of characteristics x_i faced with J choices. β is a vector of unknown parameters corresponding to the consumer's characteristics and e is the natural base of logarithms.

The coefficients in this model do not allow for direct determination of the marginal effects. The marginal effects of the regressors on the probabilities are:

$$\frac{\partial P_j}{\partial x_i} = P_j \left[\beta_j - \sum_k P_k \beta_k \right]$$

In addition to the logit model, a descriptive statistical analysis on all of the survey questions was completed. Summary statistics based on each survey question were computed for the three metropolitan areas using SAS. Frequency distributions, means, and tests for statistical differences were used to determine if consumer-purchasing behavior changes by store or city, by selected demographic or socioeconomic characteristics, by meat type, and by knowledge of meat.

Respondents were divided into four groups based on their responses to the willingness to pay questions. Frequency tables were computed to determine how each group answered questions concerning their meat purchasing and consumption behavior. Chi-squared statistics were used to test whether or not the responses of the four groups were significantly different.

Results of the descriptive statistics, chi-square analysis, and logit models provide an indication of how consumer demographic and socio-economic characteristics affect their willingness to pay and purchasing frequency of natural beef. The information will be important to determine which consumer segments will most likely purchase natural beef. Producers can market natural beef products more efficiently with this type of consumer information.

CHAPTER II

LITERATURE REVIEW

Declining Beef Demand

Consumers' Food Safety Concerns

Food safety is an important issue for most consumers. However, concern for pesticide, hormone, and antibiotic use in food products has recently become a more important factor that affects consumer purchases. Consumers are demanding food products that are safer for their families (Baker). Numerous studies have shown that certain consumer segments are willing to pay more for food safety attributes (Baker; Hayes et al.; Malone). Consumer concern for food safety has been found to be related to demographic and socioeconomic factors (Lin). In order to effectively position and market their products, producers need to know which consumers are more concerned about food safety (Givry).

Changing Consumer Demand

Schroeder, Marsh and Mintert have attributed the declining beef demand to increased health information, food safety concerns, and changing consumer demographics. Other factors such as changes in relative prices, product convenience and offering, product quality and consistency, and changing consumer preferences may have also contributed to the decline (Boland and Schroeder). When beef food safety recalls occur, beef demand tends to decline (Schroeder, Marsh, and Mintert). Consumers are

now becoming more concerned about the traceability of their meat products (Boland and Schroeder).

From 1982 to 1998, beef demand declined as a result of health information linking beef to higher cholesterol and heart disease (Schroeder, Marsh, and Mintert). As more health information has become available, beef demand has decreased; but pork and poultry demand have both increased (Schroeder, Marsh, and Mintert). Moon and Ward found that health concerns positively affected poultry, while both beef and pork were negatively impacted. Kinnucan et al. note that small percentage changes in the amount of health information available have larger impacts on meat consumption than the same small percentage change in relative prices. Conversely, Flake and Patterson also concluded that beef safety information has a modest impact on beef consumption.

According to Purcell, the poultry industry has benefited because consumers perceive chicken to be a healthier meat product than beef. The poultry industry may have provided a better response to the need for more convenient and healthy foods than the beef or pork sectors. In addition, the poultry sector could have been more capable of responding to consumer demands because of the vertically integrated nature of the industry.

Schroeder, Marsh, and Mintert note that changing consumer demographics have also caused beef demand to decrease. Consumers are demanding more convenient foods that take less time to prepare. From 1982 to 1998, the percentage of women in the labor force increased from 52 percent to 60 percent. As more women enter the labor force, the time available for food preparation declines. Since the poultry industry has created more quickly prepared foods, they have been positively affected by the decline in the time

available for food preparation. However, beef demand has been negatively affected because of a lack of convenient and “quick” beef products. As a result, some producers are looking for alternative markets for beef products. Producers are targeting consumers who are interested in specific attributes such as health, safety, and convenience (Schroeder, Marsh, and Mintert).

Previous Studies on Natural/Organic Products

Previous literature on the natural foods market is relatively scarce, but many of the factors affecting consumer decisions to purchase organic foods are related to the factors affecting consumer decisions to purchase natural foods. Therefore, previous research on organic foods is included to help gain a better understanding of the natural foods market.

Targeting Consumers of Organic/Natural Foods

According to Thompson and Kidwell, the organic market provides an example of a market that has grown because producers are providing products with specific attributes desired by consumers. Consumers are becoming interested in organic foods due to increased fears about pesticide residues. In 1997, organic food sales made up about 1 to 2 percent of total food sales in the U.S (Greene, 2000). Boland, Boyle, and Lusk note that much of the growth in organic sales has taken place in suburbs with high-income consumers.

Thompson and Kidwell conducted a study to explain why consumers choose to purchase organic versus conventional produce. They analyzed actual price premiums for

organic foods rather than hypothetical price premiums. Most previous studies measured consumer attitudes toward organic produce and did not measure actual purchase choices of organic produce. Thompson and Kidwell determined that the consumers' choice of store is closely linked to their choice to purchase organic versus conventional produce. In addition, consumers with children under the age of eighteen were much more likely to choose organic produce. However, consumers with graduate or professional degrees were not as likely to buy organic produce (Thompson and Kidwell).

According to Nayga, males are more likely than females to purchase irradiated foods, meats produced with antibiotics or hormones, and foods grown with approved pesticide levels. He notes that females are usually more concerned about food safety since they are frequently responsible for the households food and health concerns. Byrne et al. also concluded that females without a college degree and higher household incomes are the most likely to purchase organic produce.

Nayga found that income is positively related to the likelihood that consumers consider the use of irradiation, pesticides, hormones, and antibiotics to be safe. Govindasamy and Italia determined that smaller households with higher incomes are more likely to pay a higher price for organic produce. A study conducted by Misra, Huang, and Ott concluded that consumers over 60 years of age with household incomes greater than \$35,000 had the highest probability paying a premium for pesticide-free produce. However, Lin found that there was not a significant income effect on consumers' perception of the importance of food safety.

Govindasamy and Italia found that the majority of consumers are willing to pay a premium for organic produce. They also note that consumers' willingness to pay for

organic produce is impacted by socio-demographic characteristics. Younger households with women as the main meal planners are more likely to pay a 10 percent premium for organic produce. Research conducted by Malone showed that some consumers are willing to pay a significantly greater amount for food safety. Givry found that consumers' willingness to pay for natural beef was influenced by their attitude and awareness of natural beef. According to Eom, 65 percent of respondents in North Carolina would pay \$.35 per pound more for produce that was screened for pesticides. Eom found that "consumers were willing to pay substantially high price premiums for safer produce, in return for only small reductions in risk" (p. 769). However, Misra, Huang, and Ott showed that consumer resistance to purchasing organic foods increased as premiums for organic versus conventional food increased. Even though consumers say they are willing to pay more for safer produce, there is not much current evidence of this in the marketplace (Baker).

In a study conducted by Byrne et al., a majority of respondents chose organic over conventional produce. They also found that the majority of consumers believed that organic would cost more than conventional produce. In addition, consumers may not buy organic foods because they do not know that it exists or do not want to look for it outside of supermarkets (Byrne et al.). Consumers may be unwilling to make a special trip to a natural or health food store to purchase the natural/organic products. A "natural food store" is similar to a supermarket, but places more emphasis on natural and organic foods (Lohr and Semali). Thompson found store choice to be an extremely important variable in determining the likelihood of organic food purchases since organic products are not readily available in many supermarkets.

Organic/Natural Food Retailing

Most produce is not marketed based on low pesticide usage and many supermarkets do not currently carry organic produce. Consumers may not be expressing a strong demand for organic produce due to insufficient advertising and promotional activities, limited supply, improper pricing, or poor product placement. If these factors are affecting the demand for organic food, then producers will need to develop a better understanding of consumers to effectively market their products (Baker).

In order for organic foods to reach the average consumer, more penetration into conventional supermarkets will be required. Retailer attitudes that lower the probability of selling organic foods need to be altered so that product placement can be expanded into more supermarkets. However, some barriers may exist to introducing organic foods into supermarkets (Lohr and Semali). Richman found that the most common obstacles to organic success of supermarkets include finding timely and complete market information, pricing and marketing natural foods, and linking with natural foods suppliers. One of the most common problems of supermarkets is that they do not give the necessary support to natural foods. Poor product placement, bad pricing decisions, and low quality add to this situation. In addition, supermarket managers usually must build new relationships with natural foods suppliers, which takes much time and effort. They also have to educate their consumers on organic issues and provide the organic consumers with a different level of service (Richman).

In a study by Lohr and Semali, managers of natural food stores said they could obtain greater price premiums than supermarkets. This could be caused by the fact that supermarkets also carry lower priced nonorganic foods that constantly remind consumers

of the price premium. As more competition occurs between supermarkets and natural foods stores, problems such as out-of-stock foods and pressure to lower prices are expected to occur. Once organic food supplies start to increase, price premiums will probably decline. In addition, cost premiums for organic products at the wholesale level may also decline. However, in-store expenses and handling costs will probably stay the same or increase, which will cause the organic margin relative to conventional food to decline. As a result, managers may be reluctant to introduce organic foods into their supermarkets. (Lohr and Semali). Although there are several barriers for supermarkets to sell organics, many opportunities do exist for supermarkets.

Research by Lohr and Semali indicates that organic education programs are a cost-effective method of expanding market penetration without changing the price or cost premiums for organics. Organic education programs may be able to alter retailers' negative attitudes toward selling organic foods (Lohr and Semali). Richman notes that the best opportunities for supermarkets are to develop labels for natural foods and to hire special staff for natural foods. Richman conducted a survey of natural food stores and supermarkets and found that thirty-three percent of the natural food stores developed a natural foods label. Only five percent of the supermarkets had developed natural foods labels. In addition, fifty-eight percent of natural food stores indicated that they had hired special staff for natural foods, while only 13 percent of supermarkets had hired special staff.

Beef Marketing Efforts

Beef Product Attributes

According to Wesenberg, consumers make purchasing decisions based on product attributes that they consider to be important. Consumers derive utility not from consumption of the good itself, but from the attributes of the good (Lancaster). Beef quality is an extremely important attribute that affects consumers' purchasing behavior (Wesenberg). Menkhaus et al. (1993) found that consumers' perceptions of beef quality are influenced by four main categories of attributes: health, convenience, appeal, and merchandising. Consumers determine beef quality based on a variety of characteristics, which include: cholesterol, calories, sodium, artificial ingredients, microwaveability, packaging, display, and price. Schmitz and Nayga note that the expansion of beef sales may be limited because some consumers have a poor image of beef healthiness and price. However, beef is now being promoted as a more healthy and nutritional product (Givry). Skaggs et. al found that consumers were interested in leaner, low fat, healthy, and natural beef products. Yet beef products do need to be labeled appropriately so that consumers can see the nutritional and healthy qualities (Givry).

Consumers consider tenderness to be the most important palatability attribute of beef (Huffman et al. and Miller et. al). However, consumers are unsure if the beef they purchase will be tender since USDA quality grading standards do not give consumers a direct tenderness measurement. The decline in beef demand may be attributed to consumers' inability to differentiate between the quality of beef cuts available for purchase (Lusk).

Value-Added Beef Products

Barkema, Drabenstott, and Welch say that the food industry is beginning to target smaller niche markets since consumers are demanding more convenient and healthy foods. Streeter, Sonka, and Hudson note that many of the product characteristics of particular importance to consumers cannot be created during the marketing process, but must be created at the farm level. The traditional view that product differentiation is a function of the marketing process is being challenged. Producers and processors are finding more opportunities to add value by creating products with the specific attributes desired by consumers. However, producers and processors must recognize where the opportunities exist to add value. Boland, Boyle, and Lusk say that product differentiation will allow producers to produce customized or niche products for various market segments. However, producers need information on the product attributes that are most valued by consumers (Boland and Schroeder).

Marketing of Natural Beef

Changes in consumer tastes and preferences as well as low profits in the beef industry have prompted some producers to market natural beef products. In recent years, the use of growth promotants in livestock production has received considerable attention. Although the USDA has stated that residues from hormones administered in proper doses pose no threat to human health, some consumers are still not convinced (Kenney and Fallert). The recent success of niche markets for “natural” or “hormone-free” beef provides evidence that consumers are concerned about hormone use (Lusk and Fox). Currently about 95% of all cattle in the U.S. are implanted with growth hormones due to

increased production efficiency and decreased production costs. (Kenney and Fallert; Kuchler et al; Lusk and Fox).

However, producers are entering the organic/natural farming business as a method of capturing high premium prices and increasing farm income (Greene, 2000). The natural beef market is a niche market that is currently expanding. The U.S. Department of Agriculture defines natural as “a product containing no artificial ingredient or added color and is only minimally processed”. Recent work by Lusk and Fox shows that consumer demand does exist for differentiated beef products that are free of hormones and antibiotics. Skaggs et al. reports that there is a consumer segment interested in a branded, low fat and natural product. Yet the production of natural beef results in increased production costs due to feed, marketing costs, time investment, and lower carcass yield. When antibiotics and growth hormones are not used in beef production, average daily gains decline (Boland, Boyle, and Lusk). As reported in the *Angus Journal* by Mayer, it costs 25 percent more to produce natural beef than to produce regular beef. Therefore, natural beef producers will need higher revenues to offset the increased costs of production (Boland, Boyle, and Lusk).

Menkhaus et al. (1988) conducted a study to determine how a price premium on branded, low fat, fresh beef impacted sales. The study shows that a consumer segment will pay a higher price for a low fat and natural product. However, information is needed regarding consumer segments in Oklahoma, Kansas, and Texas that are willing to purchase natural beef products. Producers need to know how to effectively position their product to consumers. Grannis and Thilmany say that the target consumers must be able to recognize products that are hormone and antibiotic free or environmentally friendly.

Therefore, producers must utilize marketing and packaging methods that will make their products stand out to consumers.

Givry notes that although the organic produce market is expanding rapidly, the natural beef market may suffer due to poor availability, awareness, or a perception that the price is too high. Organic and natural products were only available at health food stores until the 1990's (Boland, Boyle, and Lusk). Natural/Organic foods are now becoming more common in conventional food stores, so sales should increase.

Previous studies have shown that there is a consumer segment willing to pay a higher price for natural beef products. However, these studies do not address the differences in consumer preferences for natural beef across metropolitan areas. This study will provide a cross-sectional assessment of consumer preferences for natural beef. In addition, consumers of natural/organic food stores or supermarkets that maintain a section of their stores for "natural foods" will be targeted because it is assumed that they have tastes and preferences that differentiate them from other food consumers. Previous research on natural beef has not been focused on natural/organic food stores. Producers can use the information for marketing decisions related to natural beef products.

Producer Alliances

Boland, Boyle, and Lusk say that natural beef producers need access to markets that will enable them to obtain a price premium for their products. To gain market access, producers must supply enough beef to meet the market demand at all times and establish a differentiated product for consumers through marketing services. Producers can add value by providing marketing services such as processing, labels, and packaging.

However, small producers may be unable do this without entering into a contract or joining an alliance (Boland, Boyle, and Lusk).

Contracts, alliances, and other non-price means of coordination may allow the beef industry to focus more on consumer demand. Hennessy says that the failure of markets to convey information to producers and processors is the main motive for vertical coordination. Producers and processors may decide to change the vertical organization of an industry because of imperfect markets in successive stages, the need to lower risk, and a desire to lower costs of transactions (Schrader). Vertical linkages can create more industry profits and reduce consumer search costs as a result of greater product differentiation (Lawrence et al.).

Richman notes that there is potential for contracts between supermarket retailers and producers of natural or organic foods. Through contracts, organic producers can lower their financial and marketing risks, but still provide the products that are demanded by consumers (Richman). Producers have also formed alliances to provide an adequate volume of organic or natural beef for supermarkets (Sartwelle).

Identifying Consumer Preferences

Contingent Valuation Method

The contingent valuation method is one of the standard approaches to valuing nonmarketed goods (Hanemann, Loomis, and Kanninen). Researchers generally use a survey to determine consumers' willingness to pay for the nonmarketed goods in dollar amounts. Respondents are presented with hypothetical situations in which they are able to buy a specific good (Mitchell and Carson). Representatives use surveys to obtain a

more representative sample of consumers than can be obtained from other methods. The survey respondents are usually selected from the same geographic area or possibly the same income level. The survey costs will vary since different types of questionnaires can be used (Churchill).

One of the main problems with conducting a survey is the validity of responses. Consumers could be influenced by various factors when answering a survey. The responses may be biased if consumers do not have the time or motivation to answer the survey. The design of the questionnaire could also affect the accuracy of the results. The responses will not be accurate if consumers do not fully understand the questions (Churchill). Respondents with varying backgrounds and levels of education may not equally understand simple questions or ideas. However, consumers' responses to the survey questions should represent valid willingness to pay responses as long as the survey is well designed (Mitchell and Carson).

Double-Bounded Dichotomous Choice Contingent Valuation

In this study, the Dichotomous Choice Contingent Valuation Method (DC-CVM) was used to elicit consumer responses to willingness to pay questions. In recent years, the DC-CVM has become a more popular method of contingent valuation. (Calia and Strazzer) The dichotomous choice method seems to better approximate markets that consumers are familiar with since the prices appear to be set by the seller and are not usually negotiable. It also lowers the possibility of respondents exaggerating their expressed willingness to pay amounts (Belzer and Theroux).

Consumers are faced with a hypothetical market situation, with a given price for each good, and asked to choose which good to accept (Yoo, Kwak, and Kim). Belzer and Theroux have identified several issues that can affect the accuracy of a contingent valuation study. The researcher must assure that the willingness to pay responses under these hypothetical situations accurately simulate behavior under real world conditions. If the situation appears to be hypothetical, then consumers may be more inclined to give hypothetical responses. Since the actual market or data do not usually exist, there is no way to ensure that respondents' give "real" answers. One of the more common problems with contingent valuation studies is the lack of effective budget constraints for consumers (Belzer and Theroux). Jamieson and Bass note that marketing researchers frequently observe actual purchase data that is far below the quantities consumers say they intend to purchase. As a result of this discrepancy, hypothetical willingness to pay usually exceeds actual willingness to pay and cannot be assumed to represent actual willingness to pay (Belzer and Theroux; Blumenschein et al.).

Since researchers do not have any clear evidence that consumers incorporate their opportunity costs into their responses, it is difficult to obtain useful economic information. Another issue is that respondents' need to have a clear understanding of the character of the commodity they are asked to value. By clearly defining the commodity, researchers can lower the extent to which consumers mistakenly value unspecified alternative commodities. The willingness to pay responses should be reliable and accurate estimates of the consumers' economic preferences (Belzer and Theroux).

The questions can be presented in either a single or double bounded framework. In the single bounded model, each respondent is asked one question. But in the double

bounded model, the respondents are faced with a second bid that is higher than the first if the answer was positive, and lower otherwise. Both models have advantages and disadvantages (Yoo, Kwak, and Kim). The double bounded dichotomous choice question, which was proposed by Hanemann, is used in this study.

For the double bounded model, the survey costs will generally be higher since the survey should be made either face-to-face or over the telephone. In addition, Herriges and Shrogren note that the response rate tends to decrease when follow-up questions are included in the survey. Respondents may be discouraged from responding to the survey when the questionnaire becomes more complex. As a result, the efficiency gains from follow-up questioning may be reduced and nonresponse bias may occur (Herriges and Shrogren). Nonresponse bias can occur when respondents do not answer certain important questions of the survey (Messonnier et al.) Consumers may also not have enough time to make valid responses to the double bounded questions (Herriges and Shrogren).

For the single bounded model, questionnaires can be mailed and respondents can take their time to answer the questions. The nonresponse rate would probably be reduced since respondents can fill out the questionnaire at their own convenience. Even though the double bounded model has several disadvantages, it seems to be preferred over the single bounded model by contingent valuation analysts. Hanemann et al. shows that the double bounded DC-CVM model is more asymptotically efficient than the single bounded model (Calia and Strazzera).

The double bounded model allows for more statistical efficiency since the series of willingness to pay questions allow the researcher to bracket the respondents

willingness to pay amounts between two of the monetary bid amounts (Yoo, Kwak, and Kim; Hutchinson et al.). Hutchinson et al. also agree that the double bounded model is more statistically efficient than the single bounded model since it allows the researcher to extract more information from each respondent. They also note that the double bounded model is especially advantageous when dealing with small sample sizes.

CHAPTER III

DESCRIPTION OF THE DATA

Methodology of the Survey

A consumer survey administered in three regional metropolitan areas was used as data for this study. Representatives of the Kerr Center for Sustainable Agriculture surveyed consumers in supermarkets catering to consumers of natural foods. The consultants began the surveys in November 2000 and finished in March 2001. The supermarkets chosen for this study were ones that maintain a section of their stores for “natural foods”. Stores from three geographic locations were chosen: two stores in the Oklahoma City metropolitan area, three stores in the Dallas/Ft. Worth metroplex, and three stores in the Kansas City metroplex (two in Kansas, one in Missouri). The surveys took place in stores that agreed to allow consumer sampling at their meat counters. A copy of the survey is presented in Appendix A.

Survey administrators asked primary household shoppers to voluntarily participate in the survey, which took no more than 3 minutes to complete. The questions addressed consumer meat purchasing behaviors, perceptions and preferences for natural beef, indicators of willingness-to-pay for natural beef cuts, and demographic characteristics of the household.

Survey Questions

Question 1. How informed are you about how meat (beef, chicken, pork) is raised and processed?

Responses: Not Informed, Somewhat Informed, Very informed

The hypothesis was that the majority of respondents would be somewhat informed about how meat is raised and processed since food safety has become a growing concern for most consumers. Consumers who were more informed about how meat is raised and processed were expected to have a greater willingness to pay for natural beef.

Question2. How important is it for you to know the retail meat you purchase can be traced back to the farm and animal of origin?

Responses: Not Important, Somewhat Important, Important, Very Important, Extremely Important

The hypothesis was that consumers who were concerned about the traceability of meat products would be more likely to pay for natural beef.

Question 3. How often do you check food ingredient labels for artificial additives or preservatives?

Responses: Never, Rarely, Occasionally, Frequently, Always

Consumers who frequently or always check labels will probably be more willing to pay for natural beef because they are likely to show a greater concern for the health/safety of food products. A 1995 FMI survey showed that consumer awareness of food nutrition labels increased from 38% to 43% from 1994 to 1995. The majority of respondents will probably check labels at least occasionally since the health/safety of food products has received considerable attention in recent years.

*Question 4. How often do you purchase a natural or organic food product?
Responses: Never, Rarely, Occasionally, Frequently, Always*

The hypothesis was that consumers who frequently or always purchase natural/organic food products would be more likely to purchase natural beef.

*Question 5. What is the factor that concerns you when you purchase beef products?
Responses: Label Ingredients, Taste & Tenderness, Brand Name, Price*

The respondents who said they frequently or always check labels (Question 3) should be more likely to say that label ingredients is the primary factor concerning beef purchases. Taste and Tenderness will probably be rated as an important factor concerning beef purchases since previous studies have shown that consumers consider tenderness to be the most important palatability attribute of beef (Huffman et al.; Miller et al.). Consumers with lower income levels were expected to be more concerned about price when purchasing beef products.

*Question 6. What image do you associate with all natural beef products?
Responses: Environment, No Antibiotics or Hormones Used in Production, Taste & Tenderness, Local Family Farms*

The hypothesis was that most consumers would associate the image of no antibiotics/hormones with all natural beef products. It was assumed that consumers would be somewhat informed about natural beef since the natural/organic market has recently experienced considerable growth and exposure.

Question 7. How interested are you in having more information available about the ingredients used in processed food/beef products?

Responses: Not Interested, Somewhat Interested, Interested, Very Interested, Extremely Interested

Most consumers will probably be interested in having more ingredient information available for processed food/beef products since food safety/health concerns have become more important. Consumers who were very or extremely interested in more ingredient information were expected to have a greater willingness to pay for natural beef.

Question 8. How often do you eat beef, pork, poultry, and fish products? (Please check the appropriate box on each line)?

Responses: Never Eat, Once per Week, Twice per Week, Three Times or More

Consumers were asked about their weekly consumption of beef, pork, poultry, and fish products. The hypothesis was that consumers who consume more poultry and fish products would be more likely to buy natural beef products.

Question 9. When you buy meat, which type do you most often buy?

Responses: Bone-in, Boneless

Consumers were asked if they buy more bone-in or boneless meat. The hypothesis was that consumers prefer boneless meat because it is more convenient due to quicker meal preparation.

Question 10. When you buy beef, which type of beef do you most often purchase?

Responses: Hamburger, Steak, Other

Consumers were asked if they buy more hamburger, steak, or other types of meat. Givry found that those who preferred natural beef were more likely to consume a larger amount of steak than those who preferred regular beef. The hypothesis was that

consumers who purchase more steak would show a greater willingness to pay for natural beef since steak is a higher priced beef product.

Question 11. When you buy hamburger, which type do you most often purchase?

Responses: 70-80% Lean, 80-90% Lean, Greater than 90% Lean

Consumers were asked about their preferences for hamburger that is 70-80% lean, 80-90% lean, or >90% lean. The hypothesis was that consumers who prefer hamburger that is greater than 90% lean would be more willing to pay for natural beef. Since these consumers pay a higher price for leaner hamburger meat, they may be more likely to pay a higher price for natural beef.

Question 12. When you buy steak, which type do you most often purchase?

Responses: Flank, Sirloin, KC Strip, Porterhouse, T-Bone, Rib Eye, Tenderloin, Other

Consumers were asked about the type of steak that they purchase more frequently. This may be related to their willingness to pay for natural beef. Consumers who prefer bone-in meat (Question 9) will probably purchase more T-bone steak.

Question 13. How would you rate these factors in your meat purchasing decision?

(Healthy/Safe, Convenient {easy to cook, to eat}, Appealing {attractive packaging, color, appearance}, Price)

Responses: 1=not important to 5=very important

Consumers were asked to rate how certain factors affected their meat purchasing decisions. The hypothesis was that consumers who were more concerned about health/safety would be more willing to purchase natural beef. Also, consumers who rated convenience as very important would be more likely to purchase chicken instead of beef since there are more convenient chicken products available on the market. Consumers

who rated price as very important were expected to be less likely to purchase natural beef.

Question 14. How would you rate beef, chicken, and pork on these product characteristics? (Cholesterol Content, Calorie Content, Sodium Content, Artificial Ingredients)

Responses: 1=very low to 5=very high content

Consumers were asked to rate beef, chicken, and pork on certain product characteristics. The hypothesis was that consumers would provide lower ratings on the characteristics for chicken than beef. Menkhaus et al. found that these product characteristics significantly affect consumers' quality perception of beef.

Question 15. How would you rate beef, chicken, and pork on these display characteristics? (Microwaveability, Packaging, Display in Store, Variety of the Products Available)

Responses: 1=very poor to 5=very good

The hypothesis was that consumers would give chicken a good rating and beef a poor rating on the microwaveability characteristic since there are more convenient chicken products on the market.

Question 16. When you purchase beef, how would you rate these factors? (Color, Presence of Marbling, Minimum External Fat, Tenderness, Good Packaging, Brand, Leanness, Sodium Content, Artificial Ingredients Content)

Responses: 1=not important to 5=very important

Since many consumers are now more concerned about the health/safety of their food products, it is assumed that that leanness, minimum external fat, sodium content, and artificial ingredients content will be rated as very important. In addition, brand will probably be rated as very important since consumers are usually concerned about the quality of their food products. Consumers typically associate a specific quality image with different brands.

After answering question 16, respondents were told to read the following description of all natural beef, and then proceed with the remaining parts of the survey. “Natural beef is a high quality beef product raised without any hormones or antibiotics. Family farmers and ranchers who produce natural beef are committed to agricultural production methods that ensure the protection and enhancement of natural resources and believe in humane treatment of animals.”

Question 17. Which of the following best describes your knowledge of all natural beef before you were read the description?

Responses: Never heard of All Natural Beef until now; Had heard of it, but didn't know much about it; Knew a lot about it

Consumers who said they knew a lot about natural beef will probably be more willing to pay for natural beef.

Question 18. When had you previously heard of or read about All Natural Beef?

Responses: Newspaper, In-store product samples, Promotional materials at the store, Other

Question 19. How often do you purchase All Natural Beef products?

Responses: Never, Occasionally, Frequently, Always

Consumers who frequently or always purchase natural beef products were expected to have a greater willingness to pay for natural beef.

Question 20. What other types of all natural products are you interested in?

Responses: Pork, Poultry, Vegetables

Question 21. Prior to being read the description, how would you have characterized your attitude to an “All Natural Beef label”?

Responses: Positive, Negative, Indifferent

Consumers who said they were more informed about natural beef (Question 17) should have a more positive attitude to an “All Natural Beef label”.

Question 22. After hearing the description, how would you now characterize your attitude to an “All Natural Beef label”?

Responses: Positive, Negative, Indifferent

Question 21 asked consumers about their attitude to an “All Natural Beef Label” after reading the description. It is possible to determine if the additional information will change consumers’ attitudes from an indifferent to a negative or positive response.

Questions 23-25.

Respondents were told to imagine that they are shopping for beef sirloin steak at their local supermarket. In questions 23-25, they can choose between Regular Beef Sirloin Steak and All Natural Beef Sirloin Steak.

Question 23. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$5.60 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$5.60 per pound

Question 24. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$5.00 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$5.00 per pound

Question 25. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$6.50 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$6.50 per pound

If the consumer chose Regular beef in question 23, then they were asked to go to question 24 and not to answer question 25. If the consumer chose All Natural Beef in question 23, they were asked to go to question 25 and not to answer question 24.

Consumers were not asked to write down a price or choose a price for natural beef. According to Givry, respondents may be confused if they are asked to write down a price or choose a price. The respondents would probably have chosen lower prices since consumers will always want to pay a lower price as long as product quality does not decline.

In the last section of the survey, consumers were asked questions about their age, gender, education, occupation, income, and number of children. Presence of children and female gender of respondent were expected to have positive influences on willingness to pay for natural beef. Older respondents with higher education levels were hypothesized to have a greater willingness to pay for natural beef since they will likely have stronger diet concerns. Higher household income levels were also expected to have a positive influence on willingness to pay for natural beef.

CHAPTER IV

RESULTS

The first step in analyzing the consumer data was a descriptive statistical analysis. The second step was to divide respondents into four groups based on their responses to the willingness to pay questions. Frequency tables were then computed to determine how each group answered questions concerning their meat purchasing and consumption behavior. Chi-squared statistics were used to test whether or not the responses of the four groups were significantly different. The third step was to estimate a multinomial logit model to determine factors that affect consumer willingness to pay for natural beef. An interpretation of each of these results is presented in this chapter.

Descriptive Statistics

Consumers from Kansas City (KC), Dallas/Ft. Worth (DFW), and Oklahoma City (OKC) were asked questions regarding their meat purchasing behavior. The responses from consumers in each of the three areas are presented in this section.

Question 1: Informed about Meat Processing

Overall, 2/3 of the respondents felt that they were somewhat informed about how meat is raised and processed (Table 4.1).

Table 4.1. Informed About Meat Processing (%)

	Not Informed	Somewhat Informed	Very Informed
KC (n=140)	19.30	60.00	20.71
DFW (n=212)	7.55	66.51	26.00
OKC (n=105)	13.33	76.20	10.50
TOTAL (n=457)	12.50	66.74	20.80

Question 2: Importance of Tracing Meat to Origin

About 3/4 of respondents in OKC, KC, and DFW said that it was important to extremely important to trace meat back to the animal or farm of origin (Table 4.2). There were more DFW respondents who said that it was either very important or extremely important to trace meat to the origin. Few of the respondents said that it was not important to trace meat to the origin.

Table 4.2. Importance of Tracing Meat to Origin (%)

	Not Important	Somewhat Important	Important	Very Important	Extremely Important
KC (n=140)	2.14	22.14	23.60	23.60	28.60
DFW (n=209)	2.90	15.80	19.14	32.10	30.14
OKC (n=105)	2.90	22.00	24.80	27.62	22.90
TOTAL (n=454)	2.64	19.20	21.81	28.41	28.00

Question 3: Check Labels

In Figure 4.1, the percentage of respondents who frequently or always check labels is shown. A large percentage of all respondents said they frequently or always check labels. However, respondents from DFW were more concerned about checking labels than respondents from OKC and KC. This is not surprising since, in question 2, more DFW respondents said that it was important to extremely important to trace meat to the origin. Consumers who frequently check labels are probably more concerned about

the health and nutrition of their food products. A previous study by FMI found that over 70 percent of consumers rated nutrition as the third most important factor after price and brand that affects product purchases. In this study, few respondents said that they never check labels (Table 4.3). A 1995 FMI survey showed that consumer awareness of food nutrition labels increased from 38% to 43% from 1994 to 1995. Also, about 34% of those who were aware of food nutrition labels said they had stopped purchasing a product as a direct result of something they had read on the label.

Figure 4.1. Supermarket Respondents Frequently/Always Check Labels

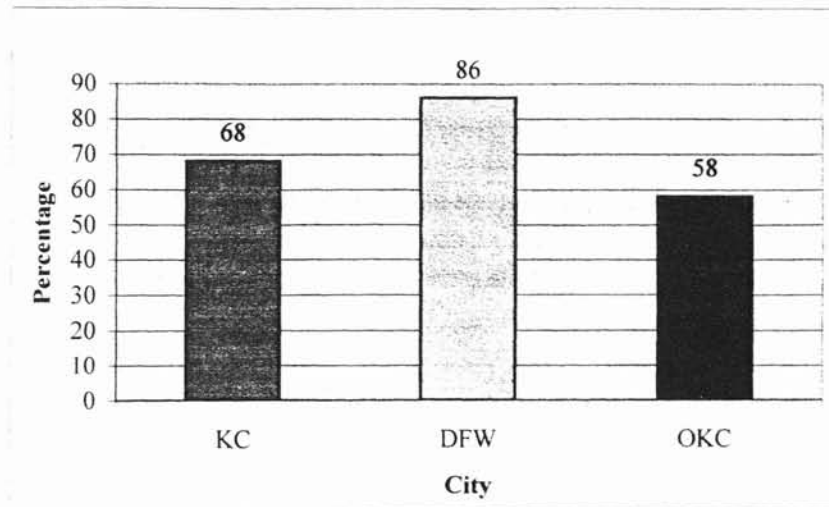


Table 4.3. How Often Consumers Check Labels (%)

	Never	Rarely	Occasionally	Frequently	Always
KC (n=140)	1.43	11.43	19.30	42.90	25.00
DFW (n=212)	0.50	2.83	10.85	40.60	45.30
OKC (n=105)	2.00	8.60	31.43	29.52	28.60
TOTAL (n=457)	1.10	6.80	18.20	38.73	35.23

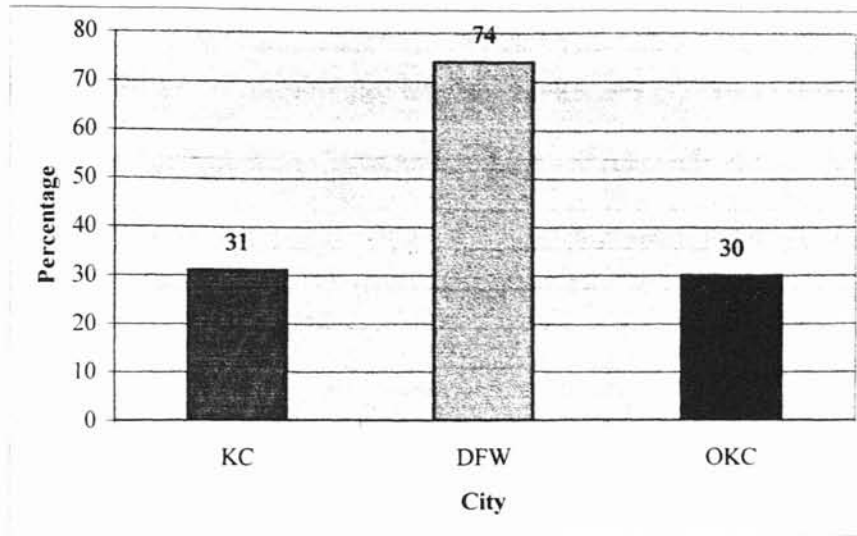
Question 4: Purchase Natural/Organic Food Products

Table 4.4 shows how often consumers purchase natural/organic food products. In KC and OKC, about 30% of the respondents said that they frequently or always purchase natural/organic food products. However, 74% of the DFW consumers surveyed said that they frequently or always purchase natural/organic food products (Figure 4.2). A very small percentage of DFW respondents said that they never purchase natural/organic food products. Therefore, DFW respondents seem to be more concerned about their health and safety since they purchase more natural/organic food products. The percentage of respondents from OKC and KC who said they rarely purchase natural/organic food products was 24.8% and 20%, respectively. The natural/organic food market may be larger in DFW or there may be differences in store chains since more of these respondents said that they frequently purchase natural/organic food products. The supermarket chain in DFW may be better geared to meet the needs of the DFW natural/organic consumers.

Table 4.4. Purchases of Natural/Organic Food Products (%)

	Never	Rarely	Occasionally	Frequently	Always
KC (n=140)	6.43	20.00	42.90	27.90	2.90
DFW (n=212)	0.50	4.70	20.75	59.43	14.62
OKC (n=105)	9.52	24.80	36.20	25.71	3.81
TOTAL (n=457)	4.40	14.00	31.10	41.01	8.53

Figure 4.2. Supermarket Respondents Frequently/Always Purchase Natural Food Products



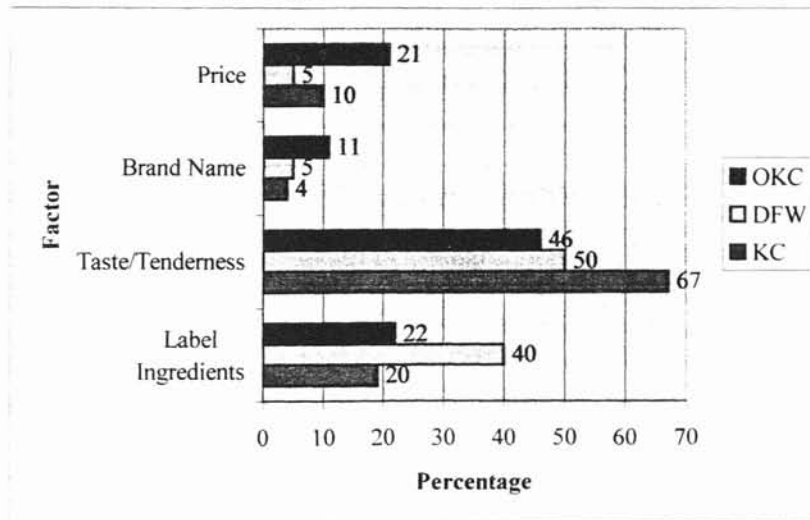
Question 5: Primary Factor Concerning Beef Purchases

Respondents in OKC, KC, and DFW said that taste/tenderness was the most important factor concerning beef purchases (Figure 4.3.) However, label ingredients were also considered to be an important factor for all respondents, especially those from DFW. This was not surprising since a large percentage of DFW respondents said they frequently check labels. OKC consumers considered price to be an important factor concerning beef purchases. For DFW consumers, price was not a significant factor. This was expected since 74% of DFW respondents said that they frequently or always purchase natural/organic food products, which are generally more expensive than similar products that are not certified as all natural or organic.

Respondents did not consider brand name to be an important factor affecting beef purchases. This is important information for producers or organizations of producers who may want to market their own branded beef products. OKC respondents were more

concerned about brand name than DFW or KC consumers, but they still didn't show a great concern (Figure 4.3). Therefore, there may not be enough demand for branded beef products in these areas or consumers just may not have much previous experience purchasing branded beef products. Branded products are relatively new to the beef industry and it may be too soon to determine if it is an important factor affecting beef purchases.

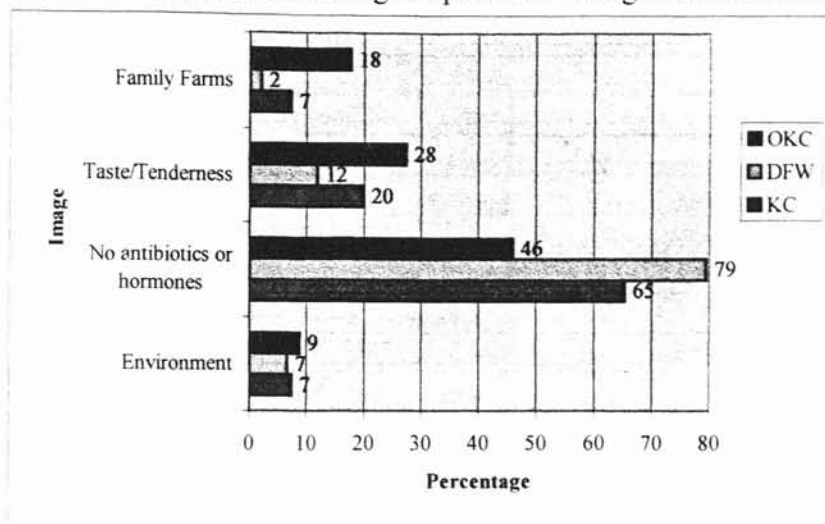
Figure 4.3. Factors Impacting Beef Purchases by Supermarket Respondents



Question 6: Image of Natural Beef

As shown in Figure 4.4, 67% of all respondents associated the image of no antibiotics/hormones with all natural beef products. However, 28% of respondents in OKC and 20% of respondents in KC associated the image of taste/tenderness with all natural beef products. It is interesting to note that about 18% of OKC respondents associated the image of natural beef with family farms, a considerable difference from responses received in KC or DFW (7% and 2% respectively).

Figure 4.4. Factors Influencing Respondents' Image of Natural Beef



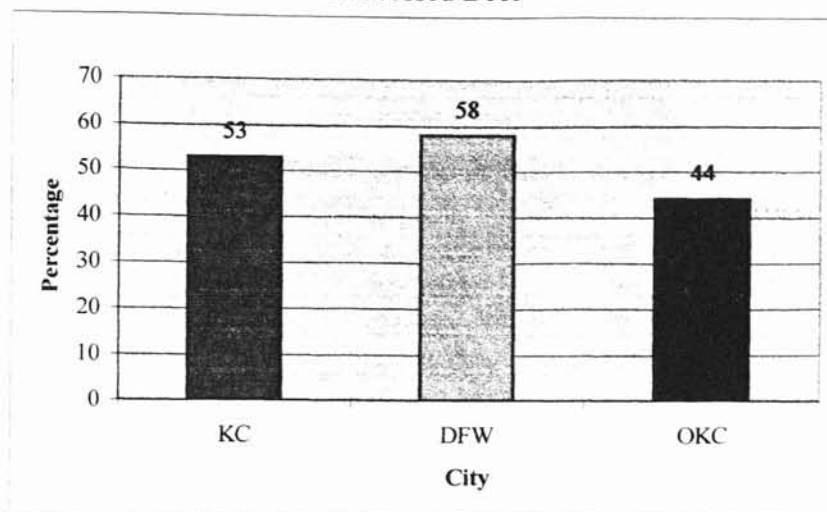
Question 7: More Information on Ingredients in Processed Beef Products

Most respondents were interested in having more ingredient information available for processed beef products (Table 4.5). As shown in Figure 4.5, respondents from OKC were slightly less interested in more ingredient information. More OKC respondents may believe that the processed beef products they consume are safe and therefore were not as interested in additional ingredient information.

Table 4.5. Interest in Ingredient Information on Processed Beef (%)

	Not Interested	Somewhat Interested	Very Interested	Extremely Interested
KC (n=139)	2.90	16.55	28.10	12.95
DFW (n=209)	5.25	11.00	25.40	29.70
OKC (n=104)	2.90	16.35	36.54	20.20
TOTAL (n=452)	4.00	13.94	28.80	22.35

Figure 4.5. Supermarket Respondents Very Interested in More Ingredient Information on Processed Beef



Question 8: Meat Consumption

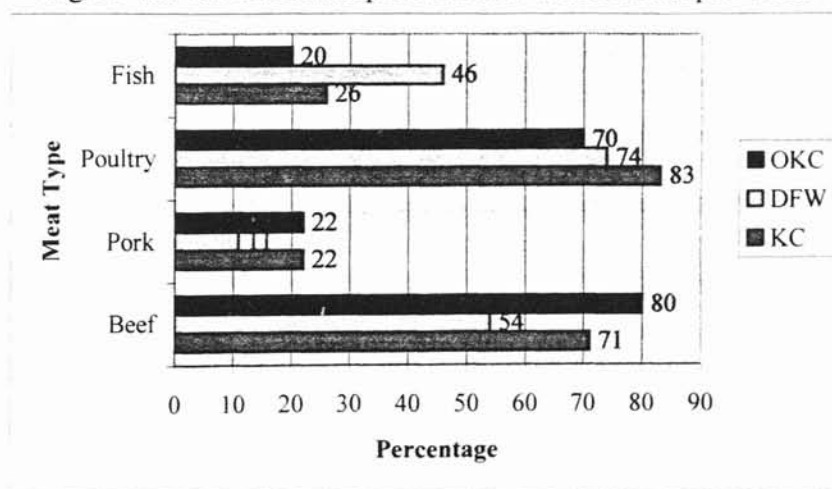
In question 8, respondents were asked how often they eat beef, pork, poultry, and fish products. Table 6 shows the frequency of meat consumption by all respondents. A majority of respondents from OKC said they consume beef three or more times per week (Figure 4.6). By comparison, more than 2/3 of the DFW respondents said they consume beef one or two times per week.

About 2/3 of all respondents consume chicken two or more times per week. DFW respondents said they consume almost twice as much fish as KC and OKC respondents. DFW respondents seemed to be more concerned about the health/safety of food products and may consume more fish since it may be healthier than other meats. Moon and Ward found that health information had a positive impact on fish consumption. Households that were more concerned about their fat and cholesterol intakes consumed less beef and pork and more fish and chicken. This could explain why DFW respondents consume a lower quantity of beef.

Table 4.6. Frequency of Meat Consumption (%)

	Never Eat	Once per Week	Twice per Week	Three or More
KC (n=136)				
Beef	2.16	27.34	38.85	31.65
Pork	14.18	63.43	18.66	3.73
Poultry	0.00	16.55	44.60	38.85
Fish	12.50	61.03	15.44	11.03
DFW (n=203)				
Beef	9.62	36.54	33.17	20.67
Pork	26.18	62.30	8.90	2.62
Poultry	1.93	23.67	37.20	37.20
Fish	8.33	45.59	30.88	15.20
OKC (n=102)				
Beef	0.00	20.39	21.36	58.25
Pork	17.17	60.61	20.20	2.02
Poultry	3.91	25.71	30.48	40.00
Fish	19.00	61.00	10.00	10.00
TOTAL (n=441)				
Beef	5.11	30.00	32.22	32.67
Pork	20.28	62.26	14.62	2.83
Poultry	1.77	21.95	37.92	38.36
Fish	12.05	53.86	21.36	12.73

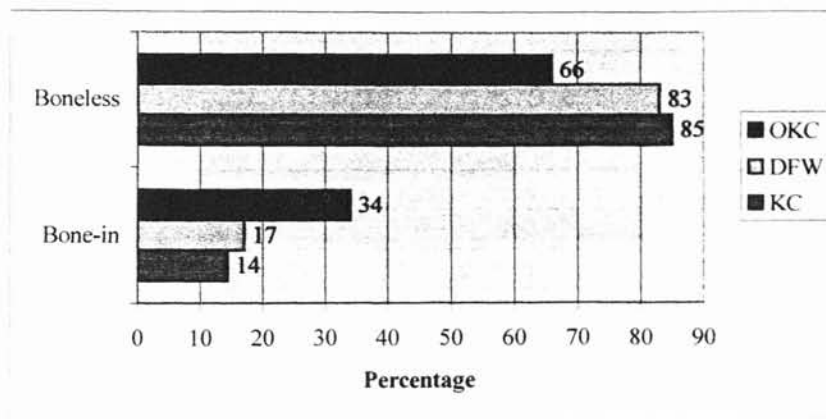
Figure 4.6. Meat Consumption Two or More Times per Week



Question 9: Preference for Bone-in or Boneless Meat

The majority of respondents in OKC, KC, and DFW preferred boneless meat (Figure 4.7). However, it is important to note that 34% of OKC consumers did prefer bone-in meat and therefore may possibly have a preference for T-bones.

Figure 4.7. Preferences for Bone-in or Boneless Meat



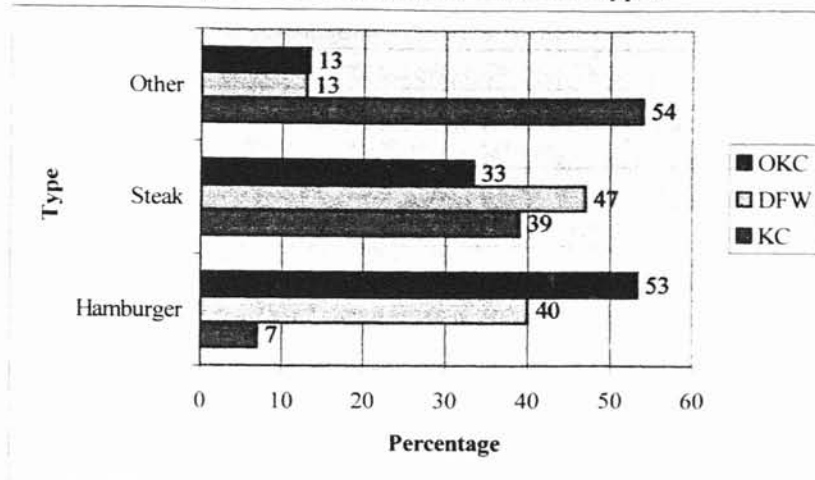
Question 10: Preferences for Meat Types

As shown in Table 4.7, a very small percentage of KC consumers preferred hamburger over steak, while about 53% of OKC consumers and 40% of DFW consumers preferred hamburger over steak. The percentage of consumers in DFW, KC, and OKC who preferred steak was 47.4%, 38.41%, and 33.33%, respectively. The majority of respondents in KC preferred meat other than hamburger or steak (Figure 4.8). Respondents were not asked to list the specific “other” types of meat preferred. However, it is likely that KC respondents may prefer roasts or ribs since these are other popular meat types.

Table 4.7 Preferences for Meat Types

	Hamburger	Steak	Other
KC (n=134)	7.25	38.41	54.35
DFW (n=192)	40.10	47.40	12.50
OKC (n=105)	53.33	33.33	13.33
TOTAL (n=431)	40.84	47.33	11.83

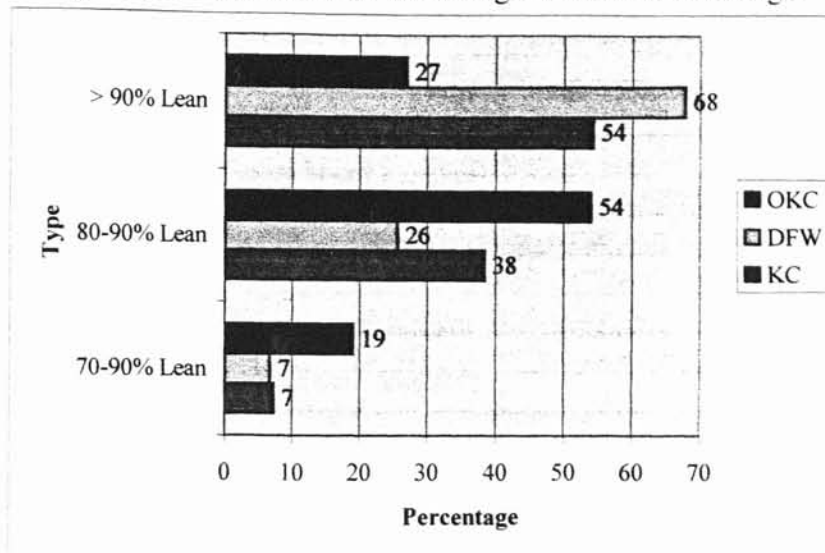
Figure 4.8. Preferences for Meat Types



Question 11: Preferences for Percentage of Lean in Hamburger

As shown in Figure 4.9, the majority of OKC respondents preferred 80-90% lean hamburger meat, while 54% of KC respondents and 68% of DFW respondents preferred >90% lean. It was expected that a larger percentage of DFW respondents would prefer >90% lean hamburger since they seemed to be more concerned about their health and more willing to pay a higher price for healthier and safer food products. About 20% of OKC respondents preferred hamburger that was 70-80% lean. This could be due to the fact that OKC respondents were more price sensitive and may purchase lower priced (i.e. higher fat) hamburger. In addition, OKC respondents may be less concerned about fat and cholesterol from red meat and therefore were not interested in purchasing leaner hamburger meat.

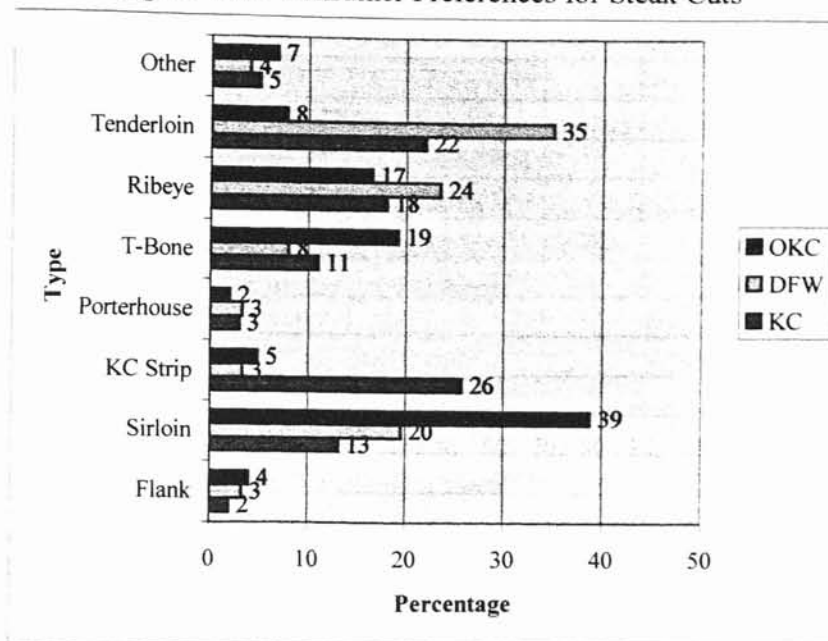
Figure 4.9. Preferences for Percentage of Lean in Hamburger



Question 12: Preferences for Steak Cuts

Figure 4.10 shows consumer preferences for the eight types of steak cuts. Consumer preferences for steak cuts varied significantly in each of the three states. The types of steak cuts that respondents preferred the least were Flank, Porterhouse, and Other. In DFW, the top steak cuts were Tenderloin, Ribeye, and Sirloin. However, in OKC, the top cuts of steak were Sirloin, T-Bone, and Ribeye. It is not surprising that OKC respondents chose T-Bone as a top steak cut since, in question 9, 34% of OKC respondents said they prefer bone-in meat. Respondents from KC chose KC Strip, Tenderloin, and Ribeye as their top three choices.

Figure 4.10. Consumer Preferences for Steak Cuts



Question 13: Factors Affecting Meat Purchases

In question 13, consumers were asked to rate factors that affect their meat purchasing decisions. The rating scale was 1-5 with 1 for not important and 5 for very important. Figure 4.11 shows that almost all of the respondents gave the health/safety factor a rating of either 4 or 5. However, a large number of respondents rated the other three factors as being important or very important as well. More respondents from OKC were concerned about the price factor (Table 4.8), which is not surprising based on their responses to questions 5 and 11. KC and DFW respondents were more concerned about the convenience factor than OKC respondents. Price was the least important factor for DFW respondents. This was expected since 74% of DFW respondents said they frequently or always purchase natural/organic food products, which are generally more expensive than “regular” food products.

Figure 4.11. Important or Very Important Factors Affecting Meat Purchases

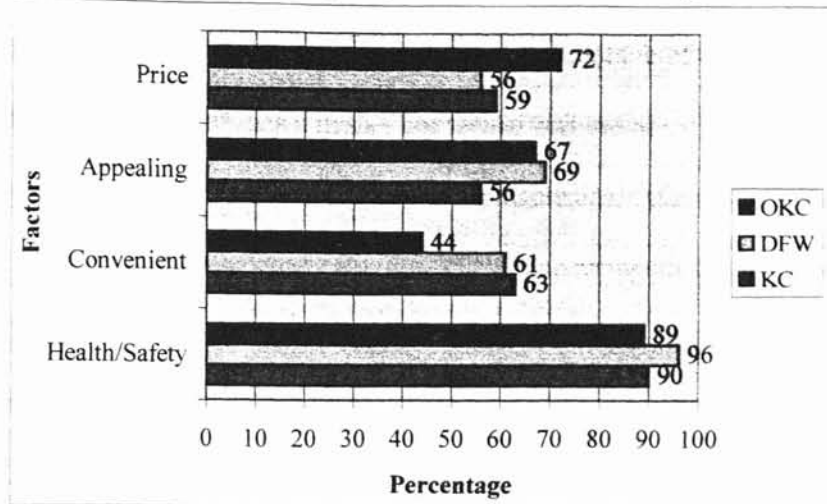


Table 4.8. Ratings of Factors Affecting Meat Purchases (%)

	1	2	3	4	5
KC (n=140)					
Health/Safety	0.00	0.71	9.30	12.90	77.14
Convenient	2.14	7.90	27.14	37.14	25.71
Appealing	1.44	8.63	23.74	30.94	25.25
Price	5.71	5.71	29.30	31.43	27.90
DFW (n=199)					
Health/Safety	1.00	0.00	2.91	10.68	85.44
Convenient	7.70	10.30	21.03	40.00	21.03
Appealing	8.21	6.15	16.41	40.00	29.23
Price	5.50	8.50	32.50	32.50	21.00
OKC (n=104)					
Health/Safety	0.95	0.00	9.52	15.24	74.30
Convenient	5.83	10.70	19.42	17.90	26.21
Appealing	10.70	2.91	18.45	26.21	40.80
Price	1.00	4.85	22.33	25.24	46.60
TOTAL (n=442)					
Health/Safety	0.67	0.22	6.43	12.42	80.30
Convenient	5.50	9.60	22.60	38.60	23.74
Appealing	6.64	6.20	19.22	33.90	33.90
Price	4.51	6.80	29.12	30.50	29.12

Question 14: Meat Nutritional Characteristics

Consumers rated beef, chicken, and pork on cholesterol content, sodium content, calorie content, and artificial ingredients. The rating was based on a scale of 1 to 5, with 1 for very low content and 5 for very high content. Consumer preferences for food products are affected by their perceptions of these and other nutritional characteristics (Menkhaus et al., 1993). Consumers make decisions about product consumption based on their nutritional perceptions and knowledge about particular products. Consumers usually rate nutrients they want to avoid as most important. They want to avoid purchasing products containing certain nutrients, such as fat, cholesterol, calories, and sodium (Piedra, Schupp, and Montgomery).

Beef

Respondents from the three states provided about the same rating for each beef characteristic. Figure 4.12 shows the percentage of respondents who said that beef has a high content of each of the product characteristics. The factor that was rated the highest by all respondents was cholesterol. A large number of respondents also said that beef has high calorie content. However, respondents did not believe that beef has high sodium content. Table 4.9 shows the percentage of all responses for each beef characteristic. KC respondents seemed to think that beef had the lowest sodium content.

Figure 4.12. High Content Ratings of Product Characteristics of Beef

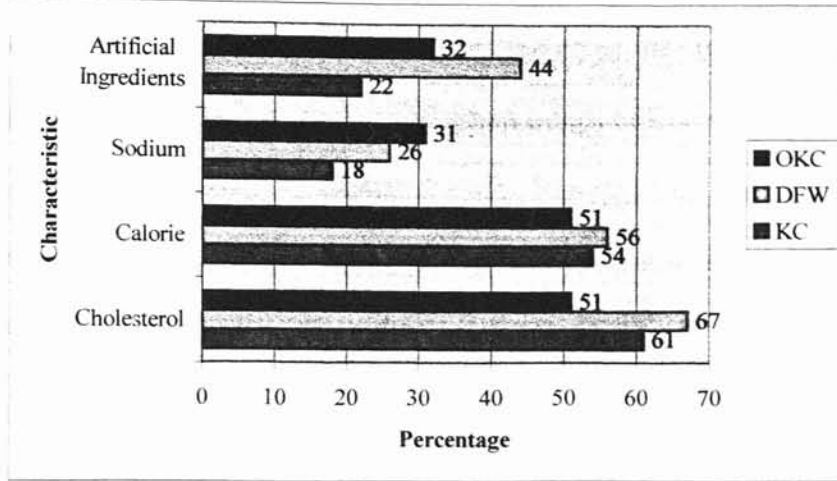


Table 4.9. Ratings of Beef Nutritional Characteristics (%)

	1	2	3	4	5
KC (n=136)					
Cholesterol	3.70	2.21	33.10	41.20	19.85
Calorie	5.20	7.41	33.33	37.80	16.30
Sodium	15.44	20.60	45.60	14.00	4.41
Artificial Ingredients	20.00	20.00	37.80	14.10	8.15
DFW (n=192)					
Cholesterol	5.00	3.00	24.50	34.50	33.00
Calorie	4.10	6.63	33.70	35.71	20.00
Sodium	13.60	22.83	38.04	12.00	13.60
Artificial Ingredients	18.30	16.70	21.00	24.20	19.90
OKC (n=101)					
Cholesterol	3.92	6.90	38.24	27.45	23.53
Calorie	3.00	4.95	41.60	31.70	18.81
Sodium	15.84	19.80	33.70	19.80	10.90
Artificial Ingredients	24.24	18.20	25.25	18.20	14.14
TOTAL (n=428)					
Cholesterol	4.34	3.65	30.40	34.93	26.71
Calorie	4.20	6.50	35.42	35.42	18.52
Sodium	14.73	21.40	39.43	14.50	10.00
Artificial Ingredients	20.24	18.10	27.40	19.52	14.80

Pork

Respondents from all three states also provided about the same rating for each pork characteristic. However, a slightly smaller percentage of KC respondents said that pork has a high content of each of the characteristics (Figure 4.13). Overall respondents thought that pork had the highest content of cholesterol as compared to the other characteristics (Table 4.10).

Figure 4.13. High Content Ratings of Product Characteristics of Pork

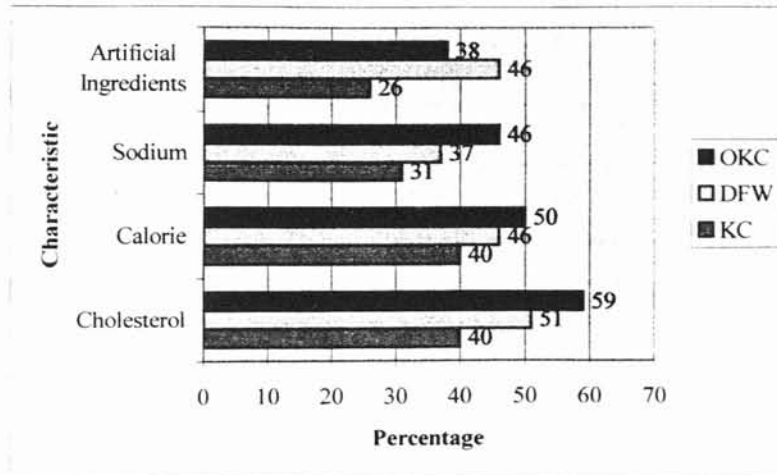


Table 4.10. Ratings of Pork Nutritional Characteristics (%)

	1	2	3	4	5
KC (n=133)					
Cholesterol	4.50	12.70	41.80	23.90	17.20
Calorie	5.60	9.02	45.90	30.10	9.80
Sodium	9.85	15.15	42.42	19.70	12.90
Artificial Ingredients	14.30	20.30	39.10	13.53	12.80
DFW (n=179)					
Cholesterol	4.84	11.83	31.72	25.30	25.81
Calorie	5.50	8.80	39.60	26.40	19.80
Sodium	11.70	14.62	36.84	16.40	20.50
Artificial Ingredients	15.43	16.60	22.30	23.43	22.30
OKC (n=98)					
Cholesterol	3.03	13.13	24.24	28.30	31.31
Calorie	3.10	7.14	39.80	23.50	26.53
Sodium	10.20	12.24	31.63	19.40	26.53
Artificial Ingredients	19.60	13.40	28.80	16.50	21.65
TOTAL (n=410)					
Cholesterol	4.30	12.41	33.20	25.54	24.34
Calorie	4.84	8.50	41.65	26.90	18.20
Sodium	10.72	14.21	37.41	18.20	19.45
Artificial Ingredients	16.05	17.04	29.40	18.52	19.01

Chicken

Overall, respondents said that chicken had a much lower content of each of the characteristics than beef or pork. A small percentage of consumers said that chicken has a high cholesterol, calorie, and sodium content (Figure 4.14). The largest percentage of respondents said that chicken has a high content of artificial ingredients. In KC, fewer consumers said that chicken has a high content of each of the product characteristics as compared with consumers in OKC and DFW. Therefore, KC respondents may believe that chicken is healthier than beef or pork. Table 4.11 shows the percentage of all responses for each chicken characteristic.

Figure 4.14. High Content Ratings of Product Characteristics of Chicken

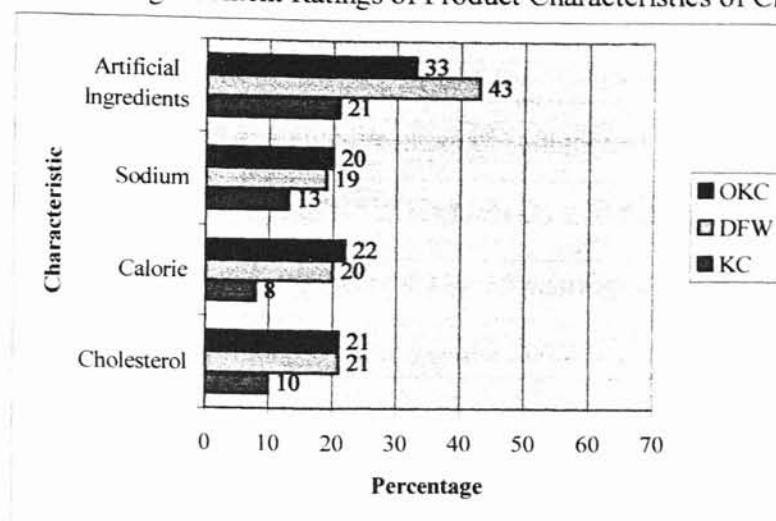


Table 4.11. Ratings of Chicken Nutritional Characteristics

	1	2	3	4	5
KC (n=135)					
Cholesterol	22.22	40.00	27.41	5.93	4.44
Calorie	15.80	41.35	34.52	6.02	2.30
Sodium	17.65	32.35	36.03	11.80	1.50
Artificial Ingredients	20.44	22.63	36.50	11.70	8.80
DFW (n=194)					
Cholesterol	16.34	40.10	22.30	6.44	14.85
Calorie	11.30	31.80	37.44	10.80	8.72
Sodium	16.60	27.30	37.43	6.95	11.80
Artificial Ingredients	18.42	17.90	21.05	21.05	21.60
OKC (n=99)					
Cholesterol	10.90	13.70	34.65	10.90	9.90
Calorie	6.93	26.73	44.50	12.90	8.91
Sodium	19.40	17.35	42.90	11.22	9.20
Artificial Ingredients	21.65	16.50	28.90	20.62	12.37
TOTAL (n=428)					
Cholesterol	16.90	38.60	26.71	7.31	10.50
Calorie	11.70	33.60	38.23	9.80	6.80
Sodium	17.60	26.60	38.24	9.50	7.84
Artificial Ingredients	19.81	19.10	27.83	17.92	15.33

Comparison of Responses for Beef, Pork, and Chicken

As illustrated in Figures 4.15- 4.17, a larger percentage of respondents in OKC, KC, and DFW said that pork has a higher content of sodium and artificial ingredients than beef. A fairly large percentage of DFW respondents said that all of the meats had a high content of artificial ingredients (Figure 4.16). The ratings of meat characteristics of OKC respondents were very similar to the ratings by DFW respondents (Figure 4.17). However, a larger percentage of DFW respondents said that beef has a high content of cholesterol.

Figure 4.15. High Content Ratings of Meat Characteristics for KC Consumers

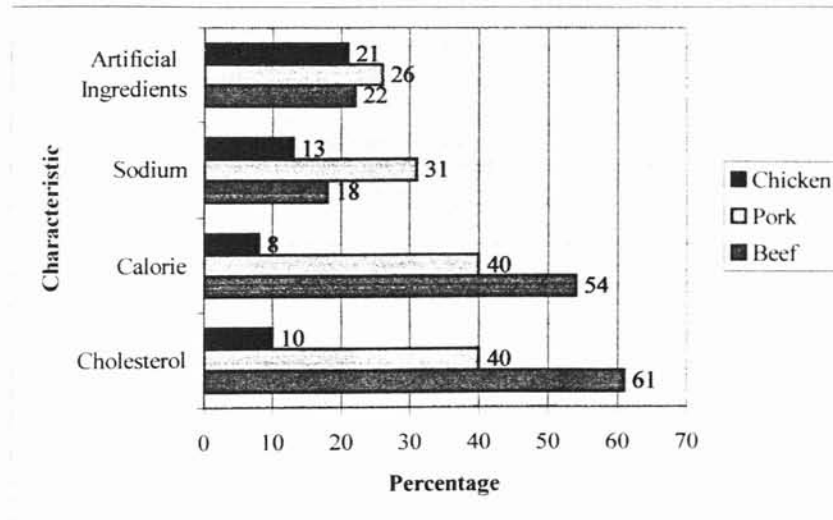


Figure 4.16. High Content Ratings of Meat Characteristics for DFW Consumers

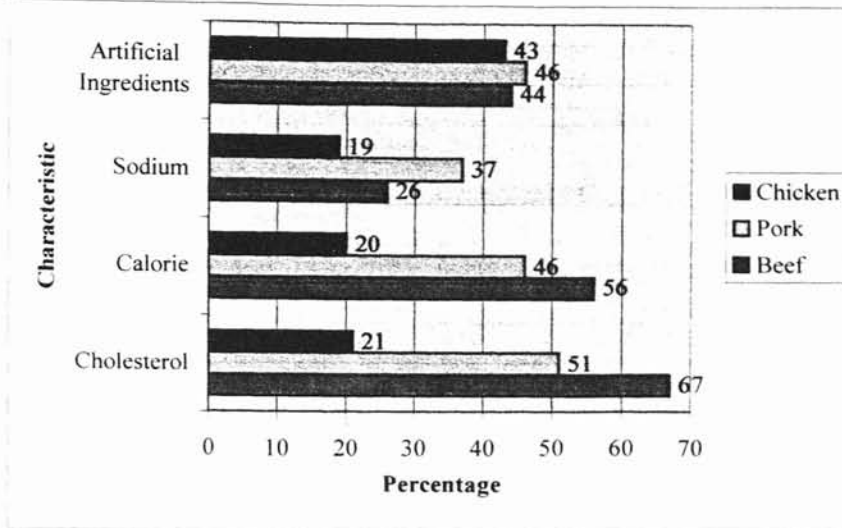
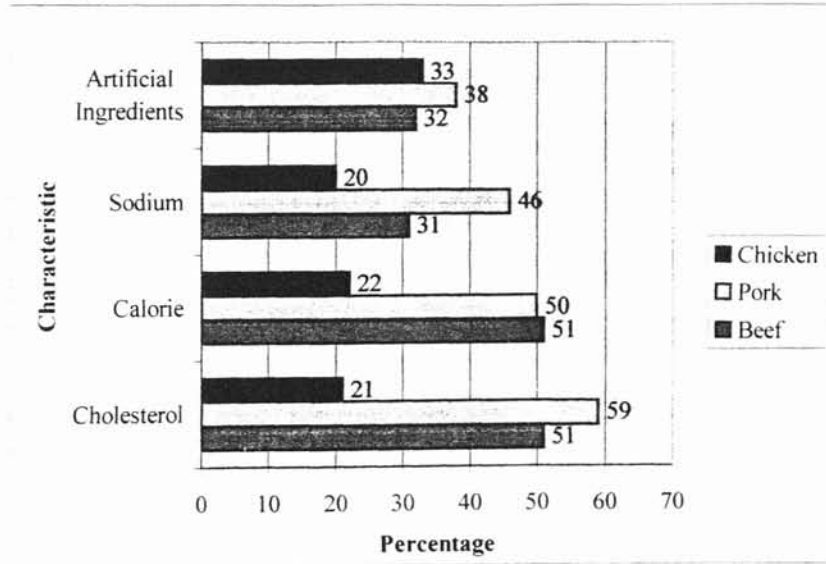


Figure 4.17. High Content Ratings of Meat Characteristics for OKC Respondents



Question 15: Meat Display Characteristics

Consumers rated beef, chicken, and pork on microwave, packaging, display, and variety characteristics. The rating was based on a scale of 1 to 5, with 1 for very poor and 5 for very good. The responses were very similar for consumers from each state.

Consumer perceptions of these convenience and display characteristics affect perceived quality and preferences for food products (Menkhaus et al., 1993).

Beef

Figure 4.18 shows the percentage of respondents from each state that provided a 4 or 5 rating for each beef characteristic. Few respondents assigned beef with a good rating for the microwave characteristic. In question 13, a large percentage of respondents said that convenience was an important factor affecting meat purchases. Therefore, the poor rating for the microwave characteristic may affect beef purchases. Consumer perceptions of beef quality may be improved if more convenient beef products are marketed (Menkhaus et al., 1993). Table 4.12 shows the percentage of all ratings for the beef characteristics.

Figure 4.18. Important Display Characteristics for Beef

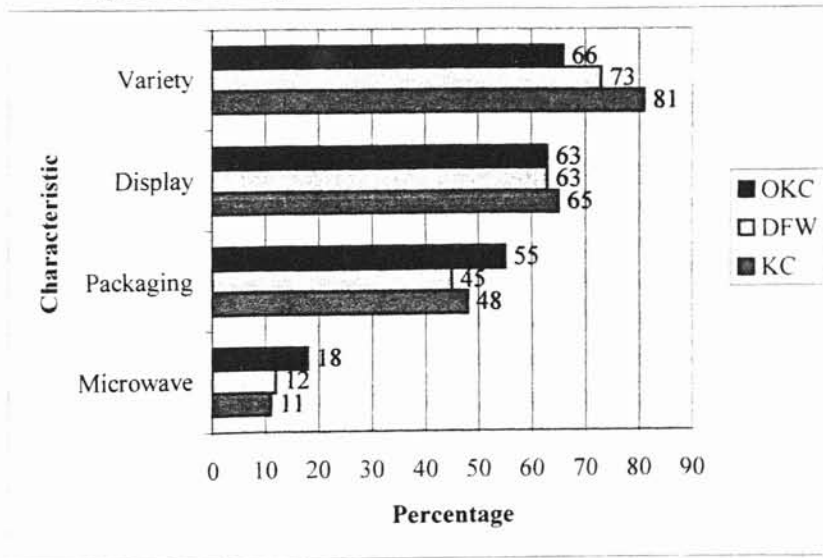


Table 4.12. Ratings of Beef Display Characteristics (%)

	1	2	3	4	5
KC (n=131)					
Microwave	55.40	18.50	14.62	8.50	3.10
Packaging	2.33	7.00	42.64	23.40	21.71
Display	2.30	4.51	27.82	37.60	27.82
Variety	1.54	1.54	16.15	37.70	43.10
DFW (n=182)					
Microwave	49.72	19.00	19.00	7.82	4.50
Packaging	5.03	11.73	38.00	31.84	13.41
Display	2.20	5.50	29.12	40.70	22.53
Variety	2.15	3.80	21.00	37.63	35.50
OKC (n=98)					
Microwave	41.84	20.41	19.40	9.20	9.20
Packaging	2.10	6.20	32.00	32.00	27.84
Display	2.04	4.10	30.61	34.70	28.60
Variety	3.10	8.20	22.45	29.60	36.73
TOTAL (n=411)					
Microwave	49.63	19.20	17.70	8.35	5.20
Packaging	3.50	8.90	38.02	30.12	19.51
Display	2.20	4.84	29.10	38.30	25.70
Variety	2.20	4.11	19.81	33.75	38.20

Pork

As shown in Figure 4.19, the ratings for pork characteristics were very similar for consumers from each state. Few respondents gave pork a good rating for the microwave characteristic. However, more respondents from OKC provided a good rating for the microwave characteristic. Table 4.13 shows the percentage of all ratings for the pork characteristics.

Figure 4.19. Important Display Characteristics for Pork

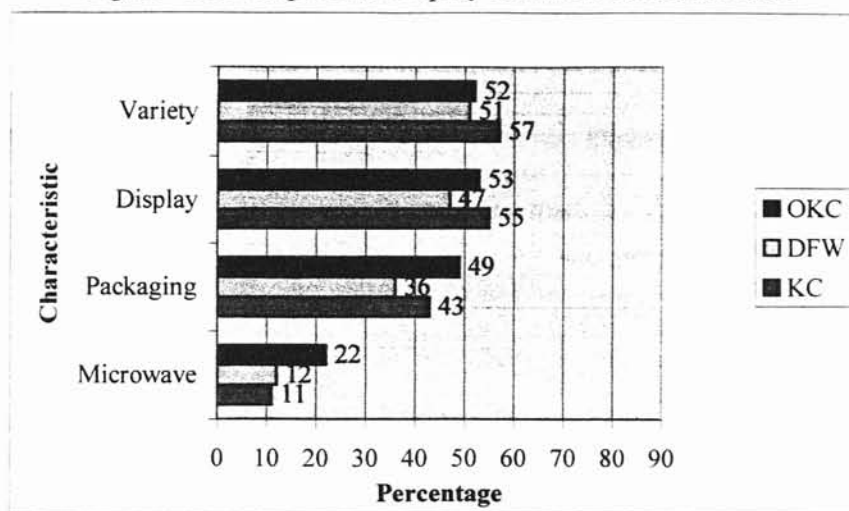


Table 4.13. Ratings of Pork Display Characteristics (%)

	1	2	3	4	5
KC (n=128)					
Microwave	50.00	21.90	17.20	8.60	2.34
Packaging	3.15	7.90	45.70	23.62	19.70
Display	2.31	8.50	34.62	33.85	20.80
Variety	2.40	5.51	34.65	28.35	29.13
DFW (n=173)					
Microwave	50.90	16.40	210.50	8.20	3.51
Packaging	9.30	10.50	44.20	26.74	9.30
Display	4.62	11.00	37.60	31.21	15.61
Variety	5.11	11.93	31.82	26.70	24.43
OKC (n=95)					
Microwave	42.71	20.83	14.60	14.60	7.30
Packaging	4.30	9.60	37.23	27.70	21.30
Display	5.30	7.40	34.74	31.60	21.05
Variety	5.30	13.70	28.42	24.21	28.42
TOTAL (n=396)					
Microwave	48.61	19.24	18.23	9.90	4.05
Packaging	6.11	9.41	43.00	25.95	15.52
Display	4.02	9.30	35.93	32.20	18.60
Variety	4.30	10.30	31.91	36.63	26.90

Chicken

More respondents provided chicken with a good rating for the microwave characteristic than beef or pork (Figure 4.20). This was expected since there is a larger quantity of microwaveable chicken products on the market. Table 4.14 shows the percentage of all ratings for the chicken characteristics.

Figure 4.20. Important Display Characteristics for Chicken

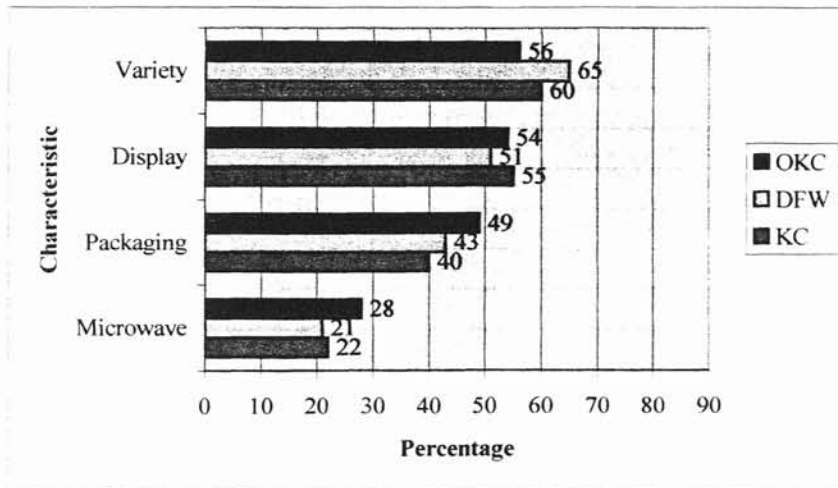


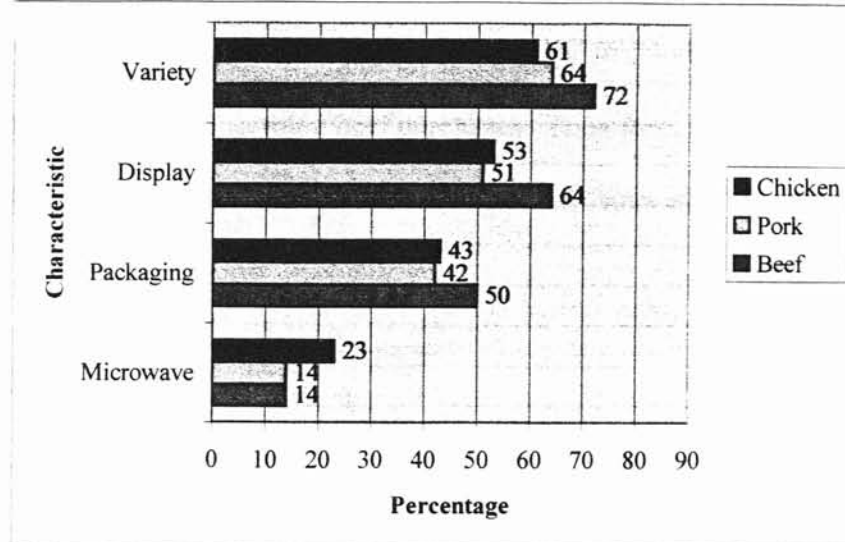
Table 4.14. Ratings of Chicken Display Characteristics (%)

	1	2	3	4	5
KC (n=132)					
Microwave	43.10	18.50	16.15	13.85	8.50
Packaging	3.10	6.20	50.40	22.50	17.83
Display	2.30	9.80	33.10	21.60	23.31
Variety	3.10	10.10	27.13	24.81	34.90
DFW (n=181)					
Microwave	44.70	14.00	20.11	11.20	10.10
Packaging	5.10	14.70	37.30	27.70	15.25
Display	2.80	9.40	36.50	30.94	20.44
Variety	1.62	7.03	26.50	32.43	32.43
OKC (n=98)					
Microwave	39.20	12.40	20.62	12.40	15.50
Packaging	3.10	10.20	38.80	23.50	24.50
Display	2.02	9.10	35.35	29.30	24.24
Variety	3.03	11.11	29.30	21.21	35.35
TOTAL (n=411)					
Microwave	42.90	15.02	19.00	12.32	10.84
Packaging	3.40	10.90	41.83	25.00	18.32
Display	2.42	9.44	35.11	30.75	22.30
Variety	2.42	9.00	27.40	27.40	33.90

Comparison of Ratings for Beef, Pork, and Chicken

It is interesting to note that all respondents provided beef with a better rating for variety, display, and packaging than pork or chicken (Figure 4.21), even though the chicken and pork industries have been more innovative in responding to the changing consumer demands. This is good news for the beef industry as it examines opportunities to provide consumers with more varieties of products.

Figure 4.21. Important Meat Display Characteristics for All Respondents



Question 16: Factors Affecting Beef Purchases

Respondents were asked to rate the importance of several factors affecting beef purchases. The factors included: color, presence of marbling, minimum external fat, tenderness, good packaging, brand, leanness, sodium content, and artificial ingredients content. The respondents providing a ranking of 1 to 5, with 1 for not important and 5 for very important. Table 4.15 shows the percentage of all ratings by respondents.

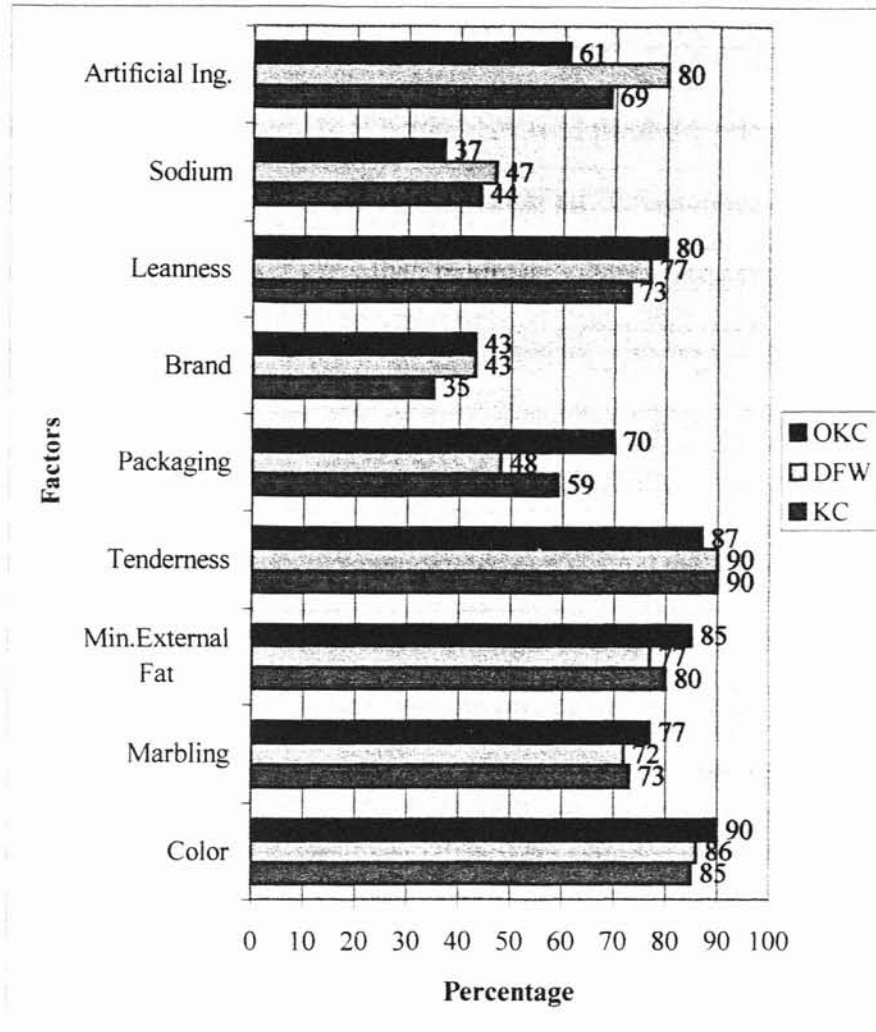
The responses indicated that almost all of the factors were important or very important (Figure 4.22). The factors that were not considered to be as important when making purchasing decisions were brand and sodium. However, respondents did comment that their knowledge about sodium content was low. So this could explain why they do not consider this factor to be as important as the others. Brand was not expected to be an important factor since few respondents said that brand was a factor concerning beef purchases in question 5.

The most important factors were tenderness (known by previous purchasing experience) and color. In question 5, tenderness was chosen by the majority of respondents as the factor concerning beef purchases. Therefore, it was expected that respondents would rate tenderness as the most important factor affecting beef purchases.

Table 4.15. Ratings of Factors Affecting Beef Purchases (%)

	1	2	3	4	5
KC (n=136)					
Color	0.00	2.22	14.10	25.20	58.52
Marbling	2.94	4.41	19.12	36.03	37.50
Min. Ext. Fat	2.21	3.70	14.00	30.15	50.00
Tenderness	0.74	1.50	8.10	27.94	61.80
Packaging	3.73	6.72	30.60	29.10	29.85
Brand	15.44	16.91	32.35	22.80	12.50
Leanness	3.70	3.70	19.12	29.41	44.12
Sodium	9.60	14.00	32.35	27.21	16.91
Artificial Ingredients	5.15	8.10	18.40	25.74	42.65
DFW (n=192)					
Color	2.62	1.60	9.95	28.80	57.10
Marbling	2.12	6.90	19.05	31.22	40.74
Min. Ext. Fat	4.12	3.10	16.00	27.84	49.00
Tenderness	1.05	1.05	7.33	31.41	59.20
Packaging	9.50	10.00	32.11	27.90	20.53
Brand	14.74	17.40	24.21	28.42	15.30
Leanness	4.10	6.15	12.82	29.74	47.20
Sodium	8.95	12.63	30.53	20.53	27.40
Artificial Ingredients	7.22	2.60	10.31	21.13	28.80
OKC (n=104)					
Color	1.90	0.95	7.63	23.70	62.90
Marbling	6.80	1.00	15.53	42.72	34.00
Min. Ext. Fat	1.92	4.81	8.65	31.73	52.90
Tenderness	0.95	1.90	9.52	37.14	50.50
Packaging	31.81	31.81	21.90	26.70	43.81
Brand	17.50	12.62	26.21	23.30	20.40
Leanness	3.00	3.00	13.90	35.60	44.55
Sodium	7.80	17.50	37.90	13.60	23.30
Artificial Ingredients	6.80	5.83	26.21	15.53	45.63
TOTAL (n=431)					
Color	1.62	1.62	10.70	27.15	58.93
Marbling	3.50	4.70	18.22	35.51	38.10
Min. Ext. Fat	3.00	3.70	13.60	29.50	50.23
Tenderness	0.93	1.40	8.10	31.71	57.90
Packaging	6.30	7.50	29.14	58.00	29.14
Brand	15.62	16.10	27.30	25.41	15.62
Leanness	3.70	4.63	15.05	31.02	45.60
Sodium	8.90	14.22	32.90	21.00	23.10
Artificial Ingredients	6.50	5.10	16.63	21.25	50.60

Figure 4.22. Important Factors Affecting Beef Purchases



Question 17 and 18: Knowledge about Natural Beef

Consumers were asked to read the following description of natural beef: “Natural beef is a high quality beef product raised without any hormones or antibiotics. Family farmers and ranchers who produce natural beef are committed to agricultural production methods that ensure the protection and enhancement of natural resources and believe in humane treatment of animals.”

In question 17, respondents were asked about their knowledge of natural beef before reading this description. As shown in Figure 4.23, over half of the respondents said they had heard about natural beef before they read the description. Few respondents had never heard of natural beef. Almost 40% of the DFW respondents said they knew a lot about natural beef prior to reading the description. This is not surprising since a large percentage of the DFW respondents said they frequently purchase natural/organic food products. In KC and OKC, about 25% of the respondents said they knew a lot about natural beef before reading the description.

In question 18, respondents were asked about when they had previously heard or read about all natural beef. The responses included: newspaper, in-store product samples, promotional materials at the store, and other sources. Respondents from OKC said they received 39% of their information from promotional materials at the store and 32% from other sources. Responses from DFW were evenly distributed among the four choices. In KC, 34% of respondents received their information from newspapers, while in-store samples and other sources each accounted for 25% of the responses (Figure 4.24).

Consumers form their perceptions about products through past experiences, advertisements, word of mouth, public relations, media, and actually seeing products in stores. Consumers decide whether or not to purchase a particular product based on their perception of that product. Therefore, marketers need to ensure that promotional activities provide the appropriate information to new consumers with no previous experience with a product (Wolf).

Figure 4.23. Knowledge of Natural Beef Before Reading Description

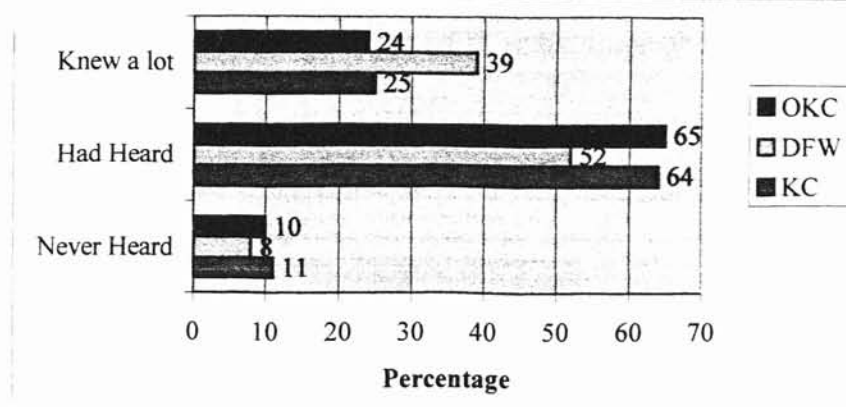
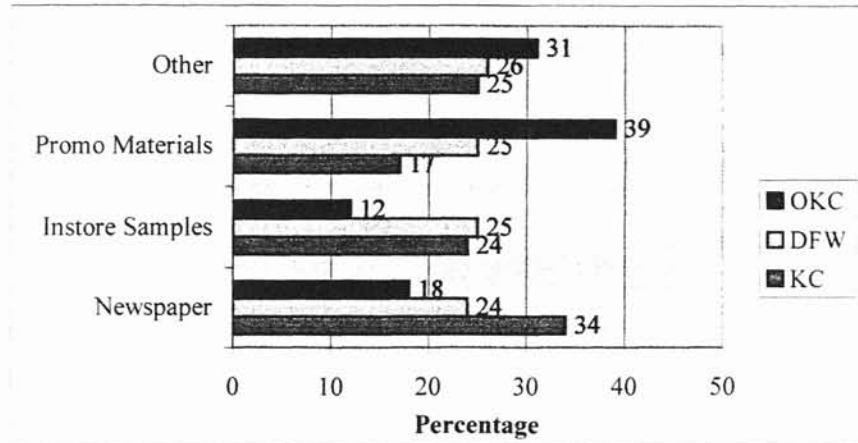


Figure 4.24. Where Consumers Heard or Read About Natural Beef



Question 19 and 20: Purchases of Natural Products

In question 19, respondents were asked how often they purchase all natural beef products. The percentages of respondents from OKC, KC, and DFW who frequently or always purchase natural beef were 37%, 43%, and 47%, respectively (Figure 4.25).

In question 20, respondents were asked about their interest in other types of all natural products, including vegetables, poultry, and pork. The respondents were mostly

interested in pork products. However, OKC respondents were much more interested in natural poultry and vegetable products than DFW or KC respondents (Figure 4.26).

Figure 4.25. How Often Consumers Purchase Natural Beef Products

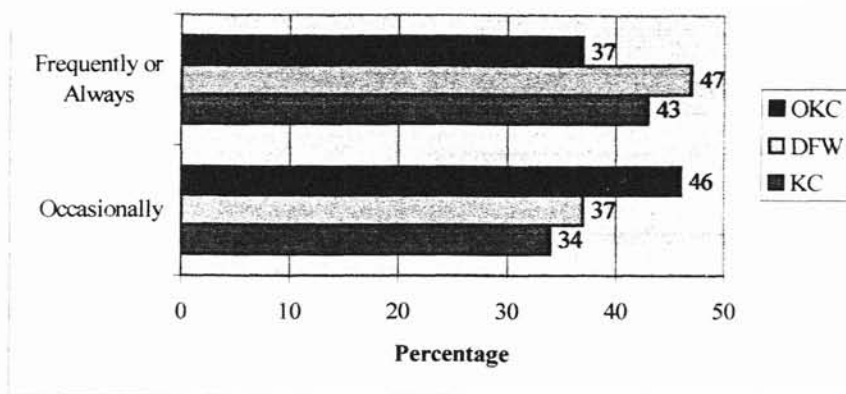
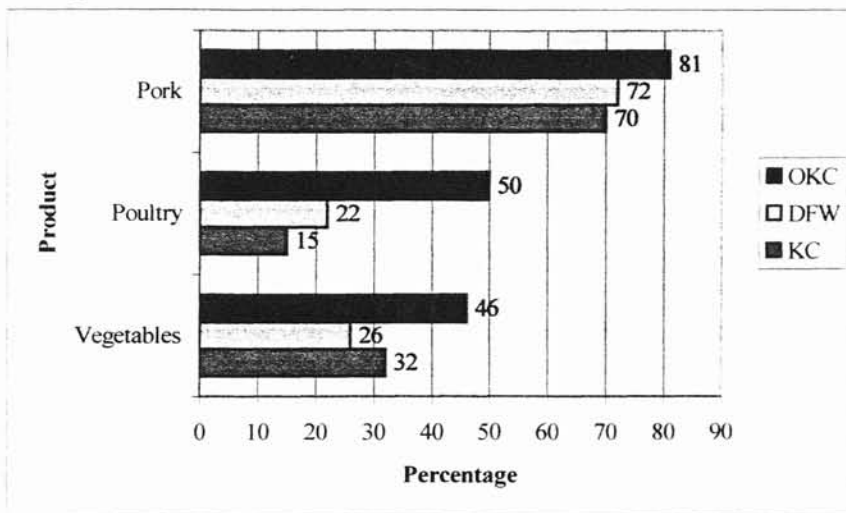


Figure 4.26. Other Natural Products of Interest to Consumers



Question 21 and 22: Attitude to an All Natural Beef Label

Consumers were asked about their attitude to an all-natural beef label before reading the description of natural beef. Few respondents had a negative attitude to an all-

natural beef label (Figure 4.27). In DFW, 80% of the respondents had a positive attitude. The percentage of positive responses from OKC and KC was 70% and 65%, respectively. The percentage of indifferent responses for DFW, OKC, and KC was 20%, 27%, and 33%, respectively, indicating that those consumers not already holding a positive view of all-natural beef products could be swayed by appropriate marketing strategies.

Affirmation of this theory came when consumers were asked about their attitude to an all-natural beef label after reading the description of natural beef. As shown in Figure 28, many of the indifferent attitudes about natural beef were changed to positive attitudes. In KC, almost 20% of respondents changed their attitudes from indifferent to positive. About 11% of OKC respondents and 10% of DFW respondents changed their attitudes from indifferent to positive.

This is important information for those who are marketing natural beef products. Consumers may be more responsive to purchasing natural beef once they have more information. Some consumers may be unwilling to purchase natural beef because they are not informed about the production methods used for natural beef. Therefore, marketers may need to add more promotional activities in order to increase awareness and sales of natural beef. However, Lin does note that it may be more difficult to change the attitudes of younger or more educated consumers solely by providing more information.

Figure 4.27. Attitude of Natural Beef Before Reading Description

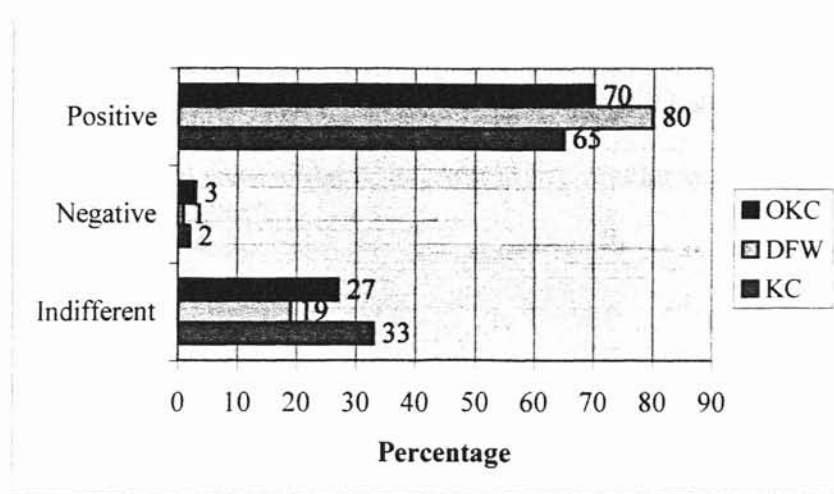
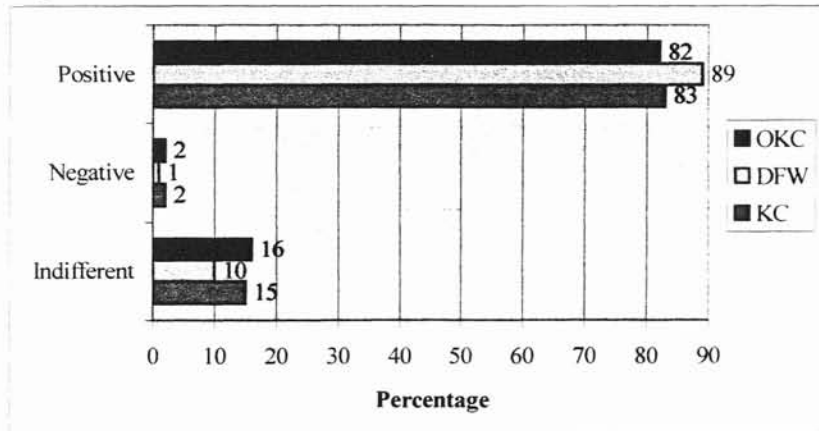


Figure 4.28. Attitude of Natural Beef After Reading Description



Questions 23-25: Willingness to Pay for Natural Beef

Consumers were asked about their willingness to purchase all natural beef steak versus “regular” beef steak at various prices. In question 23, consumers were asked if they would buy regular beef sirloin at \$4.00/lb or natural beef sirloin at \$5.60/lb. As shown in Figure 4.29, 82% of DFW respondents said they would buy natural beef. This is not surprising based on their answers to previous questions regarding health/safety and

natural/organic purchases. In OKC and KC, the percentage of respondents who said they would buy natural beef was 47% and 56%, respectively.

Consumers who chose to buy regular beef in question 23 answered question 24. In question 24, consumers were asked if they would buy regular beef sirloin at \$4.00/lb or natural beef sirloin at a lower price than before at \$5.00/lb. The percentage of DFW respondents who would switch to natural beef at the lower price was 75%, which was still significantly higher than OKC or KC (Figure 4.30). About 42% of OKC respondents and 51% of KC respondents would switch to natural beef.

Consumers who chose to buy natural beef in question 23 answered question 25. In question 25, consumers were asked if they would buy regular beef sirloin at \$4.00/lb or natural beef sirloin at \$6.50/lb. The percentages of respondents from each state that chose natural beef at the higher price were about the same as in the previous questions (Figure 4.31).

Figure 4.29. Willingness to Pay for Regular @ \$4.00/lb or Natural @ \$5.60/lb

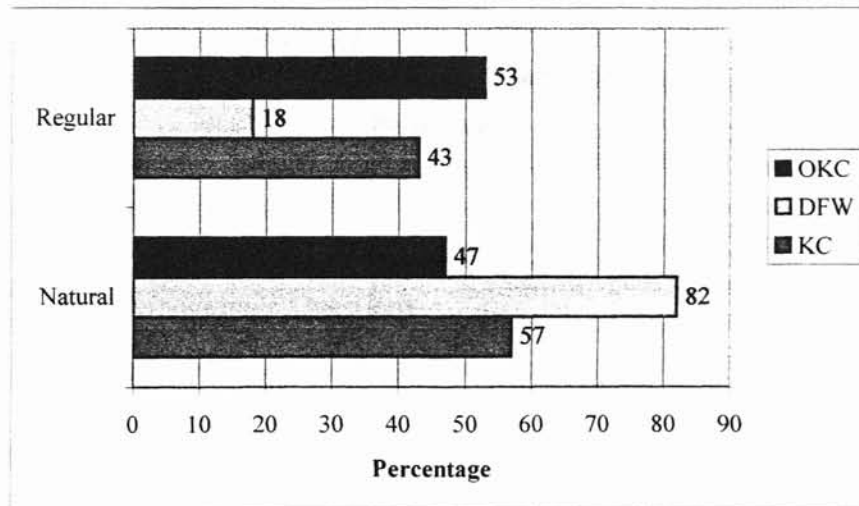


Figure 4.30. Willingness to Pay for Regular @ \$4.00/lb or Natural @ \$5.00/lb

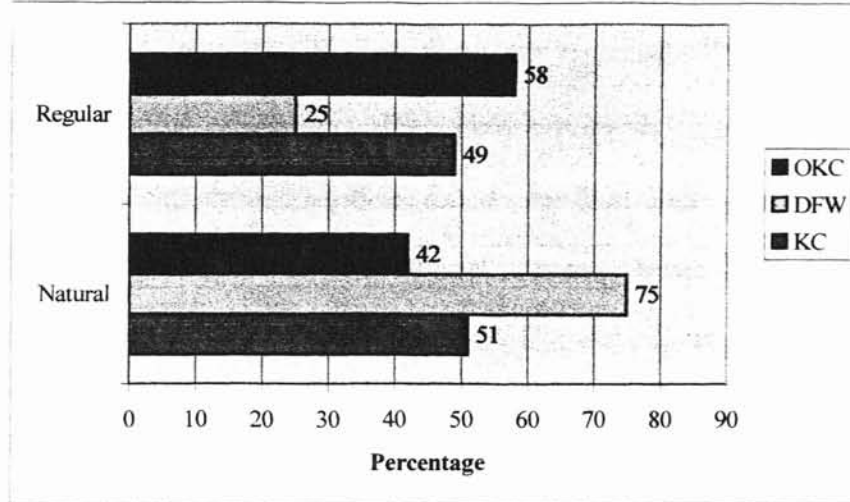
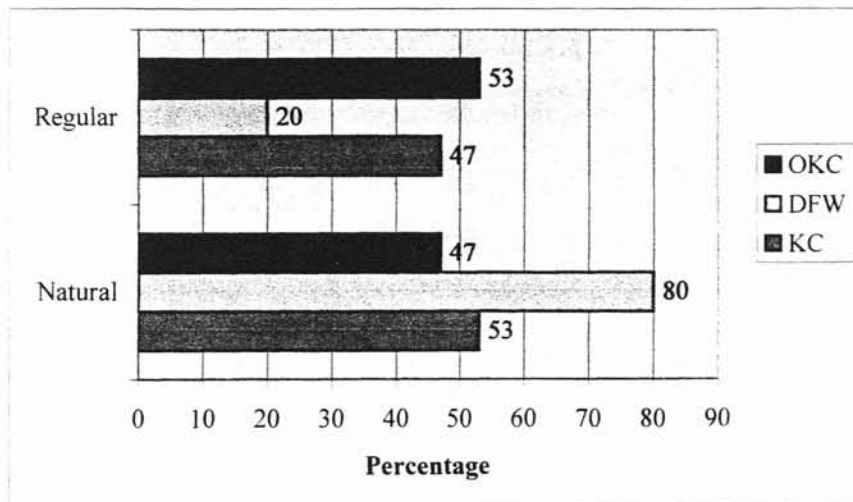


Figure 4.31. Willingness to Pay for Regular @ \$4.00/lb or Natural @ \$6.50/lb



Question 27 - 33: Demographic Questions

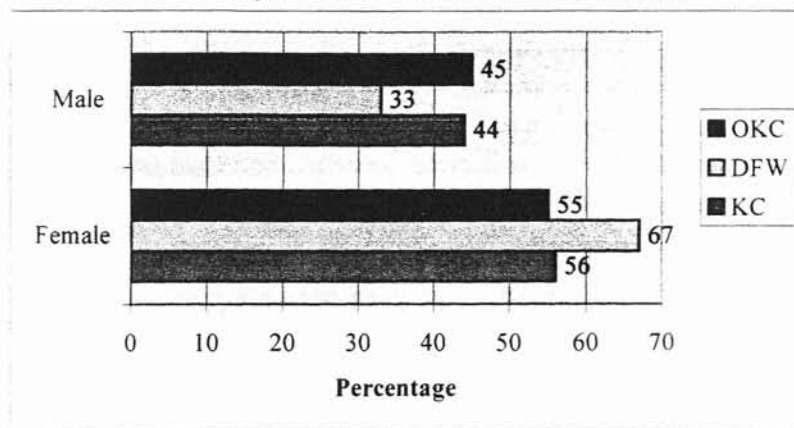
Gender

In KC and OKC, 55% of the respondents were female and 45% were male (Figure 4.32). The percentage of female respondents in DFW was slightly higher at 67%.

Previous studies have indicated that female shoppers are more concerned about food

safety than male shoppers (Lin; Nayga). According to Nayga, females are usually more concerned about food safety since they are frequently responsible for the household's food and health concerns. The results of this study agree with Lin and Nayga's findings since female respondents showed a greater concern for food safety than male respondents. More respondents from DFW were concerned about the health/safety of food products and a larger percentage of those respondents were female.

Figure 4.32. Gender of Respondents



Age

In previous studies, consumers' age was shown to influence their willingness to pay for pesticide-free produce (Misra, Huang, and Ott; Ott and Maligayga; Lin). Respondents who were older than 60 years of age were more likely to pay a higher price for pesticide-free produce. Schafer et al. concluded that older respondents showed a greater concern for hormone and antibiotic residues in meat. However, food safety may become less important to consumers after they reach 65 years of age. FMI surveys have shown that younger consumers under the age of 40 may not consider food safety to be as important as older shoppers (Lin).

price for natural beef, but they didn't necessarily have larger households than DFW or KC respondents.

About 58% of all respondents said they had no children in their household. For those who said they did have children in their household, the majority had 1 or 2 children under the age of 18 (Figure 4.35). Thompson and Kidwell found that consumers with children under the age of 18 were much more likely to purchase organic produce. FMI surveys have shown that food safety is usually more important to consumers with children in the household (Lin). This could be due to the fact that previous research indicates that children are one of the more vulnerable groups to food-related safety problems (Nayga).

Figure 4.34. Number of People Living at Residence

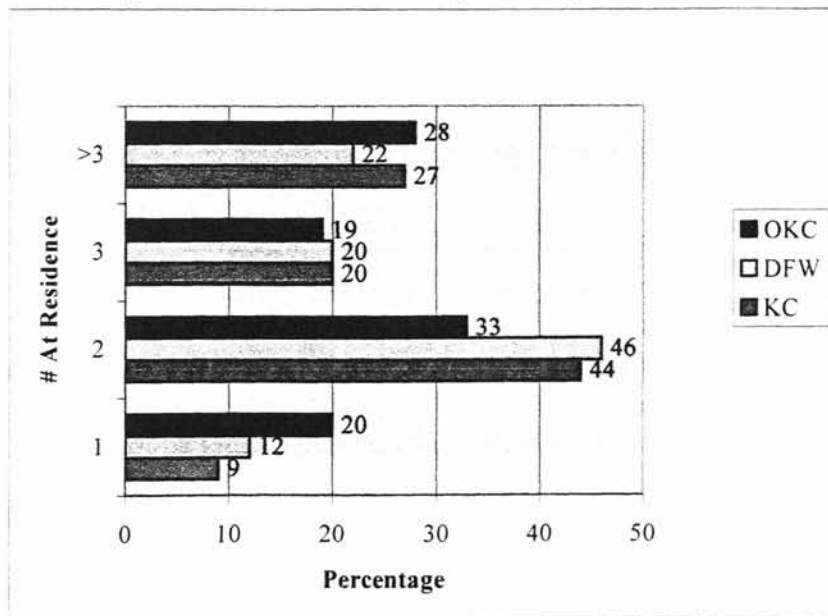
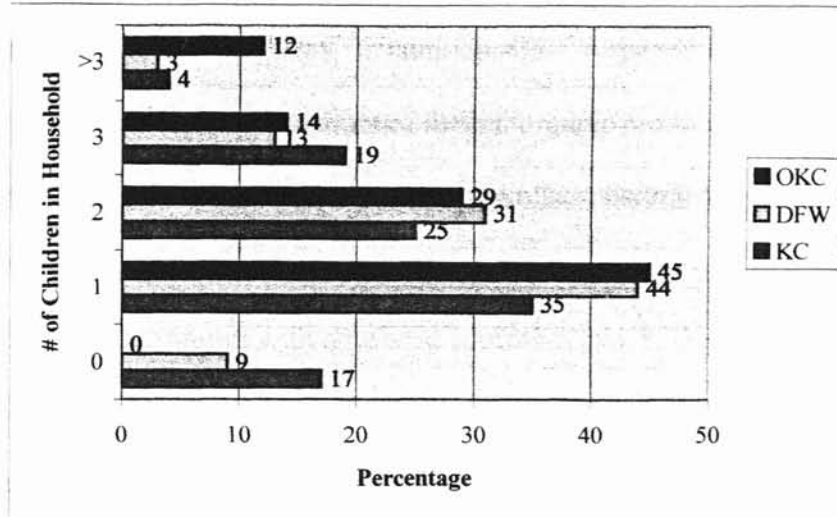


Figure 4.35. Number of Children in Household



Education

Fewer respondents from OKC had received education beyond the B.S. level. Only 32% of the OKC respondents had received a B.S. degree or higher. However in DFW and KC, 70% of respondents said they had received a B.S. degree or higher. The largest percentage of OKC respondents indicated that they had some college, while the largest percentage of DFW and KC respondents said they had a B.S. degree (Figure 4.36).

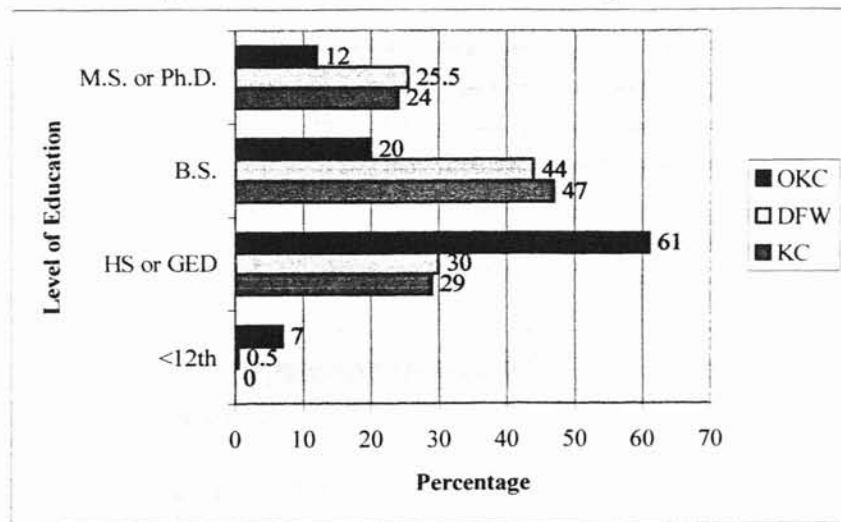
Several previous studies have indicated that respondents with advanced education were more likely to not be regular purchasers of organic produce (Byrne et al.; Thompson and Kidwell). However, out of the respondents who said they did not regularly purchase organic produce, those with a Bachelors degree or higher were more likely to have at least purchased it occasionally.

Schafer et al. found that consumers who were more educated tended to be less concerned about hormone residues in meat. However, Ott and Maligaya did find that people with more education were increasingly concerned about the use of pesticides. In

this study, DFW respondents were more educated and purchased more natural/organic products than OKC or KC respondents. In addition, OKC respondents were the least educated and purchased the lowest amount of natural/organic products. So the findings of this study show that more educated respondents purchase natural/organic products more frequently than less educated respondents.

Lin notes that consumers with advanced education may believe they know enough about how to control the safety of their food. They may also be more capable of determining the validity of food safety problems reported by the media. Marketers may find it to be difficult to change attitudes or behaviors of consumer groups with advanced education.

Figure 4.36. Education Level of Respondents



Income

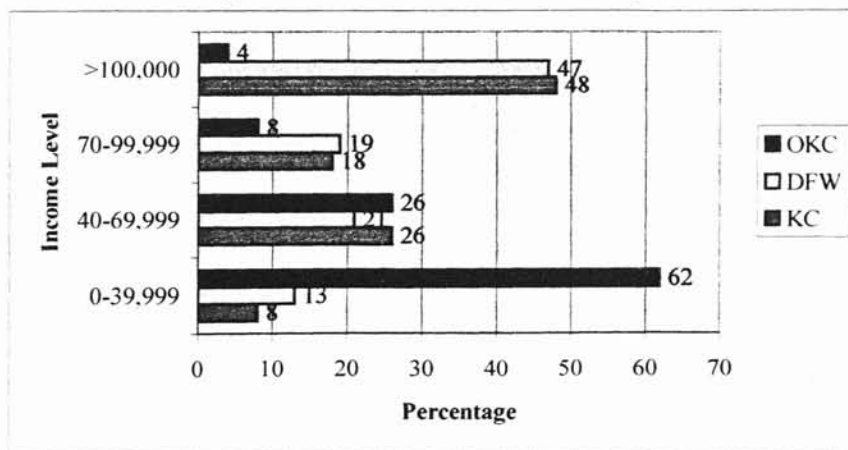
The incomes reported by KC and DFW respondents were significantly higher than those reported by OKC respondents (Figure 4.37). About 47% of KC and DFW respondents reported incomes greater than \$100,000. However, only 4% of OKC

respondents reported incomes greater than \$100,000. In OKC, about 61% of respondents reported incomes lower than \$40,000. Yet only 8% of KC respondents and 13% of DFW respondents reported incomes lower than \$40,000.

Previous studies have shown conflicting findings on the effects of income on willingness to pay for pesticide risk reduction. Several studies have indicated that respondents who earned higher incomes were more likely to pay more for pesticide risk reduction (Govindasamy, Ramu, and Italia; Misra, Huang, and Ott; Underhill and Figueroa; van Ravenswaay and Hoehn). This could be one reason that OKC consumers said they purchase less natural/organic products and were more price sensitive.

However, various other studies have shown that income and willingness to pay for pesticide risk reduction and food safety were inversely related (Buzby, Ready, and Skees; Byrne, Gempeasaw, and Toensmeyer; Dunlap and Beus). Lin concluded that there was not a significant income effect on consumers' perception of the importance of food safety.

Figure 4.37. Income Level of Respondents



Occupation

Respondents reported a wide range of occupations and there were no significant differences by state. Overall, the occupations that were reported by more than 3% of respondents included: homemaker, housewife, student, retired, and teacher. Thirteen percent of respondents were homemakers, 15% were housewives, 12% were students, 22% were retired, and 16% were teachers.

Summary

Respondents from DFW were much more concerned about the health and safety of their food products. DFW respondents said they purchased more organic/natural food products and checked labels more frequently than OKC or KC respondents. Producers may be able to target natural beef products to females, older consumers, consumers with children in the household, and possibly to higher income areas.

Price was not an important factor affecting meat purchases for DFW respondents so they are probably willing to pay a higher price for natural beef products. In the questions concerning willingness to pay for natural beef, about 80% of DFW respondents said they would buy natural beef over regular beef at each price. DFW respondents did indicate that they consume less beef than OKC or KC respondents. However, since the natural beef market is still relatively new, DFW respondents may increase their beef consumption once this market expands.

For OKC respondents, price was a much more significant factor affecting meat purchases. Only about 30% of OKC respondents said that they frequently or always purchase natural/organic food products. In the questions concerning willingness to pay for natural beef, about 45% of OKC respondents said they would buy natural beef over

regular beef at each price. Producers need to take this into consideration when planning natural beef marketing strategies for OKC. Respondents from OKC were not as willing to pay a higher price for natural beef products.

However, almost 80% of OKC respondents indicated that they consume beef two or more times per week. Yet only about 25% of OKC respondents said they knew a lot about natural beef before reading the description. After reading the description, 11% of OKC respondents changed their indifferent attitudes about natural beef to positive attitudes. Therefore, increased marketing efforts may influence OKC respondents to consider purchasing more natural beef products. However, since price is obviously a very important factor affecting purchases, increased marketing efforts may not increase natural beef sales in OKC. This is an issue that will need to be further investigated by producers interested in marketing natural beef in OKC.

In KC, respondents' attitudes concerning natural beef purchases were similar to those of OKC respondents. However, KC respondents were slightly more willing to purchase natural beef and were a little less concerned about the price factor. When asked about their willingness to pay for natural beef, about 54% said they would buy natural beef over regular beef at each price. Once KC respondents were provided with additional information about natural beef, their attitudes changed significantly. Almost 20% of KC respondents changed their indifferent attitudes about natural beef to positive attitudes after reading the description.

Overall, respondents were interested in purchasing natural beef products and a fairly large percentage were willing to pay a higher price for natural beef. Producers need to take into consideration that respondents in DFW were more interested in

purchasing natural beef products. However, the demand for natural beef in OKC and KC will probably continue to grow since the natural beef market is still relatively new.

Chi-Square Results

The consumers were grouped into four categories according to their responses to the following questions:

23. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$5.60 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound

All Natural Beef Sirloin Steak at \$5.60 per pound

If the consumer chose Regular beef, then they were asked to go to question 24 and not to answer question 25. If the consumer chose All Natural Beef, they were asked to go to question 25 and not to answer question 24.

24. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$5.00 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound

All Natural Beef Sirloin Steak at \$5.00 per pound

25. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$6.50 per pound, I would buy (Check only one)

Regular Beef Sirloin Steak at \$4.00 per pound

All Natural Beef Sirloin Steak at \$6.50 per pound

The four categories of respondents included:

- 1) NN - Respondents chose natural beef to regular beef regardless of the price in both questions 23 and 25.
- 2) NR - Respondents would buy natural beef at \$5.60/lb in question 23, but would switch to regular beef when the price of natural beef increased to \$6.50/lb in question 25.
- 3) RN - Respondents would buy regular beef when the price of natural beef was \$5.60/lb in question 23, but would switch to natural beef when the price dropped to \$5.00/lb in question 24.
- 4) RR - Respondents preferred regular beef to natural beef regardless of the price in both 23 and 24.

Once the respondents were grouped into categories, frequency tables were computed to determine how each group answered questions concerning their meat purchasing and consumption behavior. Chi-squared statistics were used to test whether or not the responses of the four groups were significantly different.

The majority of respondents, or about 50 percent, was in the NN group. About 16% of respondents were in the NR group and 14% were in the RN group. The remaining 20% of respondents were in the RR group.

Question 1: Informed about Meat Processing

The majority of consumers in each group said that they were somewhat informed about how meat is raised and processed (Table 4.16). However, a slightly higher

NN group as compared to the other groups said they were very informed about how meat is raised and processed.

Table 4.16. How Informed Are Respondents of Meat Processing (%) (Chi-Square^a = 20.59)

	Not Informed	Somewhat Informed	Very Informed
NN ^b (n=221)	8.14	65.35	28.51
NR ^c (n=71)	18.31	67.61	14.08
RN ^d (n=59)	15.25	74.58	10.17
RR ^e (n=93)	17.20	67.74	15.05

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef.

Question 2: Importance of Tracing Meat to Origin

In Table 4.17, the percentage of responses from each group is shown. The majority of respondents in the NN group said that it was either very important or extremely important to trace meat back to the farm and animal of origin (Figure 4.38). In the NR group, a little over half of the respondents said it was very important or extremely important to trace meat back to the origin. About 39% of respondents in the RN group and 35% in the RR group said it was very important or extremely important to trace meat back to the origin. Consumers who said that it was important to trace meat to the origin are probably more concerned about health and safety issues. Therefore, it was expected that a larger percentage of consumers in the NN group said that it was important to trace meat to the origin. Most of these consumers would probably not actually trace their meat to the origin, but they feel better about purchasing meat when they know that they have this option.

Table 4.17. The Importance of Ability to Trace Meat to Origin (%) (Chi-Square^a=57.34)

	Not Important	Somewhat Important	Very Important	Extremely Important
NN ^b (n=219)	1.37	8.68	20.55	36.99
NR ^c (n=71)	2.82	18.31	22.54	21.13
RN ^d (n=59)	3.39	35.59	22.03	18.64
RR ^e (n=93)	4.30	35.48	24.73	15.05

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

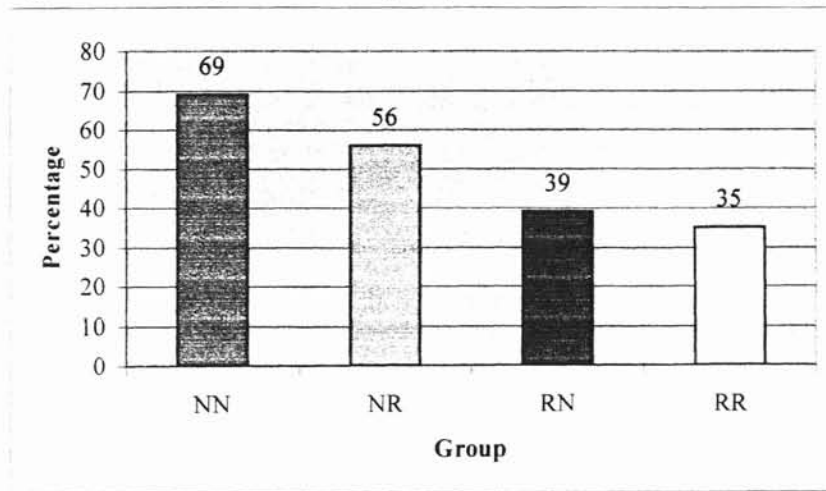
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.38. Very or Extremely Important to Trace Meat to Origin



Question 3: Check Labels

In question 3, consumers were asked how often they check labels. In the NN group, 87% of the consumers frequently or always check labels (Figure 4.39). About 75% of the NR group, 50% of the RN group, and 56% of the RR group frequently or always check labels. Table 4.18 shows all of the responses for each group. Consumers who are more concerned about health and safety issues will also be more likely to frequently or always check labels. Therefore, it is not surprising that 52.3% of consumers in the NN group always check labels. However, many of the respondents in

the other groups frequently check labels. This means that consumers in the NN group were not the only group concerned about health and safety issues. Consumers in the NN group were just more willing to pay a higher price to ensure that their food products were healthy and safe.

Table 4.18. Frequency that Consumers Check Labels (%) (Chi-Square^a = 93.62)

	Never	Rarely	Occasionally	Frequently	Always
NN ^b (n=221)	0.45	2.71	9.95	33.94	52.94
NR ^c (n=71)	1.41	8.45	15.49	56.34	18.31
RN ^d (n=59)	0.00	10.17	40.68	33.90	15.25
RR ^e (n=93)	3.23	13.98	25.81	38.71	18.28

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

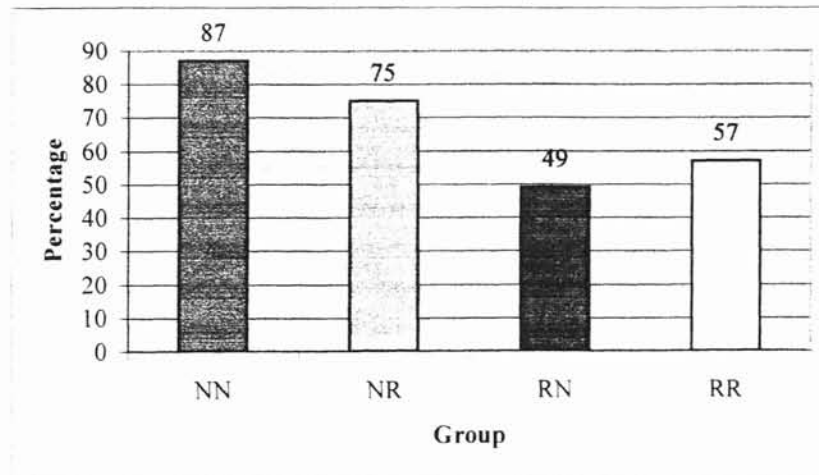
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.39. Frequently or Always Check Labels



Question 4: Purchase Natural/Organic Food Products

Table 4.19 shows the frequency that consumers purchase natural products. Seventy-two percent of the consumers in the NN group frequently or always purchase natural products, while 12% of the RR group frequently or always purchase natural

products (Figure 4.40). Therefore, natural beef producers may be able to market their products to the RR group even though they said that they wouldn't purchase natural beef under our price scenarios. Consumers in the RR group may be willing to purchase natural beef when faced with an actual market situation or they may only be interested in purchasing natural products other than beef.

Table 4.19. Frequency of Natural Product Purchases (%) (Chi-Square^a = 139.14)

	Never	Rarely	Occasionally	Frequently	Always
NN ^b (n=221)	2.26	3.62	21.72	57.01	15.38
NR ^c (n=130)	7.04	9.86	35.21	46.48	1.41
RN ^d (n=59)	0.00	25.42	42.37	30.51	1.69
RR ^e (n=93)	10.75	33.33	44.09	10.75	1.08

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

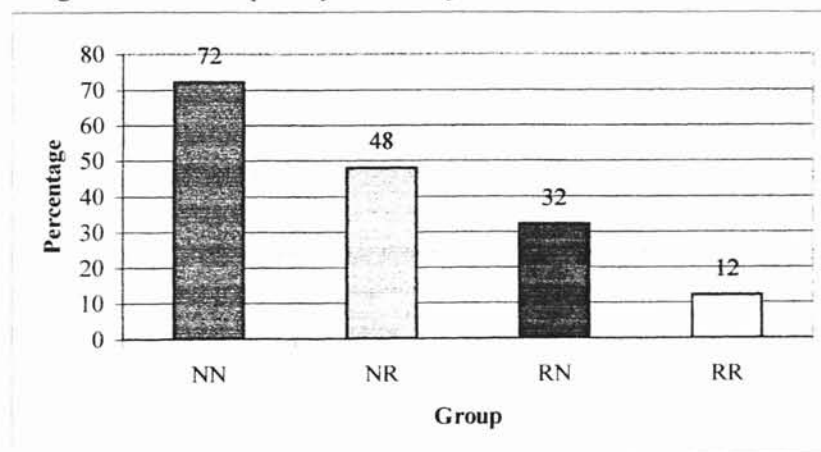
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.40. Frequently or Always Purchase Natural Products



Question 5: Factors Affecting Beef Purchases

About 44% of consumers in the NN group said that label ingredients was an important factor affecting beef purchases (Figure 4.41). In this same group, 46% said that taste and tenderness was the most important factor. More consumers in the NN

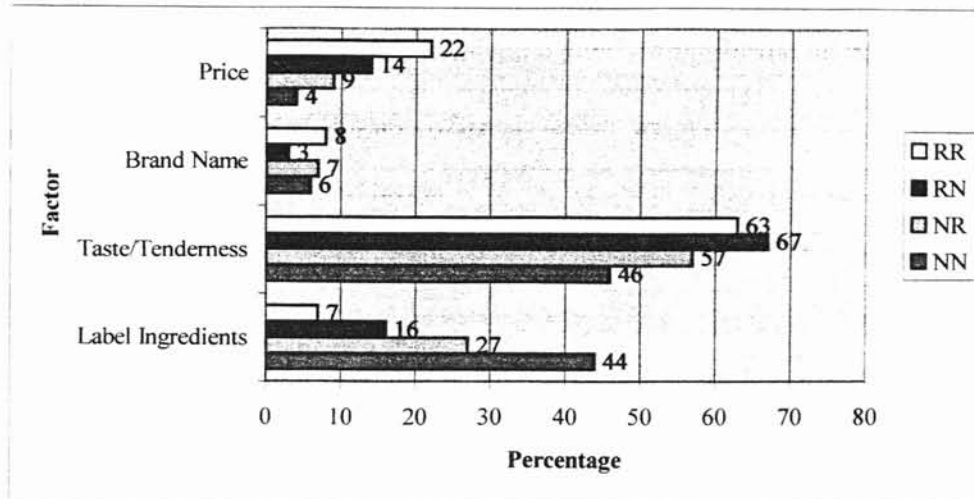
group than the other groups said that label ingredients was an important factor affecting beef purchases. This is probably because consumers in this group are more concerned about the health and safety of beef products and less concerned about the taste.

Taste and tenderness was the most important factor for the majority of consumers in the NR, RN, and RR groups. This was expected since previous studies have shown that taste and tenderness is one of the most important attributes affecting beef purchasing decisions (Huffman et al.; Miller et al.).

Price was a more important factor affecting beef purchases for consumers in the RR group, which was expected since these consumers were not very willing to purchase natural beef. Consumers in this group would always choose the lower priced beef product. In both the NR and RN groups, respondents said that price was a somewhat important factor affecting their beef purchases. This is not surprising since respondents in these groups would purchase natural beef in one of our price scenarios, but not in the other. These respondents did have a limit to the amount they would pay for natural beef. In the NN group, few respondents said that price was an important factor concerning beef purchases. This was expected since respondents in this group would purchase natural beef versus regular beef in both of our price scenarios.

None of the groups were very interested in brand name, which is important information for beef alliances that want to market their own beef brands. Producers may not be able to profit from marketing their own beef brands to consumers in these locations.

Figure 4.41. Factors Affecting Beef Purchases



Question 6: Image of Natural Beef

The majority of respondents in all four groups associated natural beef with the image of no antibiotics or hormones used in production (Table 4.20). Few consumers associated natural beef with the image of environment. This could be due to the fact that many consumers purchase all types of beef products even though the packaging is not environmentally friendly.

Table 4.20. Consumers' Image of Natural Beef (%) (Chi-Square^a = 24.68)

	Environment	No Antibiotics/ Hormones	Taste & Tenderness	Local Family Farms
NN ^b (n=203)	8.87	74.88	10.34	5.91
NR ^c (n=70)	2.86	65.71	21.43	10.00
RN ^d (n=58)	6.90	60.34	20.69	12.07
RR ^e (n=92)	6.52	56.52	30.43	6.52

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef.

Question 7: More Ingredient Information on Processed Beef

Figure 4.42 shows the percentage of respondents in each group who were very or extremely interested in more ingredient information on processed beef. Consumers in the NN group were the most interested, followed by the NR, RN, and RR groups. The various levels of interest by respondents in each group are shown in Table 4.21.

This will probably be a bigger issue for further processed meat products. For natural beef, the ingredients are limited so more ingredient information probably won't be available.

Table 4.21. Interest in More Ingredient Information in Beef (%) (Chi-Square^a = 75.31)

	Not Interested	Somewhat Interested	Very Interested	Extremely Interested
NN ^b (n=220)	3.18	8.18	19.09	33.64
NR ^c (n=69)	0.00	10.14	42.03	14.49
RN ^d (n=59)	6.78	22.03	32.2	11.86
RR ^e (n=93)	7.53	25.81	39.78	5.38

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

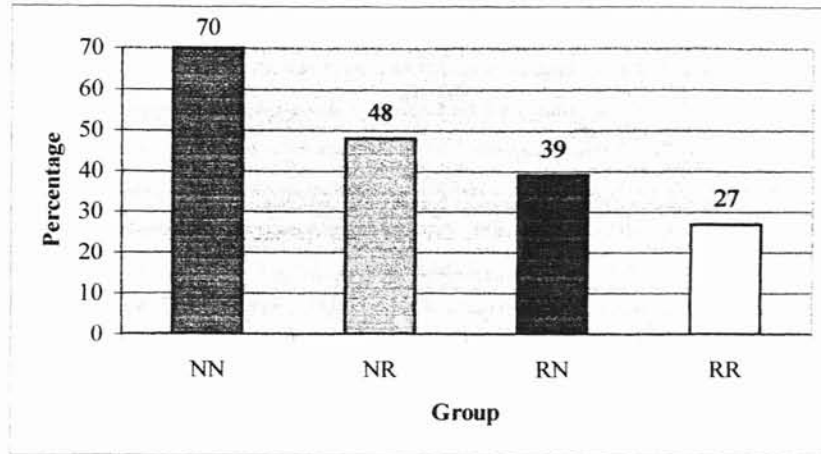
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef.

Figure 4.42. Very or Extremely Interested in More Ingredient Information in Beef



Question 19: Purchase Natural Beef

Table 4.22 indicates the frequency that each group purchases natural beef. Sixty-two percent of the NN group said they frequently or always purchase natural beef. In the RR group, 35% never purchase natural beef and 20% frequently or always purchase natural beef. It is interesting to note that even though a large majority of the RR group said they wouldn't purchase natural beef under the price scenarios in the survey, 20% said that they frequently purchase natural beef. Therefore, consumers in the RR group may be willing to purchase natural beef even more frequently at certain prices. Figure 4.43 provides an illustration of the percentage of respondents in each group who frequently or always purchase natural beef.

Table 4.22. Frequency of Natural Beef Purchases (%) (Chi-Square^a = 85.42)

	Never	Occasionally	Frequently	Always
NN ^b (n=215)	10.23	28.37	42.79	18.60
NR ^c (n=70)	21.43	40.00	37.14	1.43
RN ^d (n=58)	15.52	62.07	20.69	7.72
RR ^e (n=93)	35.48	44.09	19.35	1.08

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

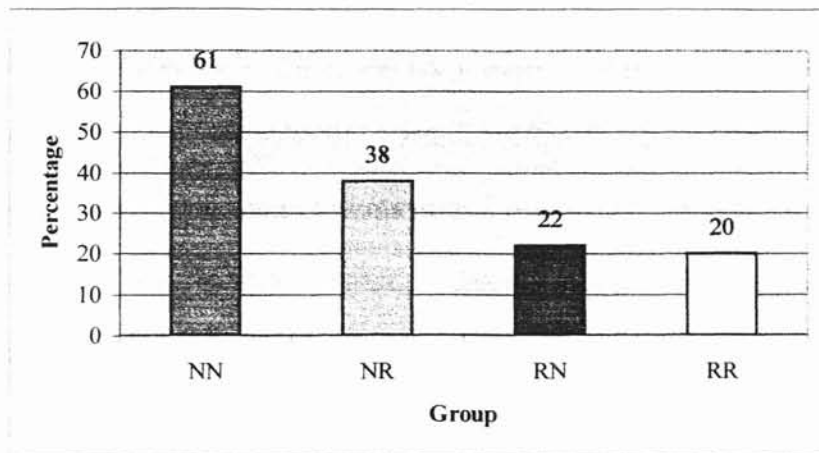
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.43. Frequently or Always Purchase Natural Beef



Question 21 and 22: Attitude to an All Natural Beef Label

Consumers were asked to read the following description of natural beef: “Natural beef is a high quality beef product raised without any hormones or antibiotics. Family farmers and ranchers who produce natural beef are committed to agricultural production methods that ensure the protection and enhancement of natural resources and believe in humane treatment of animals.”

In Table 4.23, consumer attitudes toward an All Natural Beef Label before reading the description are shown. The majority of respondents in the NN, NR, and RN groups had a positive attitude toward natural beef before reading the description (Figure

44). However, in the RR group, only 41% had a positive attitude and 55% were indifferent about natural beef before reading the description.

After reading the description, the percentage of positive attitudes about natural beef increased for all groups. The change mainly occurred because consumers changed their indifferent attitudes to positive attitudes after reading the description. Figure 4.45 provides an illustration of this change. Positive attitudes increased by 6% for the NN group, 14% for the NR group, 22% for the RN group, and 20% for the RR group (Table 4.24). The respondents in the NR, RN, and RR groups had a more positive attitude once they read the description of natural beef. Natural beef producers and marketers may be able to influence consumer attitudes toward natural beef by adding more promotional and advertising activities. However, a fairly large percentage of the RR group was still indifferent about natural beef after reading the description. Therefore, it will probably be much more difficult to influence consumer attitudes in the RR group through promotional activities.

Table 4.23. Attitude to a Natural Beef Label before Description (%) (Chi-Square^a = 69.68)

	Positive	Negative	Indifferent
NN ^b (n=218)	85.78	1.83	12.39
NR ^c (n=70)	80.00	0.00	20.00
RN ^d (n=59)	69.49	1.69	28.81
RR ^e (n=92)	41.30	3.26	55.43

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.44. Attitude to a Natural Beef Label before Reading Description

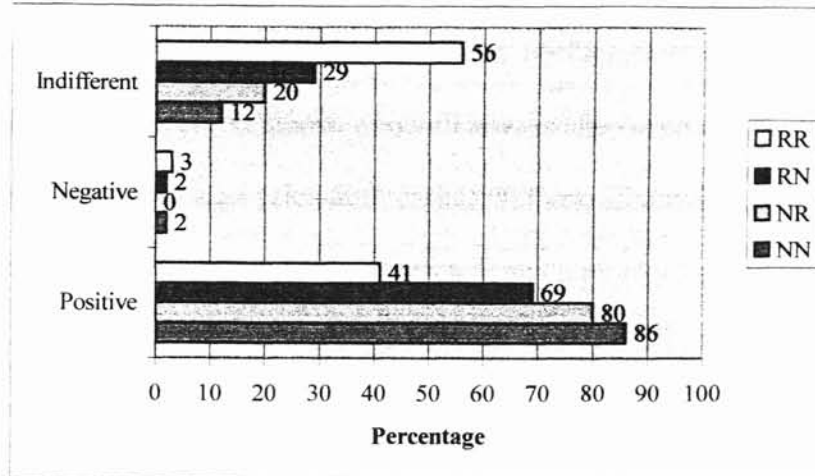


Table 4.24. Attitude to a Natural Beef Label after Description (%) (Chi-Square^a = 64.10)

	Positive	Negative	Indifferent
NN ^b (n=219)	91.78	1.37	6.85
NR ^c (n=71)	94.37	0.00	5.63
RR ^d (n=58)	91.38	1.72	6.90
RR ^e (n=92)	60.87	1.09	38.04

^a The chi-square value indicates that the groups (NN, NR, RN, RR) did respond differently to the question.

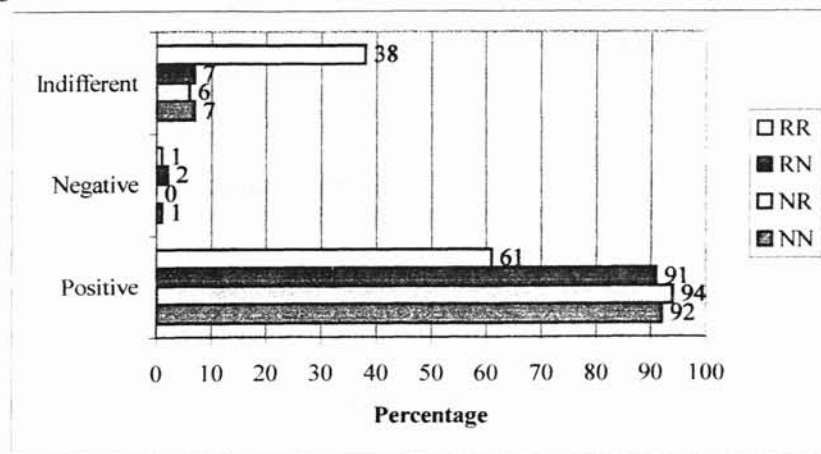
^b The NN group always prefers natural beef to regular beef regardless of the price.

^c The NR group will buy natural beef at \$5.60/lb but not at \$6.50/lb.

^d The RN group will not buy natural beef at \$5.60/lb but will buy it at \$5.00/lb.

^e The RR group always prefers regular beef to natural beef

Figure 4.45. Attitude to a Natural Beef Label after Reading Description



Summary

Based on an assessment of survey responses, beef consumers can be categorized into three distinctive groups: (1) those who will always choose natural beef over “regular” beef even with a high price differential, (2) those who would buy natural beef but have reservation prices beyond which they will purchase regular beef instead of natural beef, and (3) those who will purchase regular beef instead of natural beef if any price differential exists. Each group maintains a core set of tastes and preferences that differs significantly from the other two groups, as shown by the chi-square analyses of responses to survey questions.

Consumers’ perceptions of natural beef appear to be mostly related to the image of hormone- and antibiotic-free production conditions. Very few respondents associated natural beef with the image of family farms or environmental awareness even though many natural beef marketing efforts promote natural beef in this manner. As is often the case with food items, consumers focused on the products’ aspects that directly affected their physical intake of food and their eating experience (i.e. hormone/antibiotic free, taste and tenderness) rather than the product’s impact on the environment or agricultural producers.

Another interesting finding from this study was that respondents’ purchasing patterns – whether buying natural beef or regular beef – were not significantly affected by brand names. This is intriguing from the standpoint that many newer beef operations – whether natural beef or not – are trying to promote brand recognition and generate consumer loyalty. While brand recognition may play a larger role in processed meat products, the Southern Plains consumers that participated in this survey were generally

not interested in the brand names on their uncooked, primal beef cuts. However, consumers do have little purchasing experience with branded beef products and this could explain why their purchasing decisions were not affected by brand.

An implication is that natural beef marketing efforts in the Southern Plains may be able to capture a share of the consumers who, under the conditions stated in the survey questions, indicated they would not buy natural beef. As shown in the before-and-after-description questions related to the perceived image of natural beef, some of these consumers can be persuaded to have a more favorable view of natural beef when provided with more product information. However, their perceived differences between natural beef and regular beef may not be enough to convince them to pay a large price premium for natural beef.

As indicated by the results of this study, distinctive differences in perceptions and purchasing patterns can be recognized among beef consumers. The next step for marketers is to determine which characteristics most directly distinguish consumers in each category. Further research focusing on the levels of price premium thresholds and the impacts of socio-economic and demographic characteristics are needed to help the marketing campaigns of those enterprises promoting natural beef in the Southern Plains states.

Logit Results

Model

The multinomial logit model described in Chapter 1 was used to determine factors that affect consumers' willingness to pay for natural beef. The first model estimated the effect of consumers' demographic and socioeconomic characteristics on their willingness to pay for natural beef. Several previous studies have found that consumers' willingness to pay was significantly affected by their demographic and socioeconomic characteristics (Thompson and Kidwell; Malone; Misra, Huang, and Ott; Underhill and Figueroa; van Ravenswaay and Hoehn; Elnagheeb and Jordan; Buzby, Ready, and Skees; Byrne, Gempesaw, and Toensmeyer; Huang; Ott and Maligaya, Zellner and Degner). However, since consumers' demographic and socioeconomic characteristics may not be the best indicators of their willingness to pay, a second model was estimated to determine other factors that may affect consumers' willingness to pay. The second model estimated the effect of consumers' meat purchasing behavior and perceptions of natural beef on their willingness to pay for natural beef. Purchasing behavior and perceptions of natural beef were determined by respondents' answers to several questions designed to capture their beef tastes and preferences (See Appendix A).

In both models, the willingness to pay variable consisted of four categories:

- 1) NN - Respondents preferred natural beef to regular beef regardless of the price.
- 2) NR - Respondents would buy natural beef at \$5.60/lb but would switch to regular beef when the price of natural beef increased to \$6.50/lb.
- 3) RN - Respondents would buy regular beef when the price of natural beef was \$5.60/lb but would switch to natural beef when the price dropped to \$5.00/lb.

4) RR – Respondents preferred regular beef to natural beef regardless of the price.

The first logit model was specified as:

$$(1) \quad \text{Prob}(Y_i = j) = f(\text{Age}_i, \text{Gender}_i, \text{Education}_i, \text{Income}_i, \text{Children}_i, \text{Metroplex}_i) \text{ for all } i=1 \dots n.$$

where,

$\text{Prob}(Y_i = j)$ = probability that respondent i fell into one of the group j ($j = \text{NN}, \text{NR}, \text{RN}, \text{or RR}$).

The names and definitions of the independent variables used in Model 1 are presented in Table 4.25. All of the independent variables used in Model 1 were class variables. The frequency distributions for the demographic and socioeconomic variables used in Model 1 are shown in Table 4.26.

Table 4.25. Description of Independent Variables Used in Model 1

Variable	Definition
Age	<20=1, 20-40=2, 40-60=3, >60=4
Gender	Female=1, Male=0
Education	<12 th grade education=1, Completed high school, technical or trade school, and/or some college=2, Completed bachelors degree and/or some graduate work=3, Completed masters and/or doctorate degree
Income	Annual household income <\$39,999=1, \$40,000-\$69,999=2, \$70,000-\$99,999=3, >\$100,000=4
Children	Children in household=1, 0 otherwise
Metroplex	Dallas/Ft. Worth=1, Kansas City=2, Oklahoma City=3

Table 4.26. Frequency Distribution for Independent Variables Used in Model 1

Variable	%
Age	
<20	2.90
20-40	37.20
40-60	48.07
>60	11.84
Gender	
male	39.19
female	60.81
Education	
<12th grade education	1.81
Completed high school, tech. school, or some college	39.96
Completed B.S. and/or some graduate work	39.23
Completed M.S, Ph.D., etc.	22.00
Income	
<\$39,999	23.02
\$40,000-\$69,999	23.76
\$70,000-\$99,999	16.09
>\$100,000	37.13
Children	
no	57.86
yes	42.14
Metroplex	
Dallas/Ft. Worth	46.39
Kansas City	30.63
Oklahoma City	22.98

The second logit model was specified as:

$$(2) \quad \text{Prob}(Y_i = j) = f(\text{Informed about Meat Processing}_i, \text{Traceability of Meat}_i, \text{Check Labels}_i, \text{Purchase Natural/Organic Food Products}_i, \text{Factor Affecting Beef Purchases}_i, \text{Image of Natural Beef}_i, \text{Interest in More Ingredient Information}_i, \text{Beef Consumption}_i, \text{Bone-in/Boneless}_i, \text{Beef Type}_i, \text{Preference for \%Lean Hamburger}_i, \text{Healthy/Safe}_i, \text{Convenient}_i, \text{Appealing}_i, \text{Price}_i, \text{Cholesterol}_i,$$

Calories_i, Sodium Content_i, Artificial Ingredients Content_i, Color_i,
Marbling_i, Ext Fat_i, Tenderness_i, Packaging_i, Brand_i, Leanness_i,
Sodium_i, Artificial Ingredients_i, Knowledge of Natural Beef_i,
Frequency of Natural Beef Purchases_i, Attitude before Reading
Description_i, Attitude after Reading Description_i) for all $i=1 \dots n$.

where once again.

$\text{Prob}(Y_i = j)$ = probability that respondent i fell into group j ($j = \text{NN, NR, RN, or RR}$).

The names and definitions of the independent variables used in Model 2 are presented in Table 4.27. All of the independent variables used in Model 2 were class variables. The frequency distributions for the variables explaining consumers' meat purchasing behavior and perceptions of natural beef are shown in Table 4.28. Tests confirmed that there were no multicollinearity problems in either model.

Table 4.27. Description of Independent Variables Used in Model 2

Variable	Description
Informed About Meat Processing	Not Informed=1, Somewhat Informed=2, Very Informed=3
Traceability of Meat	Not Important=1, Somewhat Important=2, Important=3, Very Important=4, Extremely Important=5
Check Labels	Never=1, Rarely=2, Occasionally=3, Frequently=4, Always=5
Purchase Natural/Organic Food	Never=1, Rarely=2, Occasionally=3, Frequently=4, Always=5
Primary Factor Concerning Beef Purchases	Label Ingredients=1, Taste/Tenderness=2, Brand Name=3, Price=4
Image of Natural Beef	Better for the Environment=1, No Antibiotics/Hormones=2, Taste/Tenderness=3, Local Family Farms=4
Interest in More Ingredient Info for Processed Beef	Not Interested=1, Somewhat Interested=2, Interested=3, Very Interested=4, Extremely Interested=5
Beef Consumption	Never Eat=1, Once/week=2, Twice/week=3, Three or more=4
Preference for Meat Type	Boneless=1, Bone-in=0
Preference for Beef Type	Hamburger=1, Steak=2, Other=3
Preference for %Lean Hamburger	70-80%lean=1, 80-90%lean=2, >90%lean=3
Factors Affecting Meat Purchases (Healthy/Safe, Convenient, Appealing, Price)	Not Important=1, Somewhat Important=2, Important=3, Very Important=4, Extremely Important=5

Table 4.27 cont...

Ratings of Beef Product Characteristics (Cholesterol, Calories, Sodium Content, Artificial Ingredients Content)	Very Low=1, Low=2, Somewhat High=3, High=4, Very High=5
Ratings of Factors Affecting Beef Purchases (Color, Marbling, Ext Fat, Tenderness, Packaging, Brand, Leanness, Sodium, Artificial Ingredients)	Not Important=1, Somewhat Important=2, Important=3, Very Important=4, Extremely Important=5
Knowledge of Natural Beef Before Description	Never Heard Of=1, Had Heard Of=2, Knew A Lot=3
Frequency of Natural Beef Purchases	Never=1, Occasionally=2, Frequently=3, Always=4
Attitude of Natural Beef before Description	Positive=1, Negative=2, Indifferent=3
Attitude of Natural Beef after Description	Positive=1, Negative=2, Indifferent=3

Table 4.28. Frequency Distribution for Independent Variables Used in Model 2

Variable	%
Informed about Meat Processing	
not informed	12.47
somewhat informed	66.74
very informed	20.79
Traceability of Meat	
not important	2.64
somewhat important	19.16
important	21.81
very important	28.41
extremely important	27.97
Check Labels	
never	1.09
rarely	6.78
occasionally	18.16
frequently	38.73
always	35.23
Purchase Natural/Organic Food Products	
never	4.38
rarely	14.00
occasionally	31.07
frequently	42.01
always	8.53
Factor Affecting Beef Purchases	
label ingredients	29.31
taste/tenderness	54.37
brand name	5.91
price	10.40
Image of Natural Beef	
environment	7.41
no antibiotics/hormones	67.13
taste/tenderness	18.16
local family farms	7.41
Interest in More Ingredient Information	
not interested	3.98
somewhat interested	13.94
interested	28.76
very interested	30.97
extremely interested	22.35
Beef Consumption	
never eat	5.11
once/week	30.00
twice/week	32.22
three or more	32.67

Table 4.28 cont...

Bone-in/Boneless	
bone-in	20.05
boneless	79.96
Beef Type	
hamburger	40.84
steak	47.33
other	11.83
Preference for %Lean Hamburger	
70-80%lean	9.84
80-90%lean	36.38
>90%lean	53.78
Factors Affecting Meat Purchases	
Healthy/Safe	
not important	0.67
somewhat Important	0.22
important	6.43
very important	12.42
extremely important	80.27
Convenient	
not important	5.48
somewhat Important	9.59
important	22.60
very important	38.58
extremely important	23.74
Appealing	
not important	6.64
somewhat Important	6.18
important	19.22
very important	33.87
extremely important	34.10
Price	
not important	4.51
somewhat Important	6.77
important	29.12
very important	30.47
extremely important	29.12
Ratings of Beef Display Characteristics	
Cholesterol	
very low	4.34
low	3.65
somewhat high	30.37
high	34.93
very high	26.71

Table 4.28 cont...

Calories	
very low	4.17
low	6.48
somewhat high	35.42
high	35.42
very high	18.52
Sodium Content	
very low	14.73
low	21.38
somewhat high	39.43
high	14.49
very high	9.98
Artificial Ingredients Content	
very low	20.24
low	18.10
somewhat high	27.38
high	19.52
very high	14.76
Ratings of Factor Affecting Beef Purchases	
Color	
not important	1.62
somewhat important	1.62
important	10.67
very important	27.15
extremely important	58.93
Marbling	
not important	3.50
somewhat important	4.67
important	18.22
very important	35.51
extremely important	38.08
External Fat	
not important	3.00
somewhat important	3.69
important	13.59
very important	29.49
extremely important	50.23
Tenderness	
not important	0.93
somewhat important	1.39
important	8.10
very important	31.71
extremely important	57.87

Table 4.28 cont...

Packaging	
not important	6.29
somewhat important	7.46
important	29.14
very important	27.97
extremely important	29.14
Brand	
not important	15.62
somewhat important	16.08
important	27.27
very important	25.41
extremely important	15.62
Leanness	
not important	3.70
somewhat important	4.63
important	15.05
very important	31.02
extremely important	45.60
Sodium	
not important	8.86
somewhat important	14.22
important	32.87
very important	20.98
extremely important	23.08
Artificial Ingredients	
not important	6.47
somewhat important	5.08
important	16.63
very important	21.25
extremely important	50.58
Knowledge of Natural Beef	
never heard of	10.09
had heard of	58.74
knew a lot	31.16
Frequency of Natural Beef Purchases	
never	18.26
occasionally	38.13
frequently	33.79
always	9.82
Attitude before Reading Description	
positive	73.02
negative	2.04
indifferent	24.94

Table 4.28 cont...

Attitude after Reading Description	
positive	85.29
negative	1.36
indifferent	13.35

Results

Consumers' demographic and socioeconomic characteristics were expected to influence their willingness to pay for natural beef. However, results of Model 1 indicated that only two of the variables were significant in explaining consumers' willingness to pay for natural beef (Table 4.29). Odds ratios are presented along with parameter estimates for the purposes of comparing the likelihoods of respondents actually paying premiums for natural beef. Respondents with an annual household income between \$40,000 and \$69,999 were less willing to pay a higher price for natural beef than those with an annual household income greater than \$100,000. However, the odds of a respondent with an annual household income greater than \$100,000 purchasing natural beef were only about 2 times the odds for a respondent with an annual household income between \$40,000 and \$69,999.

Respondents from DFW were more willing to pay a higher price for natural beef than respondents from OKC. The odds of a respondent from OKC of purchasing natural beef were .2 times the odds for a respondent from DFW. Consumers' gender, age, household size (i.e. having children living at home), and education level were expected to influence their willingness to pay for natural beef. However, none of these variables were found to be statistically significant in determining respondents' choices in the multinomial logit analysis. Likelihood ratio tests were computed for each variable to test the null hypothesis that all the coefficients in the set were equal to 0 (Table 4.30).

Table 4.29. Estimation Results of Model 1

Variable	Estimate	Std Error	Odds Ratio**
Age			
1 <20	0.1507	0.8477	1.1626
2 20-40	0.3043	0.3814	1.3557
3 40-60	0.1504	0.3758	1.1623
Gender			
0 Male	0.2892	0.2074	1.3354
Education			
1 <12th grade education	0.1302	0.836	1.1391
2 Completed HS, tech school, some college	0.3245	0.2881	1.3833
3 Completed BS and/or some grad work	-0.0187	0.2677	0.9815
Income			
1 <\$39,999	-0.1208	0.3679	0.8862
2 \$40,000-\$69,999	-0.5913*	0.2832	0.5536
3 \$70,000-\$99,999	0.0289	0.3049	1.0293
Children			
0 no	0.005	0.0828	1.0050
Metroplex			
1 DFW	1.7313*	0.3213	5.6480
2 KC	0.3427	0.3157	1.4087

*Chi-square analyses indicated significance at the .05 level.

**Odds compared to highest/omitted category within a variable.

Table 4.30. Likelihood Ratio Tests for Independent Variables Used in Model 1

Variable	Chi-Square	Pr > Chi-Square
Age	1.62	0.2037
Gender	0.79	0.8528
Education	0.03	0.8709
Income	2.47	0.4805
Children	5.46	0.1413
Metroplex	50.89*	<.0001

*Chi-square analyses indicated significance at the .05 level.

The results of Model 2 show that consumers' meat purchasing behavior and perceptions of natural beef were much better indicators of their willingness to pay for natural beef than demographic and socioeconomic factors. The estimated coefficients, standard error, and odds ratios are shown in Table 4.31. Due to the large number of variables used in the model, only the significant variables are included in the table. Marginal probabilities were not calculated as a result of the large number of categorical

variables included in the model, although odds ratios are provided for purposes of comparison. Likelihood ratio tests were computed for each class variable to test the null hypothesis that all the coefficients in the set were equal to 0 (Table 4.32).

Respondents who said they never check food labels were less likely to purchase natural beef than those who always check food labels. The odds of a respondent who always checks labels purchasing natural beef were about 20 times the odds for a respondent who never checks labels. Respondents who said they frequently check food labels were also less likely to purchase natural beef than those who always check food labels. However, the odds of a respondent who always checks labels purchasing natural beef were only about 4 times the odds for a respondent who frequently checks labels. Therefore, there was a much greater chance that respondents who frequently check labels would purchase natural beef than those who never check labels.

Respondents who said they rarely purchase natural/organic food products were less likely to purchase natural beef than those who always purchase natural/organic food products. The odds of a respondent who always purchases natural/organic food products purchasing natural beef were 13 times the odds for a respondent who rarely purchases natural/organic food products. Respondents who preferred bone-in meat were less likely to purchase natural beef than those who preferred boneless meat. The odds of a respondent who prefers boneless meat purchasing natural beef were about 3 times the odds for a respondent who prefers bone-in meat.

A surprising finding was that respondents who said product appeal was important in their meat purchasing decisions were more inclined to purchase natural beef than those who said product appeal was very important. Respondents who said that price was very

important were less likely to purchase natural beef than those who said that price was not as important. This was expected since respondents who were more price sensitive were not as willing to purchase natural beef.

Respondents who said that beef has a very high cholesterol content were more likely to purchase natural beef than those who said beef has a lower cholesterol content. The odds of purchasing natural beef for a respondent who perceived beef to have high cholesterol content were about 36 times the odds for a respondent who perceived beef to have very low cholesterol content. However, the odds of purchasing natural beef for a respondent who perceived beef to have high cholesterol content were only 5 times higher than those who perceived beef to have low or somewhat high cholesterol content. Respondents who said that beef has low sodium content were more likely to purchase natural beef than those who said beef has very high sodium content.

Compared with respondents who perceived marbling and brand as very important, citing marbling and brand as not important had a negative affect on willingness to pay for natural beef. Respondents who said that minimum external fat and tenderness were important when purchasing beef were more likely to purchase natural beef than those who said minimum external fat and tenderness were very important. Compared with respondents who perceived leanness as very important, citing leanness as not important had a positive affect on willingness to pay for natural beef. However, the odds of purchasing natural beef for a respondent who perceived leanness as very important were only .05 times higher than the odds for a respondent who perceived leanness as not important. So respondents who said that leanness was not important were not that much more likely to purchase natural beef than those who said leanness was very important.

Compared with respondents who perceived artificial ingredients as very important when purchasing beef, citing artificial ingredients as important lowered the probability of purchasing natural beef. Respondents who said they always purchase natural beef were more likely to purchase natural beef than those who said they purchase natural beef less frequently.

Respondents who had a positive attitude toward natural beef after reading the description were more likely to purchase natural beef than those who were indifferent about natural beef after reading the description. The odds of a respondent who was indifferent about natural beef purchasing natural beef were about .04 times the odds for a respondent who had a positive attitude toward natural beef.

Table 4.31. Estimation Results: Significant* Variables in Model 2

Variable	Estimate	Std Error	Odds Ratio**
Check Labels			
never	-2.9811	1.5506	0.0507
frequently	-1.3626	0.4783	0.2560
Purchase Natural/Organic Food Products			
rarely	-2.5865	1.1816	0.0753
Bone-in/Boneless	-1.1482	0.4571	0.3172
Beef Type			
hamburger	1.2537	0.6425	3.5033
Factors Affecting Meat Purchases			
Appealing			
somewhat important	1.5632	0.571	4.7741
Price			
not important	5.8955	1.3727	363.3985
somewhat important	2.855	0.9325	17.3744
important	1.8334	0.5106	6.2551
Ratings of Beef Display Characteristics			
Cholesterol			
very low	-3.5993	1.2461	0.0273
somewhat high	-1.3682	0.5731	0.2546
high	-1.8332	0.5792	0.1599
Sodium			
low	2.1512	0.8571	8.5952
Ratings of Factors Affecting Beef Purchases			
Marbling			
not important	-2.1116	1.0527	0.1210
Ext Fat			
somewhat important	1.2562	0.5767	3.5121
Tenderness			
somewhat important	1.4102	0.6874	4.0968
Brand			
not important	-2.8658	0.8346	0.0569
Leanness			
not important	3.0567	1.5468	21.2573
Artificial Ingredients			
somewhat important	-1.2138	0.5720	0.2971
Frequency of Natural Beef Purchases			
never	-4.9183	1.8583	0.0073
occasionally	-5.7038	1.8365	0.0033
frequently	-4.1676	1.8428	0.0155
Attitude after Reading Description			
positive	3.3362	0.7324	28.1121

*See author for all estimation results. **Odds compared to either the highest/omitted level in a category.

Table 4.32. Likelihood Ratio Tests for Independent Variables Used in Model 2

Variable	Chi-Square	Pr > Chi-Square
Informed about Meat Processing	0.64	0.7275
Traceability of Meat	3.32	0.5060
Check Labels	10.3*	0.0357
Purchase Natural/Organic Food Products	10.4*	0.0343
Factor Affecting Beef Purchases	7.26	0.0641
Image of Natural Beef	5.78	0.1230
Interest in More Ingredient Information	2.50	0.6450
Beef Consumption	1.37	0.7116
Bone-in/Boneless	6.51*	0.0107
Beef Type	5.68*	0.0583
Preference for %Lean Hamburger	0.03	0.9831
Factors Affecting Meat Purchases		
Healthy/Safe	1.73	0.6307
Convenient	3.10	0.5408
Appealing	8.91	0.0633
Price	32.79*	<.0001
Ratings of Beef Display Characteristics		
Cholesterol	16.12*	0.0029
Calories	4.59	0.3326
Sodium	11.52*	0.0213
Artificial Ingred	5.63	0.2284
Ratings of Factors Affecting Beef Purchases		
Color	0.18	0.9960
Marbling	7.87	0.0963
External Fat	10.13*	0.0383
Tenderness	7.69	0.1035
Packaging	4.45	0.3479
Brand	14.79*	0.0052
Leanness	7.45	0.1140
Sodium	1.06	0.9001
Art Ingred	5.95	0.2028
Knowledge of Natural Beef	4.02	0.1342
Frequency of Natural Beef Purchases	25.83*	<.0001
Attitude Before Reading Description	0.91	0.6344
Attitude After Reading Description	26.16*	<.0001

*Chi-square analyses indicated significance at the .05 level.

Summary

Respondents' willingness to pay for natural beef was expected to significantly vary by their demographic and socioeconomic characteristics, but results of the first logit model indicated very little significant difference related to these factors. However, results of the second logit model indicated that consumers' meat purchasing behavior and perceptions of natural beef did significantly affect their willingness to pay for natural beef. Respondents who check labels more frequently were more likely to purchase natural beef. Respondents who purchase natural/organic food products more often were also more likely to purchase natural beef.

However, respondents who said that marbling and brand were not important were less likely to purchase natural beef. Respondents who were less concerned about minimum external fat, tenderness, and price were also more likely to purchase natural beef. Respondents who were more concerned about artificial ingredients were more likely to purchase natural beef. In addition, respondents who had a positive attitude toward natural beef after reading the description were more likely to purchase natural beef than those with an indifferent attitude. Therefore, producers may be able to market natural beef to a larger group of consumers by providing more product information.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

Results of the study indicate that consumer responses differed significantly by geographic location. However, geographic differences alone did not explain consumers' decisions to purchase natural beef. With the exception of one income class and location, the demographic and socioeconomic variables were not significant in explaining respondents' willingness to pay for natural beef. Instead, respondents' previous meat purchasing behavior and perceptions of natural and regular beef were much better indicators of their willingness to pay for natural beef.

Geographic Differences Related to Consumer Preferences and Perceptions of Natural Beef

Consumer preferences and perceptions of natural beef were significantly different based on their geographic location. Store differences may have caused some of the variation in responses from DFW, OKC, and KC consumers since it was not possible to use the same store chain in each of the three metropolitan areas. Consumers' tastes and preferences as measured by their meat purchasing behavior and perceptions of natural beef may have differed as a result of varied store conditions (i.e. layout, advertising, variety, etc.).

Respondents from DFW were more likely to purchase natural beef than KC or OKC respondents. DFW respondents were very concerned about the health and safety of

food products and they frequently purchase natural/organic food products. In addition, price was not a significant factor affecting meat purchases for DFW respondents. About 80% of DFW respondents chose natural beef over regular beef in the willingness to pay questions.

For 47% of OKC respondents, price was a very important factor affecting meat purchases. About one third of OKC and KC respondents said they frequently or always purchase natural/organic food products. However, KC respondents were slightly more willing to purchase natural beef and were a little less concerned about price. The percentages of OKC and KC respondents who chose to purchase natural beef over regular beef in the willingness to pay questions were 45% and 50%, respectively.

It is interesting to note that OKC and KC respondents did change their attitudes toward natural beef after reading the description. About 11% of OKC respondents and 20% of KC respondents changed their indifferent attitudes to positive attitudes after reading the description. Therefore, increased marketing efforts may influence OKC and KC consumers to consider purchasing more natural beef products.

Consumer Willingness to pay for Natural Beef

Based on an assessment of responses to the willingness to pay questions, respondents were categorized into three distinctive groups: (1) those who would always choose natural beef over regular beef even with a high price differential (NN group), (2) those who would buy natural beef but have reservation prices beyond which they would purchase regular beef instead of natural beef (NR and RN groups), and (3) those who would purchase regular beef instead of natural beef if any price differential exists (RR

group). Chi-square analyses indicated that distinctive differences in meat purchasing behavior and perceptions of natural beef existed among the groups.

Results of the multinomial logit analyses indicate that respondents' previous meat purchasing behavior and perceptions of natural beef did significantly affect their willingness to pay for natural beef. Respondents who check labels more frequently were more likely to purchase natural beef. Respondents who purchase other natural/organic food products more often were also more likely to purchase natural beef. Respondents who had a positive attitude toward natural beef after reading a description of natural beef were more likely to purchase natural beef than those with an indifferent attitude. Therefore, producers may be able to market natural beef to a larger group of consumers by providing more product information.

An interesting finding from the study was that none of the respondents' meat purchasing behavior was significantly affected by brand. However, branded beef products are a relatively new development, so consumers may not have much previous experience purchasing branded beef products. The beef industry is just now trying to move toward a more consumer-oriented marketing approach instead of the traditional commodity-oriented marketing approach. Therefore, brand could play a larger role in consumers' meat purchasing decisions once more branded beef products (i.e. consumer-oriented) enter the market. Producers who are interested in promoting their own branded beef products in the Southern Plains region may want to consider further research into this issue.

Marketing Natural Beef

The information provided from this study can be used as a starting point for producers' natural beef marketing efforts. Results of this study indicate that there is a consumer segment willing to purchase natural beef. Producers may be able to develop a specific marketing strategy for each group of respondents to increase purchases of natural beef products. In addition, producers may be able to persuade more consumers to purchase natural beef by providing more product information via promotional activities.

It should be noted that there were some limitations to this research project. The consumer survey may have been more effective if it was designed to collect more specific consumer information. However, this was not possible since the consumer survey used in this study was part of a much larger research project conducted by the Kerr Center for Sustainable Agriculture. The consumer survey may have provided more meaningful results if only one supermarket chain was chosen for the survey. If this had occurred, consumers in each of the three metropolitan areas would have experienced similar store conditions (i.e. layout, advertising, variety, etc.). The factors affecting consumers' meat purchasing behavior, perceptions of natural beef, and willingness to pay would have been easier to determine and would not have been influenced by store choice. In this study, the effect of varied store conditions on consumers' meat purchasing decisions was captured only by the class variable indicating geographic location, so it is unknown whether or not store conditions affected consumer responses. This type of information may help to determine the characteristics that most directly distinguish consumers in each category (NN, NR, RN, RR).

In addition, this study may have provided more significant results if actual market data were used to assess consumer willingness to pay. The use of actual prices and purchases of natural beef from a particular natural beef company or alliance would have provided a better assessment of consumer willingness to pay than the hypothetical market situation used in this study. Further research should probably be conducted using actual market data for natural beef. However, this will require the participation by one or more natural beef providers.

In order to effectively market natural beef, producers also need information on competitors, alliance formation, and retail demand for natural beef in Oklahoma, Kansas, and Texas. Producers need to know how effective their competitors are in marketing natural beef products. It will probably be essential for small natural beef ranchers to join together in a cooperative or alliance in order to feasibly market natural beef products. However, there is not much previous research on beef alliances since they are relatively new to the industry. It would be beneficial for natural beef producers to know about factors affecting successful alliance formation in the beef industry.

It is also important to know about the retail demand for natural beef from supermarkets and natural foods stores in Oklahoma, Kansas, and Texas. As the natural foods market continues to expand, supermarkets and natural foods stores will probably be looking for additional suppliers of natural beef. However, producers will need to establish a contract or some type of agreement with these stores to supply natural beef before they can make production decisions.

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All Natural Beef Survey

The Kerr Center for Sustainable Agriculture and the OSU Food and Agriculture Products Research and Technology Center are conducting consumer beef marketing surveys in Oklahoma, Kansas, and Texas. The purpose of the study is to become more informed about consumer perceptions and preferences related to natural beef. Aggregate results will be made available to the public on the Kerr Center's web site: www.kerrcenter.com. The survey will only take 10 minutes. Your input is very important to the success of this project.

1. How informed are you about how meat (beef, chicken, pork) is raised and processed?
 a) Not Informed b) Somewhat Informed c) Very informed

2. How important is it for you to know the retail meat you purchase can be traced back to the farm and animal of origin?
 a) Not Important b) Somewhat Important c) Important d) Very Important
 e) Extremely Important

3. How often do you check food ingredient labels for artificial additives or preservatives?
 a) Never b) Rarely c) Occasionally d) Frequently e) Always

4. How often do you purchase a natural or organic food product?
 a) Never b) Rarely c) Occasionally d) Frequently e) Always

5. What is the factor that concerns you when you purchase beef products?
 a) Label Ingredients b) Taste and Tenderness c) Brand Name d) Price

6. What image do you associate with all natural beef products?
 a) Environment b) No antibiotics or Hormones Used in Production c) Taste and Tenderness
 d) Local Family Farms

7. How interested are you in having more information available about the ingredients used in processed food/beef products?
 a) Not interested b) Somewhat Interested c) Interested d) Very Interested e) Extremely Interested

8. How often do you eat? (Please check the appropriate box on each line)

	Never eat	Once per week	Twice per week	Three times or more
Beef products	___	___	___	___
Pork products	___	___	___	___
Poultry products	___	___	___	___
Fish products	___	___	___	___

9. When you buy meat, which type do you most often buy? (Please choose one category)
 ___ Bone-in ___ Boneless

10. When you buy beef, which type of beef do you most often purchase? (Please choose one category)
 ___ Hamburger ___ Steak ___ Other (please specify) _____

11. When you buy hamburger which type do you most often purchase? (Please choose only one)
 ___ 70-80% lean ___ 80-90% lean ___ Greater than 90% lean

12. When you buy steak, which type do you most often purchase? (Please choose only one)
 ___ Flank ___ Sirloin ___ KC Strip ___ Porterhouse
 ___ T-Bone ___ Rib eye ___ Tenderloin ___ Other (Please specify)

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3. How often do you check food ingredient labels for artificial additives or preservatives?
 a) Never b) Rarely c) Occasionally d) Frequently e) Always

4. How often do you purchase a natural or organic food product?
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5. What is the factor that concerns you when you purchase beef products?
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8. How often do you eat? (Please check the appropriate box on each line)

	Never eat	Once per week	Twice per week	Three times or more
Beef products	___	___	___	___
Pork products	___	___	___	___
Poultry products	___	___	___	___
Fish products	___	___	___	___

9. When you buy meat, which type do you most often buy? (Please choose one category)
 ___ Bone-in ___ Boneless

10. When you buy beef, which type of beef do you most often purchase? (Please choose one category)
 ___ Hamburger ___ Steak ___ Other (please specify) _____

11. When you buy hamburger which type do you most often purchase? (Please choose only one)
 ___ 70-80% lean ___ 80-90% lean ___ Greater than 90% lean

12. When you buy steak, which type do you most often purchase? (Please choose only one)
 ___ Flank ___ Sirloin ___ KC Strip ___ Porterhouse
 ___ T-Bone ___ Rib eye ___ Tenderloin ___ Other (Please specify)

13. How would you rate these factors in your meat purchasing decision? (1=not important to 5=very important)

	<u>Not Important</u>			<u>Very Important</u>	
Healthy/safe	1	2	3	4	5
Convenient (easy to cook, to eat)	1	2	3	4	5
Appealing (attractive packaging, color, appearance)	1	2	3	4	5
Price	1	2	3	4	5

14. How would you rate beef, chicken, and pork on these product characteristics? (1=very low to 5=very high content)

	<u>Beef</u>					<u>Pork</u>					<u>Chicken</u>				
Cholesterol content	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Calorie content	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Sodium content	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Artificial ingredients	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

15. How would you rate beef, chicken and pork on these display characteristics? (1=very poor to 5= very good)

	<u>Beef</u>					<u>Pork</u>					<u>Chicken</u>				
Microwaveability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Packaging	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Display in store	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Variety of the products available	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

16. When you purchase beef, how would you rate these factors? (1=not important to 5=very important)

	<u>Not Important</u>					<u>Very Important</u>				
Color	1	2	3	4	5					
Presence of marbling	1	2	3	4	5					
Minimum external fat	1	2	3	4	5					
Tenderness (known by purchasing experience)	1	2	3	4	5					
Good packaging	1	2	3	4	5					
Brand	1	2	3	4	5					
Leanness	1	2	3	4	5					
Sodium content	1	2	3	4	5					
Artificial ingredients content	1	2	3	4	5					

Please read the following description of all natural beef, then proceed with the remaining parts of the survey.

(Read) Natural beef is a high quality beef product raised without any hormones or antibiotics. Family farmers and ranchers who produce natural beef are committed to agricultural production methods that ensure the protection and enhancement of natural resources and believe in humane treatment of animals.

17. Which of the following best describes your knowledge of all natural beef before you were read the description?

Never heard of All Natural Beef until now
 Had heard of it, but didn't know much about it
 Knew a lot about it

18. When had you previously heard of or read about All Natural Beef? (Please choose all that apply)

Newspaper In-store product samples
 Promotional materials at the store Other (please identify)

19. How often do you purchase All Natural Beef products? (Please choose one category)

a) Never b) Occasionally c) Frequently d) Always

20. What other types of all natural products are you interested in?

Pork Poultry Vegetables

21. Prior to being read the description, how would you have characterized your attitude to an "all natural beef label?"
 Positive Negative Indifferent
22. After hearing the description, how would you now characterize your attitude to an "all natural beef label."
 Positive Negative Indifferent

Now, imagine you are shopping for beef sirloin steak at your local supermarket. You can choose between Regular Beef Sirloin Steak and All Natural Beef Sirloin Steak.

23. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak costs \$5.60 per pound, I would buy (please choose only one)
 Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$5.60 per pound

If you choose Regular Beef, please go to Question 24, do not answer question 25. If you chose All Natural Beef, please go to Question 25, do not answer Question 24.

24. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$5.00 per pound, I would buy (Check only one)
 Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$5.00 per pound
25. If Regular Beef Sirloin Steak costs \$4.00 per pound and All Natural Beef Sirloin Steak cost \$6.50 per pound, I would buy (Check only one)
 Regular Beef Sirloin Steak at \$4.00 per pound
 All Natural Beef Sirloin Steak at \$6.50 per pound

In this section, we would like some background information about you. This information will be treated as confidential and the results will only be used in aggregate form.

27. Are you ... Male Female
28. Your age ... _____
29. How many people live at this residence? _____
30. What is the highest level of education you have completed? (Please check only one category)\
- | | |
|--|--|
| <input type="checkbox"/> Less than 12 th grade | <input type="checkbox"/> B.S., B.A., Completed |
| <input type="checkbox"/> High school graduate or GED | <input type="checkbox"/> Some graduate work, no degree |
| <input type="checkbox"/> Technical, trade or business school | <input type="checkbox"/> M.S., M.A., completed |
| <input type="checkbox"/> Some college, no degree | <input type="checkbox"/> Ph.D., D.D.S., M.D., J.D., etc. |
31. What is your occupation? _____
32. What is your annual household income before taxes? (Please check only one category)
- | | | |
|---|---|---|
| <input type="checkbox"/> Less than \$20,000 | <input type="checkbox"/> \$50,000 to \$59,999 | <input type="checkbox"/> \$90,000 to \$99,999 |
| <input type="checkbox"/> \$20,000 to \$29,999 | <input type="checkbox"/> \$60,000 to \$69,999 | <input type="checkbox"/> \$100,000 to \$109,999 |
| <input type="checkbox"/> \$30,000 to \$39,999 | <input type="checkbox"/> \$70,000 to \$79,999 | <input type="checkbox"/> \$110,000 to \$119,999 |
| <input type="checkbox"/> \$40,000 to \$49,999 | <input type="checkbox"/> \$80,000 to \$89,999 | <input type="checkbox"/> more than \$120,000 |

33. Are there children in your household? ___ Yes ___ No
If answer is yes, how many of these children are less than 18 years of age? _____

We would like to thank your for your participation in this project, and should you have any questions about the Natural Beef Study, Please contact Eric Allenbach at 2801 E. Memorial, Suite 104, Edmond, OK 73013, 405-478-7618 or e-mail: kcfsa@flash.net.

APPENDIX B. IRB FORM

Oklahoma State University
Institutional Review Board

Protocol Expires: 4/26/02

Date: Friday, April 27, 2001

IRB Application No: AG0130

Proposal Title: DEVELOPING PLANS FOR SUSTAINABLE BEEF MARKETING STRATEGIES

Principal
Investigator(s)

Jody Goss
126 Food & Ag Products Center
Stillwater, OK 74078

Rodney Holcomb
114 FAPC
Stillwater, OK 74078

Reviewed and
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Signature



Carol Olson, Director of University Research Compliance

Friday, April 27, 2001

Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

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VITA

Jody Lynn Goss

Candidate for the Degree of

Master of Science

Thesis: FACTORS INFLUENCING CONSUMER DECISIONS RELATED TO
NATURAL BEEF

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Ryan, Oklahoma On May 17, 1978, the daughter of
Dennis and Dee Goss.

Education: Graduated from Ryan High School, Ryan, Oklahoma in May 1996;
received Bachelor of Science degree in Agricultural Economics from
Oklahoma State University, Stillwater, Oklahoma in May 2000.
Completed the requirements for the Master of Science degree with a major
in Agricultural Economics at Oklahoma State University in May 2002.

Experience: Accounts Receivable Intern, Oklahoma Department of Agriculture,
May 1999 to August 1999; Agricultural Statistician Intern, Oklahoma
Agricultural Statistics Service, May 2000 to August 2000; Graduate
Research Assistant, Department of Agricultural Economics, Oklahoma
State University, August 2000 to May 2002.