8-2018

U.S. Consumers' Perception, Intention, and Purchase Behavior of Grass-Fed Beef

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U.S. CONSUMERS' PERCEPTION, INTENTION, AND PURCHASE BEHAVIOR OF GRASS-FED BEEF

by

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A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Agriculture Extension and Education

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UTAH STATE UNIVERSITY
Logan, Utah

2018

ABSTRACT

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by

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Utah State University, 2018

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The purpose of this research was to identify a specific profile of consumers who are likely to purchase grass-fed beef, allowing grass-fed beef producers to create an effective marketing plan. The researcher created an online survey through Qualtrics and administered it to an opt-in panel of household primary grocery shoppers, through Centiment. There were 484 survey responses collected from four regions within the U.S.: Northeast, Midwest, South, and West.

A conceptual model of purchasing grass-fed beef was created by combining components of the theory of planned behavior and total food quality model with additional components: demographic characteristics, knowledge, and meat and beef consumption habits. Respondents from all regions had a weakly positive attitude toward purchasing grass-fed beef and limited knowledge of grass-fed beef production practices. Most of the respondents ate meat between 1 to 5 times per week, with beef being the second most common type of meat consumed. Respondents primarily purchased their

meat from national grocery store chains. Grass-fed beef was not consumed in April 2018 by the majority of respondents (n = 288). Of the 196 respondents who had eaten grass-fed beef, a majority of them in each region were very satisfied. The primary reasons for dissatisfaction with grass-fed beef were the price and tenderness. Demographic characteristics revealed that the consumers who intended to purchase grass-fed beef were (1) married or in a domestic partnership, (2) living in households without children under the age of 18, (3) living in households with one or two individuals, and (4) reporting an annual household income between $50,000 and $74,999. The information gathered in this study helped to create a profile of U.S. consumers who are likely to purchase grass-fed beef in each region.

Future research recommendations included determining whether animal welfare concerns, environmental attitudes, and willingness to pay would influence their intention to purchase grass-fed beef. Another future research study would compare consumer intention to purchase grass-fed beef with intention to purchase other niche products, such as organic or natural beef. This information would assist producers in developing an effective marketing plan for grass-fed beef products.

(130 pages)

PUBLIC ABSTRACT

U.S. Consumers' Perception, Intention, and Purchase Behavior of Grass-fed Beef

Elizabeth K. Crandall

The purpose of this research study was to compile regional profiles of the consumers who intend to consume grass-fed beef in the U.S. and to create marketing strategies that would assist producers in marketing their product to consumers. The researcher sent an online survey to a panel of 484 consumers across the U.S. to learn about their perceptions of and intention to purchase grass-fed beef.

Respondents had a weak, positive attitude toward purchasing grass-fed beef but had low knowledge of production practices. These consumers had a desire to eat healthier; however, they wanted meat that was priced right and had a desirable leanness. Consumers were divided based on U.S. regions (Northeast, Midwest, South, and West) to determine any differences in their knowledge, attitudes, subjective norm, importance of quality cues, meat and beef consumption habits, beef consumption habits, and meal preparations. The information gathered from respondents was used to create a marketing plan for each region of the U.S.

Recommendations for future research included exploring how the processing of meat, environmental attitudes, and eating habits influence consumers' intention to purchase grass-fed beef. Information about consumer willingness to pay would also be helpful for grass-fed beef producers who are creating a marketing plan.

ACKNOWLEDGMENTS

I would like to acknowledge my amazing husband, Rhett, for his continued love, patience, and support throughout this thesis. He has pushed me to continue learning and writing, even when I did not want to. He kept me in good spirits with his sense of humor and uplifting spirit. He is truly the greatest blessing in my life, I am glad that we share so many common interests and hobbies. Here is to our wonderful life together.

My parents, Becky and Francisco, have always encouraged me to follow my dreams and have provided me with the ideal environment to be successful in all of my endeavors. They instilled in me at a young age a love for agriculture and the lifestyle that stems from it. I am grateful for their examples in my life of perseverance, determination, and love. My sweet little sister, Katie, gives me a reason to be someone she can look up to.

I am grateful for my wonderful friends and family who have helped me through this degree and many of life's challenges. I would not be where I am today if it were not for all of your support and guidance. I have had great friends who allowed me to talk them into getting their master's with me and have been a shoulder to lean on throughout the years.

I am grateful to have had outstanding mentors throughout my educational process. Dr. Kerry Rood immediately took me under his wing and allowed me to see how impactful a single professor can be. Thank you for never giving up on me and aiding me as I have been navigating through school and career choices. Dr. Brian Warnick, thank you for always believing in me and letting me know that there is always someone on my

side. I have appreciated the guidance that you have continually offered.

Finally, I would like to thank Dr. Kelsey Hall for all of the time and effort that she put into guiding me through this process. I have learned more than I thought possible about writing and communication, both skills I know I will use throughout my career. I am grateful to the rest of my committee for their willingness to work with and mentor me.

Beth Crandall

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CHAPTER I

INTRODUCTION

There has been a growing demand amongst consumers for grass-fed beef. This is primarily due to the environmental benefits and nutritional content of beef from grass-fed cattle (Sitienei, Gillespie, & Scaglia, 2016). Cardiovascular disease (CVD), which can be caused by abnormal blood lipid levels, is a leading culprit of mortality in Americans. Certain forms of dietary fats are an important part of a well-balanced diet, which helps to prevent CVD (National Cattlemen's Beef Association, 2014). Health professionals have suggested that individuals lower their consumption of saturated fatty acids (SFA), trans-fatty acids (TA), and cholesterol, while increasing their intake of conjugated linoleic acids (CLA) and omega-3 fatty acids (Daley, Abbott, Doyle, Nader, & Larson, 2010; McNeill, Harris, Field, & Van Elswyk, 2012). Consumer awareness of the effects that their beef choices have on their health has increased due to awareness raised through the media and research (Sitienei, Gillespie, & Scaglia, 2017).

Beef producers have focused on making changes to their cattle breeding, genetics, and feed programs to meet the demand for leaner beef (Van Elswyk & McNeill, 2014). Beef from cattle that have been fed grass-based diets have fewer SFAs, TAs, and cholesterol. The significantly higher levels of CLAs and omega-3 fatty acids in grass-fed beef make it a leaner red meat choice (Cheung, McMahon, Norell, Kissel, & Benz, 2017; Duckett, Neel, Lewis, Fondenot, & Clapham, 2014).

Although grass-fed beef has been proven to be a healthier, leaner red meat than conventional beef, a few things make it less desirable to some shoppers (Daley et al.,

2010). Palatability and appearance have been rated as top priorities for consumers when selecting the beef they will purchase (Mirog, 2004). Altering the fatty acid composition of beef affects the overall taste and color of the meat cut. Although flavor is not only affected by the fat content of the cattle, forage type, breed type, and marbling score also affect the taste (Van Elswyk & McNeill, 2014). All eight participants in a flavor panel felt that meat from grass-fed cattle lacked the "beef" flavor that was present in conventional beef (Duckett et al., 2014). Many chefs and gastronomical experts believe high-quality grass-fed beef has a more complex, "beefier" flavor that consumers desire (Cheung et al., 2017). One recent study suggests no obvious difference in juiciness or tenderness when comparing grass-fed and conventional beef (Duckett et al., 2014). Gathering current data from U.S. consumers about preferences and intention towards purchasing grass-fed beef will assist beef producers and cattle associations in creating beneficial marketing tactics.

Marketing channels for agriculture producers are continually changing, as the public's preferred methods of receiving advertisements are also shifting. Producers of niche markets, such as grass-fed beef, need specific information about the preferences of their consumers, so they can create a product to target their audience (Curtis, Cowee, Havercamp, Morris, & Gatzke, 2008). These producers often reach out to Extension specialists for guidance on knowing what consumers are currently seeking. Extension specialists are faced with the challenge of answering these difficult questions and are often unprepared to answer some of the marketing inquiries (Chase, 2006). Extension plays an integral role in finding answers to these questions as they have the ability to

research the public's perception on various issues and share that data with producers (Chase, 2006). Research studies have identified various tactics that can be used to target consumers (Cheung et al., 2017; Curtis et al., 2008; Dahlen, Hadrich, & Lardy, 2014; Gwin & Lev, 2011), and the results of this research can be distributed to producers by Extension specialists. Producers have expressed the need for additional research on marketing tactics (Curtis et al., 2008). They would like to have the ability to work one-on-one with Extension, which would require more staff and extensive training (Chase, 2006). Producers would also like to have the opportunity to attend workshops, as well as receive newsletters and bulletins to improve their skills (Dahlen et al., 2014).

Problem Statement

Grass-fed beef producers are tasked with marketing their product to consumers through direct sales and retail sales as well as considering the concerns of their customers. To reach their desired audience, producers' marketing techniques need to be precisely targeted for the consumers who are faced with information overload in today's competitive market. A variety of studies explore consumers' preferences for grass-fed beef (Cheung et al., 2017; Dobbs et al., 2016; Evans, 2007; Gwin, Durham, Miller, & Colonna, 2012; Sitz, Calkins, Feuz, Umberger, & Eskridge, 2005; Van Elswyk & McNeill, 2014) and marketing tactics for producers (Curtis et al., 2008; Gwin & Lev, 2011) through the use of taste panels and contingent valuation methods (Conner & Oppenheim, 2008). Past studies explored beef producers marketing tactics and consumer purchasing preferences (Gillespie, Sitienei, Bhandari, & Scaglia, 2016). One weakness of

these studies is that they did not develop U.S. regional consumer profiles describing how these factors influence their grass-fed beef purchases: meat consumption, beef consumption, knowledge, quality cues, attitude, subjective norms, perceived behavioral control, and purchase intention. This information will provide beef producers with the knowledge to make an informed decision on whether or not to shift their operations from conventional beef to grass-fed and how to best market their products to consumers. This study will also lead to the development of a marketing plan that grass-fed beef producers can use to learn how to target consumers.

Research Objectives

The research objectives for this study included the following.

1. Describe the demographic characteristics of the respondents likely to purchase grass-fed beef.
2. Compare meat consumption, beef consumption, knowledge, quality cues, attitude, subjective norms, and perceived behavioral control of respondents across regions.
3. Compare communication channels for receiving information about beef across regions.
4. Predict respondents' intentions to purchase grass-fed beef based on beef consumption, knowledge, quality cues, attitude, subjective norms, perceived behavioral control, and demographic characteristics.

Limitations of the Study

Results for this study were collected through an online survey administered by Centiment, a company that uses non-probability sampling to select participants. The sample was limited to participants who were recruited by this survey company and have

access to a computer; therefore, it might not be a representative sample. This limitation was reduced through representative balancing of the opt-in panel participants based on the U.S. Census data for age, gender, ethnicity, and region. Participants might misunderstand some of the questions in the survey. To decrease misunderstandings, a soft launch of the survey was sent to 68 individuals, and Cronbach's alphas were run on the biopolar and Likert scales of that data to establish reliability. Each region may have differences in how they interpret words, particularly on the dishes that are prepared with grass-fed beef.

Basic Assumptions

The basic assumptions made by the researcher for this study were as follows.

1. Each participant would answer the survey questions truthfully and completely.
2. Each participant was the primary grocery buyer for their household.
3. Each of the participants has eaten beef.
4. The sample would accurately reflect the U.S. population.

Significance of the Problem

Much research on grass-fed beef has been done exploring the health benefits, quality cues, or willingness to pay, stemming from the increased demand for this niche market commodity (Daley et al., 2010; Duckett et al., 2014; Van Elswyk & McNeill, 2014). The different flavor, appearance, and increased price played a role in preventing consumers from purchasing beef that has been fed only forages (Daley et al., 2010;

Duckett et al., 2014; Mirog., 2004; Van Elswyk & McNeill, 2014). Producers of grass-fed beef are constantly working to improve their marketing tactics and provide consumers with information about their product (Muhammad, Tegegne, & Ekanem, 2004). Research studies exploring the preferences of potential and current grass-fed beef consumers have been conducted in the U.S. (Dobbs et al., 2016; Gwin et al., 2012). Few, if any of these studies, have developed regional consumer profiles that explain the factors influencing their intention to purchase grass-fed beef. Few, if any, of these studies have offered suggestions for a grass-fed beef marketing plan.

Surveying consumers in the U.S. would provide information about their meat consumption habits, shopping situations, quality cues, knowledge, attitudes, communication channels, subjective norms, and demographic characteristics that influence their decision to purchase grass-fed beef. Cooperative Extension can play an integral role in sharing data about consumer preferences and providing it to the producers in their area (Dahlen et al., 2014). Results from this study will offer Extension specialists research-based knowledge that they can use to advise grass-fed beef producers in their area on valuable strategies for meeting the needs of consumers. This knowledge would assist producers in implementing marketing tactics that will specifically target their desired audience. Better marketing allows the opportunity for increased sales and overall income for these producers. This knowledge also allows for a valued relationship between Extension specialists and the producers in their county. Other organizations that reach out to the public and consumers regarding the production of beef can also use this information, such as American Farm Bureau Federation, National Beef Cattlemen's

Association, and Agriculture in the Classroom. This material benefits individuals who are interested in learning more about grass-fed beef consumption.

Definition of Terms

Attitude: The degree to which someone has a favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen, 1991).

Conventional beef: Beef from cattle fed forage and grains in their diet (Van Elswyk & McNeill, 2014).

Cost cues: The actual 'signals' indicating the price of a product at the store or market (Brunso, Fjord, & Grunert, 2002).

Extension: Extension provides non-formal education and learning activities to people throughout the country; to farmers and other resident of rural communities as well as to people living in urban areas (U.S. Department of Agriculture, 2017).

Extrinsic quality cues: Product-related attributes that are not part of the physical product (Olson & Jacoby, 1972).

Grass-fed beef: (1) Animals with a diet that consists only of grass and forage from weaning until harvest, (2) those who are raised on pasture without confinement to feedlots, (3) animals that are never treated with antibiotics or growth hormones, and (4) animals that are born and raised on American Family Farms (American Grass-fed Association, 2018).

Intention: Capture the motivational factors that influence a behavior; they indicate how hard a person is willing to try, how much effort they are planning to exert,

in order to perform a behavior (Ajzen, 1991).

Intrinsic quality cues: Physical attributes of the product that cannot be changed or physically manipulated (Olson & Jacoby, 1972).

Millennial: A person born in the 1980s to 1990s (Merriam-Webster Online Dictionary, 2018).

Perceived behavioral control: A person's perception of the ease or difficulty of performing the behavior of interest (Ajzen, 1991).

Subjective norms: The perceived social pressure to perform or not perform a behavior (Ajzen, 1991).

Summary

This chapter introduced the production of grass-fed beef in the U.S. It discussed the health and environmental benefits associated with the niche product, as well as some of the characteristics that have discouraged consumers from purchasing it. The challenge of effectively marketing grass-fed beef that producers are tasked with was described. This included needing a consumer profile of those most likely to purchase grass-fed beef and knowing what channels of communication would be most effective for producers to use.

CHAPTER II

REVIEW OF LITERATURE

In order to predict the U.S. general public's behavioral intention to purchase grass-fed beef, this review examined several topics to inform a complete predictive model: marketing tactics, attitudes, subjective norms, perceived behavioral control, extrinsic quality cues, cost cues, intrinsic quality cues, demographics of beef consumers, meat and beef consumption habits, and knowledge about grass-fed beef production practices. In addition, the review described the production of grass-fed beef and the role that Extension specialists have in working with producers and consumers. A conceptual model of purchasing grass-fed beef was created by combining meat and beef consumption habits, knowledge, and demographic characteristics with the Theory of Planned Behavior (TPB; Ajzen, 1991) and the Total Food Quality Model (TFQM) (Grunert, Larsen, Madsen, & Baadsgaard, 1996).

Production of Grass-Fed Beef

Grass-fed beef and other niche market products began to make a significant appearance as issues involving the production, distribution, consumption, and disposal of food surfaced (Perez & Howard, 2007). Grass-fed beef has become increasingly popular as a healthy red meat option, with retail sales growing from $17 million in 2012 to $272 million in 2016 (Cheung et al., 2017). Recent research has shown that 4.0% of the cattle market consists of grass-fed cattle, with only 1.0% of that being marketed as grass-fed while the other 3.0% is not labeled (Cheung et al., 2017).

Consumers have become increasingly more aware of the nutritional content of the food they eat, animal welfare, and how the production of that food affects the environment (Cheung et al., 2017). Grass-fed beef has appealed to farmers and ranchers for a variety of benefits that it can offer (Gillespie et al., 2016).

The term grass-fed did not become legally recognized until October 2007 when the U.S. Department of Agriculture defined it as "the lifetime diet must consist only of grass and forage, with the exception of milk consumed prior to weaning. Animals cannot be fed grain or grain by-products and must have continuous access to pasture during the growing season" (United States Standards for Livestock and Meat Marketing Claims, Grass (Forage) Fed Claim for Ruminant Livestock and the Meat Products Derived from Such Livestock, 2007). In 2016 this standard was withdrawn, leading several third-party organizations to create standards for grass-fed beef, including the American Grass-fed Association (American Grass-fed Association, n.d.).

For this study, the grass-fed standard for meat from the American Grass-fed Association (AGA) was used. The AGA standard focuses on four main areas of production: (1) diet, animals are only fed grass from weaning until harvest, (2) confinement, animals are raised on pasture without confinement to feedlots, (3) antibiotics and hormones, animals are never treated with antibiotics or growth hormones, and (4) origin, all animals are born and raised on American Family Farms (American Grass-fed Association, n.d.). The primary difference between conventional beef and grass-fed beef takes place during the finishing phase: grass-fed cattle are finished on pasture rather than being taken to a confined feeding area and finished on a grain-based

diet (Cheung et al., 2017). All beef cattle, whether finished on grain or grass, spend approximately two-thirds of their time on a forage diet (Felix, Williamson, & Hartman, 2018).

Marketing Grass-Fed Beef

Since grass-fed beef is a relatively new, usually small-scale market, it has not often utilized the traditional marketing channels of conventional beef (Cheung et al., 2017). This means that grass-fed beef producers must have a strong marketing plan. There was a significant demand for locally grown products, but a limited market for exchange between producers, retail outlets, and consumers (Gillespie et al., 2016). Establishing a relationship between ranchers and farmers and their customers was a major barrier (Curtis et al., 2008), but that relationship was very valuable to marketing a product (Gwin & Lev, 2011).

According to Cheung et al. (2017), the two main ways to profitably run a grass-fed beef operation are to sell direct-to-consumer at a high premium or by selling through branded programs and running a larger operation. Approximately 19.0% of the grass-fed cattle market consists of small-scale producers who sell direct-to-consumer, while the remaining 82.0% are sold through branded grass-fed programs (Cheung et al., 2017). Small-scale programs must sell their product at a higher premium due to increased processing costs, though grass-fed beef that is sold through branded programs often have to pay meat distributors for their service (Cheung et al., 2017).

Many grass-fed beef producers have worked through direct marketing channels to

sell and advertise their products. Farmers' markets, pick-your-own, and roadside stands have been popular means of marketing for many producers (Curtis et al., 2008), although these are not the only options and often times are not the most effective strategy (Gwin & Lev, 2011). Grass-fed beef producers have also worked with restaurant chefs, grocery stores, food service operators, and the internet to sell their beef (Cheung et al., 2017). Grass-fed beef producers have also sold their meat to retail establishments. A study done by the Food Marketing Institute and Foundation for Meat and Poultry Research and Education (FMI & FMPRE, 2018), found that supermarket grocery stores were the primary channel for consumers purchasing meat and poultry. Alternative channels for purchasing meat and poultry were supercenters, clubs, stand-alone butcher shops, farm-direct/farmers' markets, convenience stores, and online outlets such as Omaha Steaks. Online grocery shopping has become more popular, with online meat sales increasing 15.0% from 2015 to 2018 (FMI & FMPRE, 2018). An above average number of consumers in the South were more likely to go to supercenters, while 14.0% of those in the West were likely to purchase from a club (FMI & FMPRE, 2018). This same study found that an above average number of consumers from the Northeast occasionally purchased meat from butcher shops (FMI & FMPRE, 2018). Sixty-five percent of consumers shopped at grocery stores for their meat, while 15.0% purchased meat from Wal-Mart (McCarty & Neuman, 2013). Half of consumers read the label on the meat package before buying it (McCarty & Neuman, 2013).

Consumers used different communication channels to gather information about beef. The internet was the top resource for shoppers looking for guidance on meat

preparation, with social media being very popular among the younger generations (FMI & FMPRE, 2018). Gillespie et al. (2016) studied the communication channels that beef producers use to advertise their products. Word-of-mouth was the most common communication channel (89.7%), with the internet following closely behind (82.7%). Shoppers were looking to build a relationship with those who they buy their meat from, they liked to have access to recipes and guidance on how prepare meat (FMI & FMPRE, 2018).

Role of Extension Specialists

Extension professionals have taken a role in helping to integrate local foods into their states (Wise et al., 2013). Extension specialists could play a vital role in providing information about grass-fed beef to consumers, as well as current and future producers (Wise et al., 2013). These professionals are an institution that are in the ideal situation to focus on issues related to the food system. Since its establishment, Extension has been involved in food-system related education by working through youth, families, and the agriculture community (Perez & Howard, 2007). With Extension's ability to use a research integrated approach, they could better target and focus distribution efforts where they would be most effective for both producers and consumers (Wise et al., 2013).

Extension specialists have worked to set up networks for producers and chefs seeking local products (Curtis et al., 2008). A study performed by Wise et al. (2013) has gathered information about how Extension could help improve the current farm to table program to connect restaurant chefs with local producers. This information could also be

used in presentations prepared by Extension personnel and held for local producers (Wise et al., 2013). This information would assist producers who are seeking additional assistance on improving their marketing tactics (Muhammad et al., 2004).

Theory of Planned Behavior

Although the TPB was one of the theories used in this study, the theory of reasoned action (TRA) led to the development of the TPB and, therefore, should be briefly discussed. Ajzen and Fishbein (1980) described the TRA as how attitudes, subjective norms, and behavioral intentions influence an individual's actions. This theory left out how much perceived control people believe to have over their behavior, which led to Ajzen developing the TPB, a social behavioral model that is used to predict human behavior in different circumstances (Ajzen, 1991). The central focus of both of these theories is a person's intention to perform a certain behavior. Some behaviors, such as time, money, skills, and others' cooperation, are not under complete control and fall under the TPB (Ajzen, 1991).

The TPB is comprised of three components that a person considers before performing a behavior: attitude, subjective norms, and perceived behavioral control (Ajzen, 1998). A person's attitude toward the behavior is formed by the favorable or unfavorable consequences that can occur from carrying out that action. Attitude is also influenced by the individual's behavioral beliefs, or the probability that the behavior will produce an outcome, and how they evaluate those beliefs. Next, individuals consider the expectations of those who are important to them or from whom they want approval; this

is called subjective norms, which is influenced by their normative beliefs, or how they believe someone else wants them to act. Last, they consider perceived behavioral control, or what factors might prevent or help them from performing this behavior. Perceived behavioral control is influenced by control beliefs, which is the perceived presence of other factors that alter the performance of a behavior. Individuals have a greater chance of performing a behavior if they have a more favorable attitude toward that behavior and better subjective norms; these lead to a greater perceived behavioral control (Ajzen, 1998). With a high perceived behavioral control, individuals would have the intention of performing a behavior. If individuals have a strong perceived behavioral control and intent to perform a specific behavior, actual behavior is likely. This idea is represented in Figure 1, a representation taken from Ajzen (2006).

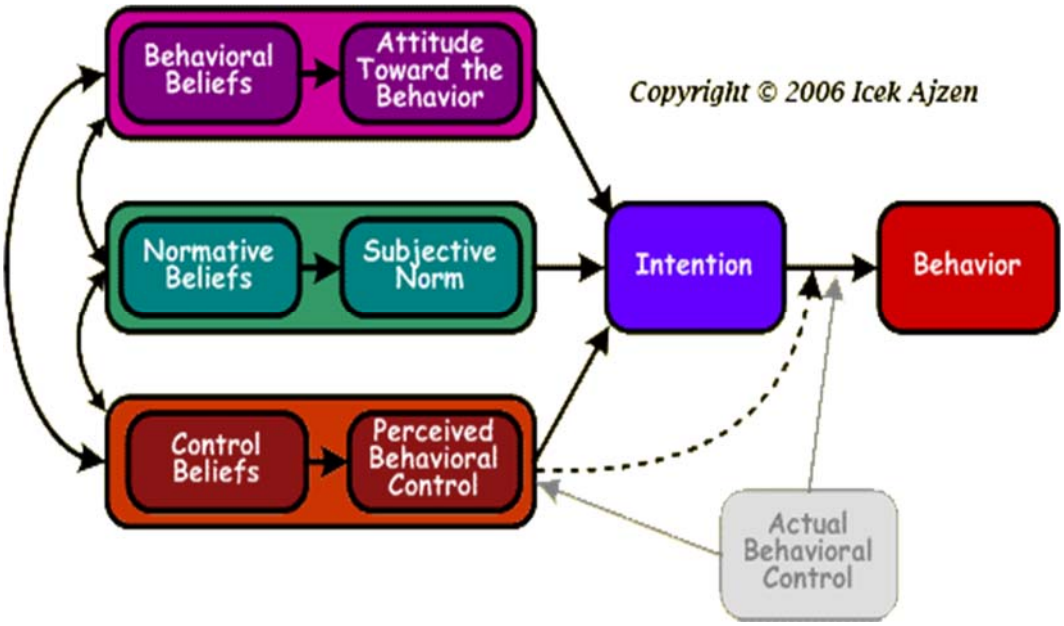

Figure 1. The theory of planned behavior illustrating how behavioral, normative, and control beliefs influence intention and behavior. From "Theory of Planned Behavior Diagram" by I. Azjen, 2006. Retrieved from http://people.umass.edu/aizen/tpb.diag.html and reprinted with permission (see Appendix C for letter of permission).

The TPB has been frequently used to understand certain behaviors, such as the relationship between food choices and behavior (McDermott et al., 2015), consumer's attitude towards local food (Kumar & Smith, 2017), the purchase of organic foods (Scalco, Noventa, Riccardo, & Ceschi, 2017), the purchase of meat from mobile slaughter units (Hoeksma, Gerritzen, Lokhorst, & Poortvliet, 2017), and intention to consume fruits and vegetables (Lohse, Wall, & Gromis, 2011). According to the TPB, if people have the intention of eating a healthier food, they have a positive attitude toward doing so and feel the social pressure to eat it. Their chances also increase if they have perceptions that they are capable of eating healthier (McDermott et al., 2015).

Total Food Quality Model

To combine multiple approaches that explain consumer quality perception and decision-making, Grunert et al. (1996) developed the TFQM. This model has two evaluation categories: before purchase and after purchase, as displayed in Figure 2. Prior to purchasing a food item, a consumer focuses on a search quality, such as the appearance of the item. After the item has been purchased, the consumer evaluates an experience quality, like taste (Grunert et al., 1996). Credence qualities, such as the health benefits of an item, cannot readily be evaluated by the consumer; therefore, they must trust the information that has been provided to them (Grunert, Bredhal, & Brunso, 2004).

The quality of food has been defined by Grunert (2005) in two ways. The first way deals with the physical characteristics that are built into that food, such as nutritional content. These are characteristics that are often measured by food technologists and

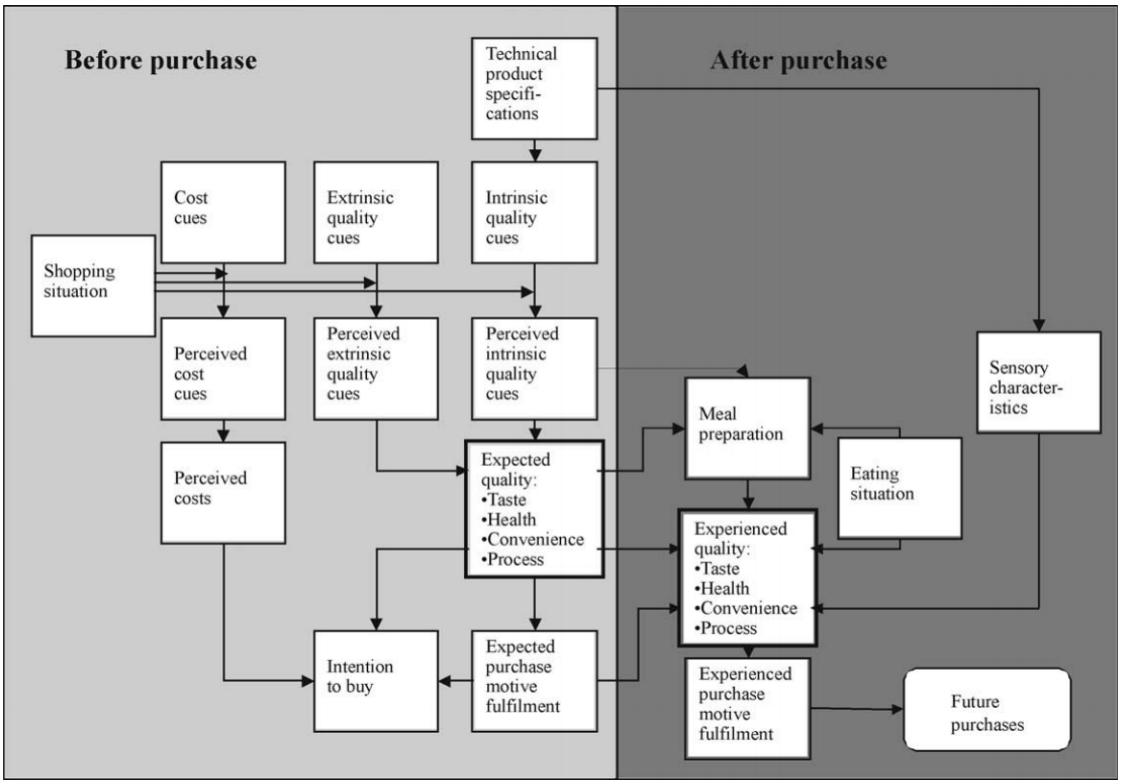

Figure 2. Total Food Quality Model. Representing extrinsic, intrinsic, and cost cues associated with shopping for an item as well as how the experience after the purchase will affect future purchases. Grunert, K. G., Bredhal, L., & Brunso, K. (2004). Consumer perception of meat quality and implications for product development in the meat sector—a review. *Meat Science, 66*, 259-272. (see Appendix C for letter of permission).

provided to shoppers. The other definition is related to how consumers perceive the quality of the food that they are eating. A combination of these two definitions has lead farmers and ranchers to create food that has the physical characteristics that meet the preferences of consumers and encourage them to buy a product (Grunert, 2005). In a study that evaluated the quality dimensions for meat consumers, the most important ones for participants were taste, tenderness, juiciness, freshness, leanness, healthiness, and nutrition (Grunert et al., 2004).

Before purchasing a food product, consumers focus on quality cues that are available to them in the store, such as cut, brand, fat content, etc. These quality cues are broken into two categories: intrinsic and extrinsic (Grunert, 1997). Grunert (1997) surveyed consumers to determine which quality cues were most important to them when purchasing meat. From the results gathered, intrinsic quality cues included visual physical characteristics about the product itself, such as cut, marbling, color, and the presence or absence of fat. Extrinsic quality cues focused on the price, brand, origin, and animal production information. These quality cues can help to fulfill shoppers' purchase motives when they are seeking a specific product, which create positive consequences. If the positive consequences outweigh the negative consequences (e.g., price), consumers usually purchase the product (Grunert et al., 2004).

After the purchase of a product is when the consumer experiences its quality. This experienced quality, as Grunert et al. (2004) calls it, is influenced by the consumer's expectations and sensory characteristics, which is dependent upon how it was prepared, what time of day it was eaten, the consumer's mood, etc. The satisfaction of customers and chance of them purchasing the product again is determined by their experience before and after the purchase. This can pose a problem for ranchers and farmers of unbranded products. If consumers had a bad experience with an inferior product that is under the same "name" as their product, these consumers will no longer purchase the brand even if the farmer's or rancher's item is superior. Branded items and consumer perceptions were highly correlated, thus influenced the probability of a consumer purchasing that brand (Brunso et al., 2002).

Conceptual Model of Intention to Purchase Grass-Fed Beef

A conceptual model (see Figure 3) was created to predict U.S. consumers' intention to purchase grass-fed beef. This model was developed by reviewing existing literature related to TPB, TFQM, meat consumption, grass-fed beef consumption, knowledge, and demographic characteristics of individuals who consume beef or grass-fed beef.

Theory of Planned Behavior Components

Attitude is measured as a summative evaluation of an object or issue using

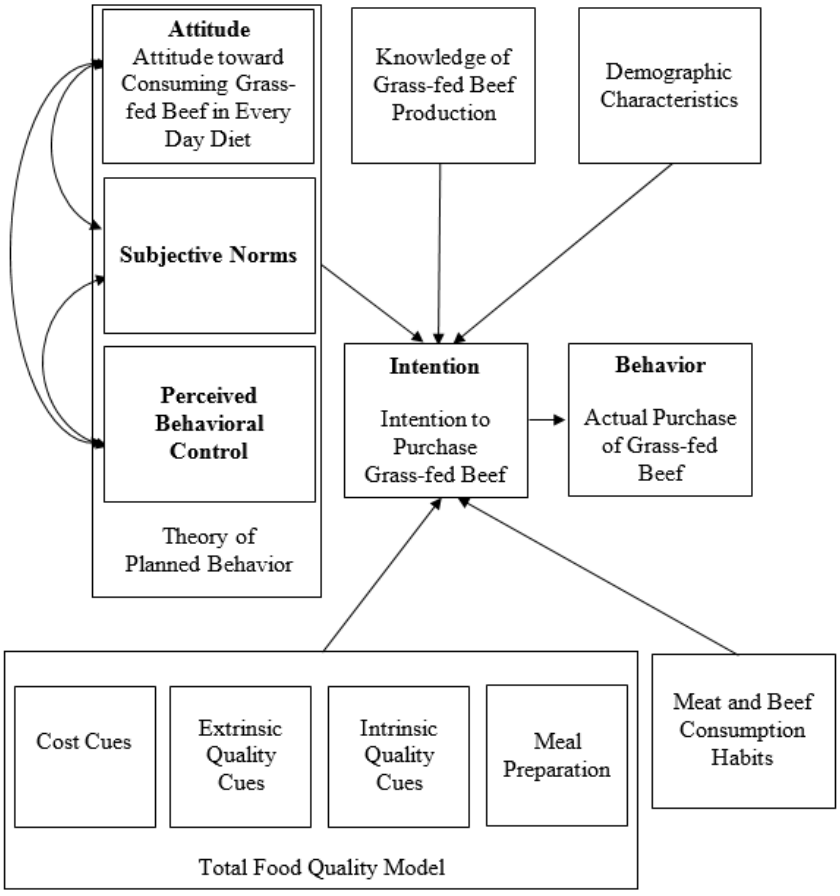

Figure 3. Conceptual model of intent to purchase grass-fed beef in the U.S.

attribute dimensions like good-bad, beneficial-harmful, pleasant-unpleasant (Eagly & Chaiken, 1993). Attitudes toward grass-fed beef consumption in the U.S. have not been deeply studied. However, attitudes toward beef consumption have been studied using the theory of planned behavior. McCarthy, de Boer, O'Reilly, and Cotter (2003) found that health, taste, and the safety of beef heavily influenced the attitudes of consumers. A study by Hoeksma, Gerritzen, Lokhorst, and Poortvliet (2017), concluded that higher quality beef produced with better animal welfare led to more beef consumption. Attitude was the most important factor that determined if an individual would consume beef (Hoeksma et al., 2017).

Subjective norms determine how influential others are on an individual's decision to perform a specific behavior (Ajzen, 1998). Spouses, family members, and friends have influenced individuals during purchasing decisions (Simpson, Griskevicious, & Rothman, 2012). The views of others, especially doctors and dieticians, played an integral role in determining how consumers feel about their beef consumption (McCarthy et al., 2003). While subjective norms did influence consumer's intention to consume beef, it was not as important as their attitude and perceived behavioral control (Hoeksma et al., 2017; McCarthy et al., 2003). Significant and positive influence from subjective norms, particularly spouses, indicated social pressure about buying meat in Pakistan (Khattak & Khattak, 2017). However, another study reported insignificant prediction of subjective norms (family members, friends, doctors, & nutritionists) on influencing consumers to purchase beef for their family in Pakistan (Khattak & Naqvi, 2016).

When consumers feel that they have the ability to control their behavior, this

increases their intention (Ajzen, 1998). Intention to perform a behavior was unlikely if individuals lacked time, money, or skills (Ajzen, 1998). Hoeksma et al. (2017), found a consumer's perceived behavioral control to be an important factor influencing their intention to purchase meat from mobile slaughter units. Perceived behavioral control was considered a significant predictor for buying meat in Pakistan (Khattak & Khattak, 2017; Khattak & Naqvi, 2016).

Total Food Quality Model Components

Cost cues (i.e., price) are visible at the time of purchase, which has influenced individuals' intention to purchase beef (Grunert et al., 2004). Increased premiums on grass-fed beef has deterred shoppers away from purchasing it. In 2016, premiums on grass-fed products were 31-50% higher than conventional beef (Cheung et al., 2017). Cheung et al. (2017) also found that despite many consumers' willingness to pay, price was still a barrier that farmers and ranchers must overcome to successfully sell their product. While some consumers were willing to pay a slight premium, most could not afford it and would resort to purchasing conventional beef (Cheung et al., 2017). Some researchers believed that for grass-fed beef to become a larger commodity, farmers and ranchers would have to find a way to decrease their premiums to a more affordable value (Cheung et al., 2017; Gwin, 2009).

Extrinsic cues are non-physical product-related attributes that can be modified without changing the product, such as information on production practices, product origin, or packaging. In recent years, the extrinsic quality of health concerns has become a priority for consumers because it affects the type of beef they purchase from grocery

stores, farmers' markets, restaurants, and private vendors (Cheung et al., 2017; Gwin & Lev, 2011; Ziehl, Thilmany, & Umberger, 2005). CVD has been the leading cause of mortality in Americans and is caused by high levels of dietary fats that come from the diet. Although not all dietary fats cause CVD, some have positive effects on blood lipid levels and are necessary in a well-balanced diet (National Cattlemen's Beef Association, 2014). Conjugated linoleic acids and omega-3 fatty acids assist in lowering blood cholesterol levels, while saturated fatty acids and trans-fatty acids have proven to cause adverse effect to the heart (Daley et al., 2010; McNeill et al., 2012).

Research from a variety of studies has shown differing outcomes regarding the fatty acid content of grass-fed beef when compared to conventional beef. Some data concluded that while grass-fed and conventional beef have varying levels of specific fatty acids, the total fatty acid content does not differ (Daley et al., 2010), but that the fatty acid ratios in grass-fed beef are more beneficial for overall health (Cheung et al., 2017; Van Elswyk & McNeill, 2014). Fatty acid composition is also dependent on breed, genetics, and the type of forage eaten (Duckett et al., 2014; Van Elswyk & McNeill, 2014).

Grunert (2005) found that many consumers were concerned with extrinsic cues such as the origin of their food and information about animal welfare. A study done by the FMI and FMRPE (2018) found that consumers want transparency from the producer on issues such as animal welfare and environmental practices. According to Birt (2017), millennials are not just concerned with the type of food they eat, they want to know everything that is happening to produce that food. This leads to an increased demand for

food that is not only healthier but also better for the planet (Birt, 2017). Conventionally produced beef feedlots hold cattle while they are being finished on grain produce a significant amount of animal waste (manure); this can pollute both the air and water (Gwin, 2009). Whereas cattle that are grass-fed help to regenerate soil and plant-life through grazing systems and the manure that is spread into pastures (Cheung et al., 2017).

Beef purchasers were also concerned with how their food was produced and the health of those animals. Animals that live in closely confined quarters were more likely to become ill and need antibiotics (Cheung et al., 2017). Overuse of these can cause antibiotic resistance in cattle and humans that consume the meat (Cheung et al., 2017; Gwin, 2009). Grass-fed beef producers have focused on informing consumers about how their beef is produced, by using words such as “antibiotic-free,” “hormone-free,” and “lean” (Gillespie et al., 2016). Grass-fed cattle were overall healthier than conventionally finished beef as feeding grain can raise the pH of the rumen and cause acidosis (Cheung et al., 2017). These were all concerns for beef consumers, as they wanted to know more about the origins of the beef that they eat (Grunert, 2005).

Intrinsic quality cues focus on the physical aspects of a product, such as cut, color, fat, or marbling. Some shoppers found grass-fed beef less desirable than conventional beef due to its different color, taste, smell, and price (Daley et al., 2010; Mirog, 2004). There is a variance in the fatty acid composition of grass-fed beef when compared to conventional beef; this variance alters the taste, appearance, and smell of the meat (Van Elswyk & McNeill, 2014).

A variety of studies have been done to determine consumer preferences in relation to the palatability of grass-fed beef. In 2010, Daley et al. discussed how grass-fed beef is less accepted in areas where conventional beef is a normal part of the society's diet and argued that people prefer to eat what they are used to eating. Test panels with individuals trained to taste-test food found grass-fed beef less palatable, which was supported by Duckett et al. (2014) when flavor panels determined that grass-fed beef lacked juiciness and had an off flavor, but that this differed by country and what consumers were used to eating. Van Elswyk and McNeill (2014) reported that grass-fed steaks were less tender than conventionally raised steaks although there was no difference in the juiciness of the meat. Additionally, the flavor varied depending on the breed, age, and type of forage that cattle were consuming, making it difficult to measure taste scores. Cheung et al. (2017) stated consumers would not buy beef, no matter how healthy it was, if it was not palatable to them. Leanness and fatty acid composition was more important to consumers than how it was produced, according to a study done by Evans (2007). Most believed that grass-fed beef was lean, easy to overcook, and lacked flavor. Grass-fed animals do not necessarily have to be lean to be healthy; the composition of fatty acids can be more desirable and the animal adequately finished, which will result in a healthy, flavorful steak. Many chefs and gastronomical experts felt that grass-fed beef was better-tasting than conventional beef and their customers agree (Cheung et al., 2017). The lower lipid content of grass-fed beef causes it to have a different aroma and appearance than conventional beef (Daley et al., 2010). The fat in the meat may also appear to be slightly yellow due to an increase in adipose β-carotene deposition that comes from grass feeding

(Van Elswyk & McNeill, 2014).

Knowledge

According to Gillespie et al. (2016), there was limited knowledge on how grass-fed beef is marketed and advertised, what beef products are available, and how prices are determined. U.S. shoppers were reluctant to purchase different cuts and kinds of meat and poultry for they lack meat knowledge (FMI & FMPRE, 2018). If they were advised, 42.0% of these shoppers would try different meats. More knowledge of meat would lead to U.S. shoppers buying a greater variety of meat more often (FMI & FMPRE, 2018).

Meat Consumption and Beef Consumption Habits

The FMI and FMPRE (2018) surveyed 1,500 U.S. consumers, asking questions about meat consumption. The study found that meal preparation is still being done in the home and that those who are most likely to prepare their own meals increase with age, household size, and focus on nutrition. This survey also found that 40.0% of shoppers have one to three dinners per week with meat, while 34.0% have four dinners and 26.0% have five to seven dinners with meat each week (FMI & FMPRE, 2018). Consumers are eating more meat in the home that in restaurants (Yang & Woods, 2016). The U.S. Department of Agriculture sent out a survey and found that 3.6 meals per week were eaten outside the home (U.S. Department of Agriculture Economic Research Service, 2018). Additionally, out of 2,710 respondents, 71.5% of them stated that they usually eat meat in their diet (Yang & Woods, 2016). A study with 750 participants found that 36.0% of consumers eat beef more than once a week, while 60.0% eat chicken more than once a

week (McCarty & Neuman, 2013). McCarty and Neuman also found that 86.0% of respondents eat ground beef for weeknight dinners. Eight percent of consumers stated that they intended to increase consumption of beef in the next six months (McCarty & Neuman, 2013).

Demographics of Beef Purchasers

Demographics have played a major role in purchasing patterns of consumers (Reicks et al., 2010). Previous grass-fed beef studies focused on consumers' differences in gender, age, education level, marital status, household size, and household income of shoppers (Chamberlain, Kelley, & Hyde, 2013; Evans, 2007; Sneed & Fairhurst, 2017; Yang & Woods, 2016; Ziehl et al., 2005).

Gender has been shown to influence consumer choices when purchasing beef products (Reicks et al., 2010; Ziehl et al., 2005). A study done by Evans (2007) discovered females were more likely to purchase grass-fed beef than men. Ziehl et al. found that women sought food that was naturally-produced and had little price sensitivity. They also valued price, product consistency, and type of meat (e.g., natural or organic) higher than men. This same study found that approximately the same percentage of men and women purchase certain meat cuts (Reicks et al., 2010). Sneed and Fairhurst (2017) also found that that shoppers at farmers' markets were predominately female. Forty-six percent of women purchase a limited variety of meat cuts but would purchase more if they had greater knowledge of meat cuts (FMI & FMPRE, 2018).

Ethnicity has played a small role in consumer purchasing choices. According to Ziehl et al. (2005), Caucasians were most concerned with the price of the meat that they

purchased. According to Lin (2013), Caucasians consist of 82.2% of grass-fed beef consumers.

Age has shown to be a major contributing factor to what consumers consider important when evaluating beef. Fifty percent of millennials (ages 22-37) stated that they did not purchase different types of meat but would purchase more if they were more knowledgeable (FMI & FMPRE, 2018). This same study found that age also has an effect on where meat shoppers purchase their meat from. The older age groups had a tendency to purchase more from butcher shops and directly from the farmer or rancher than the younger age group does, but only on occasional trips. This older age group purchased most of their meat from supermarket grocery stores, while supercenters were more popular for millennials (FMI & FMPRE, 2018). Fifty-eight percent of millennials and 44.0% of boomers were more likely to purchase grass-fed beef (FMI & FMPRE, 2018). As Reicks et al. (2010) researched the difference in consumer perceptions of steaks and roasts, they discovered that age had a strong influence on how consumers preferred meat cuts. Consumers between the ages of 20 and 30 were more likely to purchase these cuts of meat (Reicks et al., 2010). Alternatively, those over the age of 41 were most motivated by tenderness and price of the meat product (Reicks et al., 2010). Chamberlain et al. (2013) found that healthier food was purchased at farmers' markets by individuals older than 24. A study done by Yang and Woods (2016) found that millennials consume more specialty meat items at home, such as fish, lamb, and wild game. This same study found that older consumers eat more beef and pork products in their home.

Marital status has been found to have an influence on consumers' preferences

toward grass-fed beef (Lin, 2013). Fifty-seven percent of grass-fed beef consumers are married (Lin, 2013). Grass-fed beef consumers who had never been married, preferred grass-fed steak that was not USDA certified, while those who were married had a higher preference for this label. Those who were divorced, separated, or widowed had a higher preference for USDA certified grass-fed beef and lower preference for USDA certified grass-fed steak, as compared to those who are married (Lin, 2013).

Findings were inconclusive about the influence individuals' level of education has on them purchasing meat. Those with lower levels of education were less likely to purchase grass-fed beef (Evans, 2007), while college graduates purchased the highest percentage of meat cuts (Reicks et al., 2010). However, Sneed and Fairhurst (2017) found no significant difference between level of education and consumers' expectations of the local food that they purchased.

Household income has determined the concerns of meat purchasers and their willingness to pay for different meat products. Ziehl et al. (2005), found that many consumers who had higher-than-average incomes were less willing to pay for premium beef products. This study also found that small households with lower incomes were more willing to pay a premium for natural products. Larger households with lower incomes were least likely to purchase grass-fed beef (Evans, 2007). Lyford et al. (2010) stated households with higher incomes have decreased perceptions of beef safety risk. Households with an income greater than $100,000 were least concerned with the price of steaks and roasts but valued nutritional value (Reicks et al., 2010). Lin (2013), found that 33.9% of grass-fed beef consumers have an income of $35,000-74,999 and 18.1% make

between $75,000 and $149,999.

The size of the household has shown to influence consumers' priorities when purchasing beef. Reicks et al. (2010) found that households with two adults and less children were most likely to purchase meat. This study also discovered that larger households were more price conscious. Larger households particularly focus on price per pound (FMI & FMPRE, 2018). Smaller households tend to want smaller packages that are priced cheaper (FMI & FMPRE, 2018). Chamberlain et al. (2013) stated households with more than two individuals were more likely to purchase a variety of products from farmers' markets. Smaller households purchase most of their meat from supermarket grocery stores, while larger households often shop for meat at supercenters (FMI & FMPRE, 2018). Sixty-eight percent of grass-fed beef consumers have no children in their household (Lin, 2013). A study performed by Lin (2013), identified 18.6% of grass-fed consumers reside in the Northeast, 24.1% in the Midwest, 33,1% in the South, and 24.2% in the West.

Summary

This chapter contained the theoretical frameworks of this study: the TPB and the TFQM. This chapter also reviewed the literature used as a background and model for the study. Most of this literature was related to the background and emergence of grass-fed beef as an American commodity, health benefits of grass-finished cattle, consumer preferences regarding grass-fed beef, marketing techniques used by producers, and the role that Extension plays in sharing this information.

Grass-fed beef is quickly becoming an important American commodity (Gillespie et al., 2016). Much of this is due to the societal shift towards eating foods that are healthier, grass-fed beef provides a nutritionally positive fatty acid contribution to our diets (Cheung et al., 2017). This market trend has allowed some beef producers to alter their genetics and feeding habits to create a grass-finished beef, thus receiving premiums for their products. Grass-finished cattle provide a variety of benefits to the environment and ecosystem, along with added health (Gwin, 2009). Not all consumers are willing to sacrifice the flavor, appearance, and price of their beef for the healthier grass-fed alternative (Daley et al., 2010; Duckett et al., 2014). This has caused a variety of challenges for these niche market beef producers. They are overcoming these barriers by implementing better marketing tactics, educating the public on grass-fed beef, and finding new outlets for selling their products (Curtis et al., 2008; Gillespie et al., 2016). Extension specialists have the ability to use research-driven information to assist producers and consumers in achieving their goals (Perez & Howard, 2007; Wise et al., 2013).

CHAPTER III

METHODS

The purpose of this research study was to compile regional profiles of the consumers who intend to consume grass-fed beef in the U.S., as well create as a marketing plan that would assist ranchers to market their product to consumers.

The research objectives for this study were formulated, namely to:

1. Describe the demographic characteristics of the respondents likely to purchase grass-fed beef.
2. Compare meat consumption, beef consumption, knowledge, quality cues, attitude, subjective norms, and perceived behavioral control of respondents across regions.
3. Compare communication channels for receiving information about beef across regions.
4. Predict respondents' intentions to purchase grass-fed beef based on beef consumption, knowledge, quality cues, attitude, subjective norms, perceived behavioral control, and demographic characteristics.

Research Design

This study used a quantitative, descriptive survey created online through Qualtrics and administered through Centiment. Online surveys are beneficial for participants because they cost less than other forms of surveying (Dillman, Smyth, & Christian, 2014). Dillman et al. also stated that a major benefit of online surveys is that they can be completed by a large number of people in a relatively short amount of time. Once these surveys are completed, they can be analyzed immediately, which is beneficial for researchers. Dillman et al. also pointed out that there are challenges to using online

surveys to collect data. It is becoming more difficult to design surveys that allow participants to access them from a variety of devices. Participants need to be able to answer all survey questions using the internet on desktops, laptops, and mobile devices at any time, or they are less likely to participate (Dillman et al., 2014).

Population and Sample Size

According to the U.S. Census Bureau (2017), the U.S. population was 325,719,178 as of December 1, 2017, which was used to determine a sample size. Sampling size (n = 400) was determined by rounding up the sample size of 384, using a margin error of +/- 5%, confidence interval of 95%, and a standard deviation of 0.5 (Ary, Jacobs, & Sorenson, 2010). Participants selected for this study were over 18 years old and were the primary grocery buyer for their household.

To select participants, nonprobability sampling was used through an opt-in panel. Opt-in panels do not allow each person within the population the same probability of being chosen. Participants have already agreed to take part in the survey, and it is limited to individuals who have internet access (Baker et al., 2013). Centiment used an incentive to gain participants for their panels that are used for various studies. Participants have the option to either take an individual monetary compensation or donate this money to a nonprofit of their choice (K. Wassmer, personal communication, April 20, 2018). Centiment asks panelists about their profile information the first time they sign on to the survey platform. This profile information is used to prequalify respondents for surveys. This marketing research and survey company used representative balancing to ensure to

opt-in panel respondents reflect the U.S. census on age, ethnicity, gender, and region. This addressed exclusion, selection, and non-participation bias, all limitations of non-probability sampling (Baker et al., 2013). Age, ethnicity, gender, and region of respondents was compared to U.S. census data to ensure that the panel was a representative sample (see Table 1).

Table 1

Comparison of Selected Demographic Characteristics for Survey Sample and U.S. Population

Characteristic	Actual survey (%)	U.S. Census (%)
Gender		
Female	50.7	50.7
Male	49.3	49.2
Age		
18-24	8.3	13.0
25-44	39.3	41.0
45-64	34.6	30.0
65-99	17.8	16.0
Ethnicity		
Hispanic	6.6	11.0
Non-Hispanic	93.4	89.0
Black or African American	14.3	12.0
White	71.1	70.0
Other[a]	8.1	18.0
Region		
Northeast	18.6	17.3
Midwest	23.6	20.9
South	37.6	38.0
West	20.2	23.8

[a] Other includes Native American or Alaska Native, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Other, Native Hawaiian, Guamanian, Samoan, Pacific Islander

Instrumentation

The questionnaire included a letter of information (Appendix A), letting participants know the study's purpose, procedures, risks, confidentiality, benefits, explanation and offered to answer questions, compensation, voluntary participation, IRB approval statement, and investigator statement. Participants responded to a question that certified they had read the letter of information. Participants who agreed to participate in the survey, were directed to the questions about meat consumption. Those who did not agree to participate in the study or were younger than 18 were directed to the end of the survey.

Section one determined the household consumption of meat (Appendix B). Participants were asked multiple choice questions that described where their meat was purchased from, how often it is eaten, and what types of meat are consumed (Cheung et al., 2017; Jensen, Bruch, Dobbs, & Menard, 2014). Participants were asked about their knowledge pertaining to grass-fed beef production and certification processes using five true or false statements. The response for each of these questions was scored as 1 for correct or 0 for incorrect. The scores were summated to create one overall mean score for knowledge. This section also evaluated whether or not grass-fed beef was consumed in the household and what the level of satisfaction was with the eating experience.

Section two described the importance of beef characteristics, specifically extrinsic and intrinsic quality cues (Olson & Jacoby, 1972). Participants used a 5-point Likert scale ranging from 1 (*Not at all important*) to 5 (*Extremely important*) to rate their level of agreement with 23 statements adapted from previous literature (Birt, 2017; Cheung et al.,

2017; Daley et al., 2010; Dobbs et al., 2016; Duckett et al., 2014; Gwin et al., 2012; Kumar & Smith, 2017; Mirog, 2004; Van Elswyk & McNeill, 2014).

Section three measured the attitude of consumers toward consuming grass-fed beef in their everyday diet with five bipolar adjective items (Hoeksma et al., 2017). The bipolar adjective scale has 1 representing the most negative attitudes and 7 representing the most positive. The adjective pairs of "good/bad" and "beneficial/unbeneficial" were re-coded during data analysis. The items of this section aligned with the attitude component of the TPB (Ajzen, 1991).

Section four measured the subjective norms that influenced consumers purchasing of grass-fed beef, which are components of the TPB (Ajzen, 1991). Participants were asked two questions about their perceived social pressure (subjective norms) to purchase grass-fed beef and four questions about their perceived behavioral expectations from others (normative beliefs; Hoeksma et al., 2017; McCarthy et al., 2003). A 5-point Likert scale was used, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

In section five, participants answered how frequently they used 16 communication channels when wanting to obtain information on grass-fed beef, using a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*) was used (FMI & FMPRE, 2018; Gillespie et al., 2016).

Section six explored the perceived behavioral control that consumers have over purchasing grass-fed beef, the last component of the TPB (Ajzen, 1991). Three items on a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*), was used to determine how much control the participant believed they had over purchasing grass-

fed beef (Hoeksma et al., 2017; Kumar & Smith, 2017).

Section seven determined the consumer's intention to purchase grass-fed beef (Ajzen, 1991). This section used a 5-point Likert scale, ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*), to measure the participants' intent to purchase grass-fed beef (Hoeksma et al., 2017; Kumar & Smith, 2017).

Section eight identified the demographics of the survey participants, including gender, age, race, area of residence, level of education, marital status, household type, and annual income (Jensen et al., 2014; Lin, 2013).

Independent Variables

The interval independent variables in this study included respondents' (a) knowledge of grass-fed beef production practices, (b) attitude toward consuming grass-fed beef in their everyday diet, (c) subjective norms of purchasing grass-fed beef, and (d) perceived behavioral control of purchasing grass-fed beef. Importance of cost cues, intrinsic quality cues, and extrinsic quality cues were treated as categorical variables. Household meat consumption, grass-fed beef consumption, and shopping channel were treated as dichotomous variables. As for demographic variables, gender, marital status, household annual income, household size, and children under 18 in the household were treated as dichotomous variables.

Dependent Variable

The dependent variable in this study was intention to purchase grass-fed beef. This identified dependent variable, recoded as a dichotomous variable, was used in the

prediction model with the independent variables.

Validity

In quantitative research, validity evaluates the accuracy of the means of measurement (Golafshani, 2003). Validity is a way to determine if your study measures what it was intended to measure in the objectives (Golafshani, 2003). In this study, face and content validity were checked by a panel of experts comprised of faculty in agricultural education, meat science, agricultural communications, and agribusiness. Additionally, the researcher established validity by running an exploratory factor analysis (EFA) using Principal Component extraction and Varimax rotation to determine whether the items for each component of the TPB and TFQM had a factor loading of more than 0.5 with the five dimensions extracted (extrinsic quality cues, intrinsic quality cues, attitudes, subjective norms, & perceived behavioral control).

Pilot Study

A soft launch of the questionnaire, similar to a pilot study, was used to ensure the questionnaire worked properly and allowed the researchers to revise the instrument before the questionnaire was administered to the nonprobability sample. The soft launch wanted 40 valid and complete responses collected from individuals over the age of 18 and the primary grocery buyers for their household, but 68 individuals completed the survey. The respondents were recruited from Centiment, and the online survey was administered through Qualtrics. Pilot test data were analyzed using SPSS 23.0 to measure

construct reliability.

Reliability

Index scores were calculated as a composite measure by averaging the scores of multiple items developed to measure a specific concept, specifically attitude, subjective norms, and perceived behavioral control. Pilot test data and actual data were analyzed using the Statistical Package for the Social Sciences (SPSS) 23.0. To ensure consistency of scale items within the survey, Cronbach's alpha was used for item scores with a range of values, including Likert and bipolar attitude scales. In research, a Cronbach's alpha of 0.9 is excellent, while scores of 0.7 and 0.8 are considered acceptable. Reliability scores for the pilot test were .83 for the subjective norms construct and .77 for the perceived behavioral control construct. After removing the unaffordable/affordable bipolar adjective pairing, the reliability score for the pilot test was .83 for the attitudes construct. See Table 2 for the Cronbach's alpha scores for the pilot test and actual survey.

Table 2

Reliability Coefficients of the Index Scores of the Constructs

	Reliability coefficient	
Index	Pilot test	Actual survey
Attitude	.83	.92
Subjective norms	.83	.91
Perceived behavioral control	.77	.85

Data Collection

Prior to data collection, the university's Institutional Review Board (IRB) approved the study. After IRB approved the survey, Centiment sent the questionnaire to the selected panel of participants via email, where they were able to access the online survey through an anonymous link. The survey was launched in May 2018. Centiment offered a monetary incentive to the individuals who participated in the opt-in panel. Response rates were monitored daily by Centiment, and the survey remained open until the required number (n = 400) of responses was collected. The total number of completed surveys was 484.

Data Analysis

Data for this study were analyzed using SPSS® 23.0. For research objective one. the Chi-Square test of independence determined if there was a significant relationship between the intent to purchase grass-fed beef variable and these demographic variables: gender, age, ethnicity, household annual income, region, marital status, highest level of education, household size, and children under 18 living in the household. For objective two, a series of frequency tables described the meat consumption habits, beef consumption habits, and grass-fed beef consumption habits of respondents by region of the U.S. (Northeast, Midwest, South, and West). One-way analysis of variance (ANOVA) determined whether knowledge of grass-fed beef production practices and attitude toward consuming grass-fed beef in an everyday diet were statistically significantly different between the U.S. regions. The Kruskal-Wallis H Test is considered

the non-parametric alternative to the one-way ANOVA. The Kruskal-Wallis H Test was used because the quality cues (cost, intrinsic, and extrinsic) were ordinal dependent variables. The Krusal-Wallis H Test measured whether the quality cues, subjective norm, and perceived behavioral control were statistically significantly different between the regions. Research objective three reported the mean and standard deviation for frequency of use for each communication channel by region. For research objective four, a binomial logistic regression model predicted consumers' intention to purchase grass-fed beef using the components of the TPB (attitude, subjective norms, and perceived behavioral control), TFQM (intrinsic quality cues, extrinsic quality cues, cost cues, and meal preparation), knowledge, beef consumption habits, and demographic characteristics.

Summary

For this research study, a descriptive online survey was used to collect data from consumers to determine their beef purchasing preferences. These consumers were 18 years and older and were the primary grocery shopper for their household. Centiment, a public survey software company, used nonprobability sampling with an opt-in panel to select participants. Once IRB approved the study, Centiment sent it to the selected panel of participants. Once responses were collected, the data were analyzed using SPSS® 23.0.

CHAPTER IV

RESULTS

The purpose of this study was to create a regional profile of grass-fed beef consumers and to develop a marketing plan for grass-fed beef producers. The theory of planned behavior and total quality food model were used in this study as a framework through assessment of knowledge, quality cues, attitude, subjective norms, perceived behavioral control, and intention to purchase grass-fed beef. Four hundred and eighty-four respondents participated in the study.

Objective One: Describe the Demographic Characteristics of the Respondents Who Intend to Purchase Grass-fed Beef

A chi-square test of independence was calculated to check for significant difference between the intent to purchase grass-fed beef variables and demographic variables. Respondents were asked about gender, age, ethnicity/race, state residence, level of highest education, annual household income in 2017, marital status, and type of household. The state residence was recoded to place each respondent into one of the four U.S. census regions (U.S. Census Bureau, n.d.). The Likert scale measuring intention to purchase grass-fed beef if available to purchase ranged from 1 (strongly disagree) to 5 (strongly agree). Respondents who either agreed or strongly agreed they intended to purchase grass-fed beef if it was available to purchase. Those who were unlikely to purchase grass-fed beef selected neither agree or disagree, disagree, or strongly disagree about their intention to purchase grass-fed beef if it was available to purchase.

Table 3 compared the demographic characteristics of respondents who were most likely to those who were not likely to purchase grass-fed beef if it was available to purchase. Marital status, household size, children under 18 living in household, and household annual income were statistically significant. The association between purchase intention and marital status was small (Cohen, 1988), Cramer's V = .170. A small association also existed between purchase intention and annual household income (Cramer's V = .210), children under 18 living in the household (Cramer's V = .145) and household size (Cramer's V = .143). Respondents who were married or in a domestic partnership were more likely to purchase grass-fed beef (*n* = 136, 50.4%) than single respondents (*n* = 80, 29.6%), separated respondents (*n* = 8, 3.0%), widowed respondents (*n* = 12, 4.4%), or divorced respondents (*n* = 32, 11.9%). Households with one or two individuals were more likely to purchase grass-fed beef (*n* = 162, 60.0%) than households with three or four individuals (*n* = 86, 31.9%), households with five or six individuals (*n* = 21, 7.8%), or households with seven or more individuals (*n* = 1, 0.4%). Households that did not have children under 18 years old were more likely to purchase grass-fed beef (*n* = 172, 63.7%) than households living with children under the age of 18 (*n* = 98, 36.3%). Respondents who reported $50,000-$74,999 as their household annual income in 2017 were more likely to purchase grass-fed beef (*n* = 64, 23.7%) than those in other income brackets: less than $10,000 (*n* = 16, 5.9%), $10,000-$14,999 (*n* = 10, 3.7%), $15,000-$24,999 (*n* = 28, 10.4%), $25,000-$34,999 (*n* = 35, 13.0%), $35,000-$49,999 (*n* = 36, 13.3%), $75,000-$99,999 (*n* = 36, 13.3%), $100,000-$149,999 (*n* = 21, 7.8%), $150,000-$199,999 (*n* = 13, 4.8%), and $200,000 or more (*n* = 4, 1.5%).

Table 3

Comparison of Demographic Characteristics by Purchase Intention of Grass-Fed Beef

	Intent to purchase		No intent to purchase				
Characteristic	*f*	%	*F*	%	X^2	*df*	*p*
Gender							
Male	143	53.0	118	55.1	0.228	1	.633
Female	127	47.0	96	44.9			
Age (years)							
18-24	24	8.9	16	7.5	8.206	6	.223
25-34	62	23.0	41	19.2			
35-44	51	19.0	33	15.4			
45-54	42	15.6	31	14.5			
55-64	51	19.0	45	21.0			
65-74	28	10.4	40	18.7			
75 and older	11	4.1	8	3.7			
Ethnicity							
White	182	67.4	162	75.7	2.788	4	.141
Black/African American	40	14.8	29	13.6			
Hispanic/Latino/Spanish	24	8.9	8	3.7			
Asian	18	6.7	10	4.7			
Other	6	2.2	5	2.3			
Residence by region							
Northeast	52	19.3	38	17.8	2.214	3	.529
Midwest	59	21.9	55	25.7			
South	99	36.7	83	38.8			
West	60	22.2	38	17.8			
Level of education							
Less than high school	6	2.2	8	3.7	2.788	5	.733
High school diploma/GED	56	20.7	54	25.2			
Some college	74	27.4	56	26.2			
Certificate/Associate's	40	14.8	28	13.1			
Bachelor's degree	62	23.0	43	20.1			
Graduate/professional degree	32	11.9	25	11.7			
Marital status							
Single, never married	80	29.6	91	42.5	13.989	5	.016*
Married/domestic partnership	136	50.4	76	35.5			
Separated	8	3.0	6	2.8			
Divorced	32	11.9	28	13.1			
Widowed	12	4.4	13	6.1			

(*table continues*

	Intent to purchase		No intent to purchase				
Characteristic	*f*	%	*F*	%	X^2	*df*	*p*
Household size							
1-2	162	60.0	157	73.4	9.948	3	.019*
3-4	86	31.9	43	20.1			
5-6	21	7.8	13	6.1			
7 or more	1	0.4	1	0.4			
Children under the age of 18							
Yes	98	36.3	49	22.9	10.135	1	.001**
No	172	63.7	165	77.1			
Household Annual income ($)							
Less than 10,000	16	5.9	19	8.9	21.328	10	.019*
10,000-14,999	10	6.5	14	3.7			
15,000-24,999	28	10.4	26	12.1			
25,000-34,999	35	13.0	30	14.0			
35,000-49,999	36	13.3	42	19.6			
50,000-74,999	64	23.7	38	17.8			
75,000-99,999	36	13.3	20	9.3			
100,000-149,999	21	7.8	13	6.1			
150,000-199,999	13	4.8	2	0.9			
200,000 or more	4	1.5	0	0.0			

* $p \leq .05$; ** $p \leq .001$.

Objective Two: Compare Meat Consumption, Beef Consumption, Knowledge, Quality Cues, Attitude, Subjective Norms, and Perceived Behavioral Control of Grass-fed Beef Purchasers Across Regions

Table 4 illustrates how many times per week meat was consumed in respondents' households by region. Across the four regions, respondents most frequently consumed meat between 1 and 5 times per week, followed by 6 to 10 times per week.

When respondents were asked what types of meat their households consumed on a weekly basis, the most frequent response was chicken for all four regions of the U.S., as shown in Table 5. Beef was the second most consumed meat in all four regions. The other meat was venison in the Midwest and South.

Table 4

Household Meat Consumption per Week by Regions

	Residence by region							
	Northeast		Midwest		South		West	
Times Per Week	*n*	%	*n*	%	*n*	%	*n*	%
Never	1	1.1	3	2.6	5	2.7	2	2.0
1-5 times	65	72.2	67	58.8	107	58.8	63	64.3
6-10 times	15	16.7	38	33.3	49	27.0	27	27.5
11-15 times	5	5.6	4	3.5	10	5.5	3	3.1
More than 15 times	4	4.4	2	1.8	11	6.0	3	3.1

Table 5

Weekly Household Meat Consumption by Region

	Residence by region							
	Northeast		Midwest		South		West	
Type of meat	*n*	%	*n*	%	*n*	%	*n*	%
Beef	79	87.8	101	88.6	150	82.4	73	74.5
Pork	39	43.3	55	48.2	94	51.6	46	46.9
Chicken	87	96.7	107	93.9	168	92.3	85	86.7
Turkey	20	22.2	21	18.4	31	17.0	13	13.3
Lamb	1	1.1	1	0.9	5	2.7	7	7.1
Fish	36	40.0	29	25.4	57	31.3	36	36.7
Other seafood	3	3.3	6	5.3	14	7.7	8	8.2
Other meat	0	0.0	3	2.6	2	1.1	0	0.0

Table 6 illustrated which cuts of beef are purchased by respondents in each region. Ground beef was the most commonly purchased cut of beef, with 76.7% (n = 69) being in the Northeast, 86.0% (n = 98) in the Midwest, 78.6% (n = 143) in the South, and 57.1% (n = 56) in the West. Beef tri tip was the least commonly purchased cut of beef in

Table 6

Cuts of Beef Purchased by Consumers by Regions

	Residence by region							
	Northeast		Midwest		South		West	
Cuts of beef	*n*	%	*n*	%	*n*	%	*n*	%
Beef tri tip	10	11.1	9	7.9	22	12.1	19	19.4
Roast	28	31.1	36	31.6	74	40.7	34	34.7
Ground beef	69	76.7	98	86.0	143	78.6	56	57.1
Prime rib	14	15.6	11	9.6	22	12.1	18	18.4
Preformed hamburgers	32	35.6	34	29.8	47	25.8	23	23.5
Ribeye	12	13.3	20	17.5	47	25.8	24	24.5
Sirloin steak	29	32.2	29	25.4	57	31.3	36	36.7
Stew meat	16	17.8	21	18.4	36	19.8	21	21.4

all the regions, except the West. In the Northeast, nearly an equal percentage of households purchased preformed hamburgers (35.6%, *n* = 32), sirloin steaks (32.2%, *n* = 29), and roasts (31.1%, *n* = 28). In the Midwest, roasts (31.6%, *n* = 36) and preformed hamburgers (29.8%, *n* = 34) were the second and third most common beef cut purchased. In the South, roasts (40.7%, *n* = 74) were the most commonly purchased cut of beef after ground beef. In the West, sirloin steaks (36.7%, *n* = 36), and roasts (34.7%, *n* = 34) were the second and third most commonly purchased cuts of beef, while prime rib was the least common.

When asked where they purchase their beef from, consumers primarily chose a national grocery store chain, no matter their region (see Table 7). In the Northeast, locally owned grocery stores were a close second for shopping channel (51.1%, *n* = 46), while few respondents purchased directly from the farmer or rancher (6.7%, *n* = 6) and online

Table 7

Market Channels Where Consumers Purchase Beef by Region

	Residence by region							
	Northeast		Midwest		South		West	
Type of store	*n*	%	*n*	%	*n*	%	*n*	%
Locally owned grocery store	46	51.1	45	39.5	70	38.5	25	25.5
National grocery store chain	49	54.4	68	59.6	130	71.4	63	64.3
Supercenter grocery store	39	43.3	65	57.0	113	62.1	48	49.0
Club store	10	11.1	15	13.2	38	20.9	26	26.5
Butcher shop	17	18.9	23	20.2	14	7.7	12	12.2
Farmer or rancher	6	6.7	7	6.1	3	1.6	1	1.0
Restaurant	17	18.9	17	14.9	25	13.7	20	20.4
Online	3	3.3	0	0.0	7	3.8	2	2.0

(3.3%, *n* = 3). Consumers in the Midwest and South purchased nearly as much of their beef from a supercenter grocery store as they do from a national grocery store chain. No consumers in the Midwest chose an online store. In the South, only three respondents (1.6%) purchased their beef directly from the farmer or rancher, and only one respondent (1.0%) chose this option in the West.

Table 8 illustrated whether consumers in each region have consumed grass-fed beef in March 2018. The majority of respondents in the Northeast (60.0%, *n* = 54), Midwest (66.7%, *n* = 76), and South (58.8%, *n* = 107) had not consumed grass-fed beef within the last month. Nearly an even number of consumers in the West consumed grass-fed beef (52.0%, *n* = 51) as those who did not (48.0%, *n* = 47).

Of the 196 respondents who had eaten grass-fed beef, Table 9 illustrated their level of satisfaction. Respondents in the Northeast (52.8%, *n* = 19), Midwest (44.8%, *n* = 17), South (48.0%, *n* = 36), and West (36.2%, *n* = 17) were very satisfied with their

Table 8

Consumer Consumption of Grass-fed Beef in the Past Month by Region

	Residence by region							
	Northeast		Midwest		South		West	
Eaten grassfed beef	*n*	%	*n*	%	*n*	%	*n*	%
Yes	36	40.0	38	33.3	75	41.2	47	48.0
No	54	60.0	76	66.7	107	58.8	51	52.0

Table 9

Consumer Satisfaction of Grass-fed Beef Consumption

	Residence by region							
	Northeast		Midwest		South		West	
Level of satisfaction	*n*	%	*n*	%	*n*	%	*n*	%
Not at all satisfied	0	0.0	1	2.6	1	1.3	1	2.1
Slightly satisfied	4	11.1	7	18.4	7	9.4	5	10.6
Moderately satisfied	8	22.2	4	10.5	12	16.0	10	21.3
Very satisfied	19	52.8	17	44.8	36	48.0	17	36.2
Extremely satisfied	5	13.9	9	23.7	19	25.3	14	29.8

grass-fed beef. Fewer consumers in the Midwest (2.6%, $n = 1$), South (1.3%, $n = 1$), and West (2.1%, $n = 1$) were not at all satisfied.

When asked what the primary reason for dissatisfaction with their eating experience, consumers in the Midwest (44.4%, $n = 16$), South (52.0%, $n = 39$), and West (57.4%, $n = 27$) said that price was the main reason, while tenderness was the main reason for consumers in the Northeast (52.8%, $n = 19$). One respondent stated that trustworthiness was their primary reason for dissatisfaction with grass-fed. Table 10 illustrates these reasons for consumer dissatisfaction of grass-fed beef in each region.

Table 10

Primary Reason for Dissatisfaction of Grass-Fed Beef by Region

	Residence by region							
	Northeast		Midwest		South		West	
Primary reason	*n*	%	*n*	%	*n*	%	*n*	%
Price	16	44.4	19	50.0	39	52.0	27	57.4
Appearance	4	11.1	2	5.3	5	6.7	2	4.3
Aroma	8	22.2	4	10.5	12	16.0	10	21.3
Tenderness	19	52.8	17	44.7	36	48.0	17	36.1
Flavor	5	13.9	9	23.7	19	25.3	14	29.8

The home was the location for eating grass-fed beef in March 2018 for the majority of consumers in the Northeastern (80.6%, *n* = 29), Midwestern (86.8%, *n* = 33), Southern (89.3%, *n* = 67), and Western (80.9%, *n*= 38) regions. Table 11 illustrated this comparison.

Table 12 illustrated that grilled beef dishes were the most prepared in all regions (Northeast: 38.9%, *n* = 14, Midwest: 34.2%, *n* = 13, South: 56.0%, *n* = 42, and West: 48.9%, *n* = 23). In the Northeast, stir fried (*n* = 10, 27.8%), roasted (*n* = 8, 22.2%), and pan fried (*n* = 9, 25%) were also very common. Pan fried was very common in the Midwest (*n* = 11, 28.9%). The South had many consumers that prepared their grass-fed beef by roasting (*n* = 22, 29.3%) and pan frying (*n* = 21, 28.0%). Many consumers in the West choose to barbeque (*n* = 12, 25.5%), stew (*n* = 12, 25.5%), and pan fry (*n* = 11, 23.4%) their grass-fed beef. The least common dishes throughout all regions were braised, deep fried, and broiled.

Table 11

Location for Eating Grass-Fed Beef During March 2018

	Residence by region							
	Northeast		Midwest		South		West	
Location	*n*	%	*n*	%	*n*	%	*n*	%
Home	29	80.6	33	86.8	67	89.3	38	80.9
Restaurant	7	19.4	5	13.2	8	10.7	9	19.1

Table 12

Grass-Fed Beef Dishes Prepared Most Often by Region

	Residence by region							
	Northeast		Midwest		South		West	
Dishes	*n*	%	*n*	%	*n*	%	*n*	%
Stir fry	10	27.8	7	18.4	9	12.0	7	14.9
Stew	6	16.7	7	18.4	16	21.3	12	25.5
Roasted	8	22.2	7	18.4	22	29.3	8	17.0
Grilled	14	38.9	13	34.2	42	56.0	23	48.9
Deep fried	3	8.3	1	2.6	6	8.0	5	10.6
Broiled	6	16.7	2	5.3	8	10.7	6	12.8
Barbeque	6	16.7	8	21.0	17	22.7	12	25.5
Braised	1	2.8	2	5.3	5	6.7	2	4.3
Pan fried	9	25.0	11	28.9	21	28.0	11	23.4
Other	2	5.6	2	5.3	2	2.7	3	6.4

Respondents indicated the level of importance of 23 quality cues on their decision to purchase or consume beef products using a Likert scale ranging from 1 (*Not at All Important*) to 5 (*Extremely Important*). A Kruskal-Wallis H Test was conducted to evaluate if differences existed among the four regions (Northeast, Midwest, South, and

West) on the importance of 23 quality cues when deciding to purchase or consume beef products. Distributions of the quality cue scores were similar for all groups, as assessed by visual inspection of boxplots. As shown in Table 13, median scores were statistically significantly different between groups for price (H(3) = 8.75, p = .033) and leanness (H(3) = 8.27, p = .041). Pairwise comparisons were performed using a Bonferroni correction for multiple comparisons. This post hoc analysis revealed a statistically significant difference in price between the West (*Me* = 4.00) and South (*Me* = 5.00) (p = .024) regions, but not between any other group combinations. A statistically significant difference in leanness between the West (*Me* = 4.00) and South (*Me* = 4.00) (p = .026) regions, but not any other group combination.

Respondents were asked five true/false questions to gauge their knowledge of grass-fed beef production and certification practices. A one-way ANOVA was conducted to determine if knowledge of grass-fed beef production practices was different for groups living in different regions of the U.S. Respondents were classified into four regions: Northeast (n = 90), Midwest (n = 114), South (n = 182), and West (n = 98). Knowledge scores were normally distributed, as assessed by visual inspection of Normal Q-Q Plots because the sample sizes are greater than 50. There was homogeneity of variances, as assessed by Levene's test for equality of variances (p = .893). All regions exhibited low knowledge: Northeast (M = 2.20, SD = 1.02), Midwest (M = 2.30, SD = 0.99), South (M = 2.16, SD = 1.07), and West (M = 2.27, SD = 1.03). The differences between these regions was not statistically significant, $F(3, 480) = 0.49$, p = .684 (see Table 14).

Attitude toward consuming grass-fed beef in an everyday diet was measured with

Table 13

Kruskal-Wallis H Test Summary Table for the Differences of the Importance of Quality Cues Among Regions

Quality cue	Region	*Me*	X^2	*df*	*p*
Price	Northeast	4.50	8.75	3	.033*
	Midwest	4.00			
	South	5.00			
	West	4.00			
Leanness	Northeast	4.00	8.27	3	.041*
	Midwest	4.00			
	South	4.00			
	West	4.00			
Aroma	Northeast	4.00	5.71	3	.127
	Midwest	5.00			
	South	5.00			
	West	4.00			
Marbling	Northeast	4.00	3.35	3	.341
	Midwest	4.00			
	South	4.00			
	West	4.00			
Tenderness	Northeast	5.00	2.89	3	.409
	Midwest	4.00			
	South	4.50			
	West	4.00			
Appearance	Northeast	5.00	2.83	3	.419
	Midwest	5.00			
	South	5.00			
	West	4.00			
Food safety concerns	Northeast	4.00	2.72	3	.438
	Midwest	4.00			
	South	4.00			
	West	4.00			
Supporting local economy	Northeast	4.00	2.52	3	.472
	Midwest	4.00			
	South	3.50			
	West	4.00			
Freshness	Northeast	5.00	2.47	3	.481
	Midwest	5.00			
	South	5.00			
	West	5.00			

(*table continues*)

Quality cue	Region	*Me*	X^2	*df*	*p*
Knowing farmer who produces beef	Northeast	3.00	2.36	3	.502
	Midwest	3.00			
	South	3.00			
	West	3.00			
Taste/flavor	Northeast	5.00	2.07	3	.558
	Midwest	5.00			
	South	5.00			
	West	5.00			
Environmental impacts of beef production	Northeast	3.50	2.03	3	.566
	Midwest	3.00			
	South	3.00			
	West	4.00			
Farm preservation	Northeast	4.00	1.90	3	.594
	Midwest	4.00			
	South	3.00			
	West	3.00			
Juiciness	Northeast	4.00	1.71	3	.634
	Midwest	4.00			
	South	4.00			
	West	4.00			
Knowing where beef was raised	Northeast	4.00	1.63	3	.652
	Midwest	3.50			
	South	3.00			
	West	4.00			
Humane treatment of animals	Northeast	4.00	1.57	3	.665
	Midwest	4.00			
	South	4.00			
	West	4.00			
Naturally raised	Northeast	4.00	1.47	3	.689
	Midwest	4.00			
	South	4.00			
	West	4.00			
Locally raised	Northeast	3.00	1.33	3	.723
	Midwest	3.00			
	South	3.00			
	West	3.00			
Ease of preparation	Northeast	4.00	1.16	3	.762
	Midwest	4.00			
	South	4.00			
	West	4.00			

(*table continues*)

Quality cue	Region	*Me*	X^2	*df*	*p*
Health benefits of consuming beef	Northeast	4.00	1.31	3	.728
	Midwest	4.00			
	South	4.00			
	West	4.00			
Living a healthy lifestyle	Northeast	4.00	.0.87	3	.833
	Midwest	4.00			
	South	4.00			
	West	4.00			
Knowing how beef was raised	Northeast	3.00	0.26	3	.967
	Midwest	3.00			
	South	4.00			
	West	3.00			
Animal welfare	Northeast	3.50	0.14	3	.986
	Midwest	3.00			
	South	3.00			
	West	3.50			

* $p < .05$.

Table 14

One-Way Analysis of Variance Summary Table for the Effects of Region on Knowledge of Grass-fed Beef Production Practices

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
Between groups	3	1.60	0.54	0.49	.684	.003
Within groups	480	515.74	1.07			
Total	483	517.35				

five items using a 7-point bipolar attitudinal scale with the following anchors: good/bad, positive/negative, beneficial/harmful, healthy/unhealthy, and pleasant/unpleasant. The numbers 1 and 7 indicated a very strong feeling, while numbers 2 and 6 indicated a strong feeling. Numbers 3 and 5 indicated a weak feeling, while 4 indicated participants were undecided or did not understand the adjectives (McCroskey & Richmond, 1989). The researcher created a summated overall mean for the five items. All regions of the

U.S. exhibited a weak positive feeling: Northeast (M = 5.18, SD = 1.47), Midwest (M = 5.23, SD = 1.55), South (M = 5.27, SD = 1.63), and West (M = 5.12, SD = 1.62). There were no outliers, as assessed by boxplot; data were normally distributed for each group, as assessed by interpreting Normal Q-Q Plots. There was homogeneity of variances, as assessed by Levene's test for equality of variances (p = .475). As shown in Table 15, an ANOVA indicated there were no significant differences between regions and overall attitude toward consuming grass-fed beef in an everyday diet, F(3, 480) = 0.23, p = .877.

Six subjective norms influencing respondents to buy grass-fed beef were measured on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Important referents included family members, friends, doctors, and dietitians. Subjective norms were calculated as the summated mean of the six items. The inspection of data revealed outliers that were not a result of data entry error or measurement error. Since there was no good reason to reject those outliers as invalid, a Kruskal-Wallis H test was run to determine if there were differences in subjective norms between four groups of participants living in different regions of the U.S.: Northeast (n = 90), Midwest (n = 114), South (n = 182), and West (n = 98). Distribution of subjective norms were similar for all groups, as assessed by visual inspection of a boxplot. Median subjective norm

Table 15

One-Way Analysis of Variance Summary Table for the Effects of Region on Attitude Toward Consuming Grass-fed Beef in an Everyday Diet

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
Between groups	3	1.71	0.57	0.23	.877	.001
Within groups	480	1174.14	2.45			
Total	483	1175.39				

scores were neutral among the regions from the Northeast (3.08), Midwest (3.17), South (3.33), and West (3.17), but the differences were not statistically significant, H(3) = 2.27, p = .518.

Perceived behavioral control was assessed as the summated mean of three items asking respondents their level of agreement with various factors that would facilitate/ impede their ability to purchase grass-fed beef. The inspection of data revealed outliers that were not a result of data entry error or measurement error. Since there was no good reason to reject those outliers as invalid, the Kruskal-Wallis H test was run. A Kruskal-Wallis H test was run to determine if there were differences in perceived behavioral control between participants living in four regions of the U.S.: Northeast (n = 90), Midwest (n = 114), South (n = 182), and West (n = 98). Distribution of perceived behavioral control were similar for all groups, as assessed by visual inspection of a boxplot. Median perceived behavioral control scores changed among the regions from the Northeast (3.67), South (3.67), Midwest (3. 83), and West (4.00), but the differences were not statistically significant, H(3) = 2.34, p = .504.

Objective 3: Compare Frequency of Beef Information Communication Channels by Region

Research objective 3 sought to analyze the frequency that respondents in the four regions use 16 communication channels to access information about beef. Frequency of communication channel used was measured on a 5-point Likert-type scale. The real limits scale measuring frequency use was 1.00-1.49 = *never*, 1.50-2.49 = *rarely*, 2.50-3.49 =

sometimes, 3.50-4.49 = *often*, and 4.50-5.00 = *always*.

All regions showed that consumers often used social media, print publications, government agencies, Cooperative Extension, magazine articles and advertisements, radio commercials, and blogs to learn about beef (see Table 16). Respondents in the Midwest (M = 3.62, SD = 1.24) and South (M = 3.51, SD = 1.35) often accessed information that was promoted by a well-known personality or cooking expert. Those in the Midwest were the only respondents who often used websites or the internet (M = 3.54, SD = 1.26) to find information about beef. Television commercials or stories were

Table 16

Frequency of Using Communication Channels by Region

	Northeast		Midwest		South		West	
Communication channel	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Product label	2.40	1.28	2.60	1.27	2.29	1.21	2.20	1.18
Product signage at grocery store	2.57	1.15	2.78	1.27	2.60	1.21	2.59	1.25
Menu or posters at restaurants	2.82	1.15	3.04	1.28	2.97	1.30	2.83	1.30
Well-known personality or cooking expert	3.46	1.26	3.62	1.24	3.51	1.35	3.39	1.35
Websites/internet	3.29	1.35	3.54	1.26	3.40	1.34	3.21	1.33
Blogs	3.96	1.26	3.84	1.27	3.90	1.24	3.71	1.32
Radio commercials or stories	3.71	1.27	3.84	1.14	3.99	1.14	3.79	1.31
Television commercials or stories	3.42	1.26	3.54	1.21	3.55	1.21	3.51	1.33
Newspaper advertisements or articles	3.63	1.32	3.73	1.18	3.73	1.24	3.46	1.32
Magazine advertisements or articles	3.71	1.27	3.75	1.25	3.71	1.27	3.55	1.29
Cooperative extension	3.78	1.35	3.98	1.13	3.95	1.22	3.73	1.30
Government agency	3.68	1.25	3.82	1.15	3.87	1.19	3.82	1.29
Cookbook	3.33	1.28	3.36	1.29	3.21	1.20	3.15	1.24
Print publications	3.64	1.34	3.73	1.26	3.75	1.25	3.56	1.34
Social media	3.64	1.34	3.69	1.36	3.68	1.34	3.57	1.46

used as a source of information for consumers in the Midwest (M = 3.54, SD = 1.21), South (M = 3.55, SD = 1.21), and West (M = 3.51, SD = 1.33). Newspaper advertisements or articles were a source of information for respondents in the Northeast (M = 3.63, SD = 1.32), Midwest (M = 3.73, SD = 1.18), and South (M = 3.73, SD = 1.24). In each of the regions, consumers rarely or sometimes used the product label, the product sign at the grocery store, menus or posters at restaurants, and cookbooks as communication channels to learn about beef.

Objective 4: Predict U.S. Consumers' Intentions to Purchase Grass-Fed Beef Based on Beef Consumption, Knowledge, Quality Cues, Attitude, Subjective Norms, Perceived Behavioral Control, and Demographic Characteristics

A binomial logistic regression was performed to ascertain the effects of specific demographic variables, quality cues, attitude toward consuming grass-fed beef in an everyday diet, subjective norms influencing respondents to buy grass-fed beef, perceived behavioral control, meat consumption, grass-fed beef consumption, and knowledge about grass-fed beef production on the likelihood that participants purchase grass-fed beef. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. A Bonferroni correction was applied using all 27 terms in the model, resulting in a statistical significance being accepted when $p < .00016$ (Tabachnick & Fidell, 2014). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable. The area under the ROC curve was .888, 95% CI [.860 to .917], which was an

excellent level of discrimination according to Hosmer, Lemeshow, and Sturdivant (2013). The logistic regression model was statistically significant, $X^2(27) = 256.070$, $p < .001$. The model explained 55.1% (Nagelkerke R^2) of the variance in intent to purchase grass-fed beef, and correctly classified 84.0% of cases. Sensitivity was 84.0%, specificity was 78.0%, positive predictive value was 82.8%, and negative predictive value was 79.5%. Of the 27 predictor variables, only five variables were statistically significant: weekly household beef consumption, past experience consuming grass-fed beef, knowing how beef was raised, subjective norms, and perceived behavioral control (see Table 17). Households that primarily consumed beef on a weekly basis significantly predicted whether U.S. consumers intend to purchase grass-fed beef, Wald $X^2(1) = 4.09$, $p = .043$. The odds ratio indicated that as households eat beef less than a weekly basis, those households were less likely to purchase grass-fed beef. Those who consumed grass-fed beef in April 2018 significantly predicted their intent to purchase grass-fed beef, Wald $X^2(1) = 17.89$, $p < .000$. The odds ratio shows that not consuming grass-fed beef was associated with a reduction in the likelihood of purchasing grass-fed beef. Respondents were more likely to purchase grass-fed beef if they thought naturally raised beef were important quality cues when deciding to purchase or consume beef products. Whether consumers have agreed that subjective norms influence their decision making significantly predicted whether they purchased grass-fed beef, Wald $X^2(1) = 27.15$, $p < .000$.

Table 17

Logistic Regression Predicting the Purchase of Grass-Fed Beef

Characteristic	*B*	*SE*	Wald	*df*	*p*	Odds ratio	95% CI for odds ratio	
							Lower	Upper
Attitude	.088	.095	0.867	1	.352	0.952	.907	1.314
Subjective norm	1.126	.216	27.150	1	.000	3.084	2.019	4.710
Perceived behavioral control	3.007	1.250	5.786	1	.016	20.228	1.745	234.440
Knowledge	-.138	.119	1.329	1	.249	.871	.690	1.101
Past consumption of grass-fed beef	-1.178	.278	17.894	1	.000	.308	.178	.531
Weekly household consumption of beef	-.765	.378	4.093	1	.043	.465	.222	.976
Weekly consumption of meat 1-5 times	.047	.277	.028	1	.867	1.048	.608	1.805
Purchased ground beef	.238	.330	.521	1	.471	1.269	.665	2.415
Importance of tenderness	-.522	.402	1.683	1	.195	.593	.270	1.305
Importance of marbling	.394	.302	1.704	1	.192	1.483	.821	2.682
Importance of taste	.140	.532	.069	1	.793	1.150	.405	3.265
Importance of leanness	-.366	.353	1.073	1	.300	.694	.347	1.386
Importance of price	-.178	.428	.173	1	.678	.837	.362	1.937
Importance of health benefits	-.426	.355	1.435	1	.231	.653	.326	1.311
Importance of living healthy lifestyle	-.192	.364	.279	1	.598	.825	.404	1.684
Importance of ease of preparation	.270	.312	.745	1	.388	1.309	.710	2.415
Importance of food safety	.643	.377	2.911	1	.088	1.902	.909	3.981
Importance of naturally raised beef	-.466	.329	2.010	1	.156	.627	.329	1.195
Importance of humane treatment	.095	.358	.071	1	.790	1.100	.545	2.220
Importance of supporting local economy	-.393	.361	1.187	1	.276	.675	.333	1.369
Know how beef was raised	-.813	.326	6.232	1	.013	.443	.234	.840
Farm preservation	-.535	.357	2.246	1	.134	.585	.291	1.179
Importance of environmental impacts	-.319	.370	.742	1	.389	.727	.352	1.502
Importance of locally raised beef	.687	.355	3.755	1	.053	1.989	.992	3.985
Households of 1-2 individuals	.305	.410	.554	1	.457	1.357	.607	3.033
Married or domestic partnership	-.301	.274	1.204	1	.273	.740	.432	1.267
Household with children under age 18	-.132	.427	.096	1	.757	.876	.379	2.024
Constant	-5.582	1.023	29.752	1	.000	.004		

Summary

In this chapter, consumer demographics, meat and beef consumption habits, quality cues, knowledge, attitude, subjective norms, and perceived behavioral control were used to create a consumer profile of those with the highest intention of purchasing grass-fed beef. These characteristics were compared with consumers across four U.S. regions; Northeast, Midwest, South, and West. The researcher discussed the channels of communication that consumers use to obtain information about beef, including which channels would be most effective for grass-fed beef producers. A binomial logistic regression was used to highlight demographics, TPB, and TQFM components used to predict consumer intention to purchase grass-fed beef.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

A conceptual model incorporated the components of two theories (theory of planned behavior and total quality food model) with demographic characteristics, household meat and beef consumption habits, knowledge of grass-fed beef production practices, experience with consuming grass-fed beef, and intention to purchase grass-fed beef. Communication channels that respondents used to access information about grass-fed beef were assessed. The findings of this study provided information about U.S. consumers' intention to purchase grass-fed beef products by their demographic characteristics. Additionally, the findings examined whether regional differences existed for respondents' beef consumption habits, meal preparation, knowledge, attitude, subjective norm, perceived behavioral control, quality cues, and communication channels. Lastly, this study provided insight into how U.S. consumers' purchasing behaviors of grass-fed beef were influenced by their attitude, subjective norm, perceived behavioral control, knowledge, experience, importance of quality cues, and demographic characteristics.

Conclusions

Objective One: Describe the demographic characteristics of the respondents who intend to purchase grass-fed beef.

This study revealed the demographic characteristics of U.S. primary household grocery shoppers who intend to purchase grass-fed beef. Four of the demographic

characteristics were statistically significant: marital status, household size, children under 18 years old in the household, and household annual income. Respondents who were married or in a domestic partnership had a higher intention of purchasing grass-fed beef, which was supported by past research (Lin, 2013). Households most likely to purchase grass-fed beef had one or two individuals (60.0%), as compared to households with three to four individuals (31.9%), five to six individuals (7.8%), and seven or more individuals (0.4%). The finding about household size was similar to Reicks et al.'s (2010) study that households with two adults and fewer children were more likely to buy meat. Note that in this study, households with an annual income of $50,000-$74,999 in 2017 were more likely to purchase grass-fed beef (23.7%). Lin discussed that 33.9% of grass-fed beef consumers have an income of $35,000-74,999, and 18.1% made between $75,000 and $149,999. Households without children under the age of 18 were more likely to purchase grass-fed beef (63.7%) than those with children. In a similar study, Lin found that 68.0% of grass-fed beef consumers did not have children in their household. Grass-fed beef is sold at a premium price, making it expensive to feed more people in a household.

Several demographic characteristics were not statistically significantly different among those who intend to purchase grass-fed beef and for those who do not intent to purchase. Gender was not a statistically significant demographic characteristic, with nearly the same percentage of males (53.0%) and females (47.0%) intent to purchase grass-fed beef. The finding about gender in this study was opposite to the findings of Ziehl et al.'s (2005) and Evans' (2007) studies with women more likely to purchase grass-fed beef or naturally-purchase meat than men. This finding was not surprising for

more men are grocery shopping than in the past. Food Marketing Institute (2015) reported that men represent 43.0% of all primary household shoppers (n = 2,265). As for age, the finding in this study did not show a statistically significant association with intention to purchase grass-fed beef. Ages 18-19 were most likely, followed by 85 and over, 34-44, and 24-34, respectively. This shows the different age groups that grass-fed beef producers should be targeting. In terms of ethnicity, white consumers were the majority of respondents (67.4%) who intended to purchase grass-fed beef, which was supported by the study conducted by Lin (2013) that Caucasians consisted of 82.2% of grass-fed beef consumers. Respondents living in the South (n = 99, 36.7%) had the most likely intention to purchase, followed by the West (n = 60, 22.2%), Midwest (n = 59, 21.9%), and Northeast (n = 52, 19.3%). The findings were similar to those of Lin, who reported grass-fed consumers resided in the South (33.1%), followed by the West (24.2%), Midwest (24.1%), and Northeast (18.6%). In this study, respondents who earned a bachelor's degree were most likely to purchase, followed by those with an associate's degree or certificate. This finding was similar to Reicks et al.'s (2010) study that found college graduates were more likely to purchase more meat cuts.

Objective Two: Compare meat consumption, beef consumption, knowledge, quality cues, attitude, subjective norms, and perceived behavioral control of grass-fed beef purchasers across regions.

Respondents' meat consumption practices showed that they most frequently consumed meat between 1 and 5 times per week in all four regions. Previous research has shown that meat was consumed multiple times each week, with 40% (n = 600) of

participants eating it in 1 to 3 dinners each week and 34% consuming meat in four dinners per week (FMI & FMRPE, 2018). This study's beef consumption habits were similar to those of beef consuming households in Tennessee, most commonly citing two or three meals at home in which beef was served in a typical week, followed by no meals then by four or five meals (Jensen, Bruch, Dobbs, & Menard, 2014).

Chicken was the most common meat consumed on a weekly basis across all regions in this study, and beef was the second most common. The conclusion that chicken was consumed slightly more often than beef was supported by previous research (McCarty & Neuman, 2013). Chicken is cheaper and considered a leaner cut of meat, making it a more desirable choice for consumers.

Ground beef was the cut of beef purchased the most in all regions: Northeast (76.7%, n = 98), Midwest (86.0%, n = 98), South (78.6%, n = 143), and West (57.1%, n = 56). Roasts, preformed hamburgers, and sirloin steaks were also frequently purchased cuts of beef. A study conducted by Cheung et al. (2017) found that ground beef consisted of 55.0% of total grass-fed beef sales, making it the most common cut sold. Furthermore, Jensen et al. (2014) found that ground beef was consumed more often than steak, with 91.8% (n = 603) of consumers eating it at least once a month. Ground beef is cheaper than most cuts of beef and is easy to use in many dishes. This could explain why it is the most popular cut of beef purchased. Steaks are eaten less frequently and are typically saved for special occasions.

National grocery store chains were the most common place to purchase beef products in all regions. This was followed closely by supercenter grocery stores and

locally owned grocery stores. Beef being purchased primarily from grocery stores was supported by past research (FMI & FMRPE, 2018; McCarty & Neuman, 2013). Gillespie et al. (2016) found that only 18.2% of ranchers and farmers sold grass-fed beef through grocery stores. In this study, club stores were more common in the South (*n* = 38, 20.9%) and West (*n* = 26, 26.5%), while more respondents in the Northeast (*n = 17,* 18.9%) and Midwest (*n* = 23, 20.2%) purchased their meat from butcher shops. Such a finding revealed a similarity to FMI and FMPRE's study since superstores, clubs, and butcher shops were alternative channels where consumer purchased meat and poultry. Yang and Woods (2016) found that consumers felt that the highest quality meat comes from butcher shops, but that 54.9% (*n* = 2,088) of consumers had not shopped at a butcher shop in the last year. Respondents in this study bought the least amount of meat online; however, 38.8% of grass-fed beef producers used the internet to sell their product (Gillespie et al., 2016).

The findings of this study revealed a difference in grass-fed beef consumption in March 2018 between the regions. More respondents from the West consumed grass-fed beef than other regions, which is not surprising because a lot of the cattle in the West graze on forage on federal and state land and would be more accessible to Western consumers. Grass-fed beef accounts for only 4% of the total beef market (Cheung et al., 2017). However, grass-fed beef is becoming more popular, with the market growing by 15 times between 2012 and 2016.

A majority of grass-fed beef consumers, in each region, had eaten it in their home. This finding was supported by research conducted by Yang and Woods (2016), where

most meat was eaten in the home. Although data from the U. S. Department of Agriculture Economic Research Service (2018) found that 3.6 meals per week were eaten outside the home.

There were regional differences with how the respondents prepared their grass-fed beef. In this study, grilling was the most common way for preparing grass-fed beef. Respondents in the Northeast were the highest percentage to choose stir fried (n = 10, 27.8%), while the Midwest barbequed (n = 12, 25.5%) and used grass-fed beef in stews (n = 12, 25.5%). Such findings contrasted Yang and Woods' study (2016) that found stove top and conventional oven the two most common ways to prepare grass-fed beef, followed by grilling. This study as well as the Yang and Woods' study reported that deep frying was the least common method for cooking meat.

No matter what region the respondents lived in, they had limited knowledge of grass-fed beef production practices. These results were supported by Gillespie et al. (2016) who indicated U.S. consumers have limited knowledge of grass-fed beef marketing, cuts, and pricing. This study's finding revealed a similarity to a study in which consumers' answered questions about their knowledge and consumption of grass-fed beef (Harrison, Gillespie, Scaglia, & Lin, 2014). Harrison et al.'s (2014) study reported that 52.2% of respondents thought cattle were raised on open pasture for grass-fed beef. However, most cattle are finished on grain at feedlots even if they spend some time on pasture. Furthermore, Harrison et al. indicated that few respondents (9.5%) thought grass-fed production involved cattle that have never been fed grains. One explanation for this is that most consumers do not know how beef is produced in the U.S.

U.S. shoppers would try different cuts of meat if they were more knowledgeable (FMI & FMRPE, 2018), leading them to purchase a wider variety of meat.

The total quality food model explores how cost cues, extrinsic quality cues, and intrinsic quality cues influence consumers' purchasing decisions. Extrinsic quality cues that consumers across all regions found very important when deciding what meat to purchase were the health benefits of consuming grass-fed beef, living a healthy lifestyle, and humane treatment of animals (*Me* = 4.00), which was consistent with studies conducted by Cheung et al. (2017) and Van Elswyk and McNeill (2014). Consumers found it somewhat important to know how their beef was raised, know the farmer who raised the beef, and the environmental impacts of raising beef (*Me* = 3.00). However, the Northeast (*Me* = 3.50) and West (*Me* = 4.00) found the environmental impacts of beef production slightly more important. The South (*Me* = 4.00) found knowing how their beef was raised to be very important. Studies conducted by Grunert (2005), Birt (2017), and Jensen et al. (2014) supported the results of this study. Other research has found that consumers value beef that has beef locally raised (Yang & Woods, 2016), although respondents in this survey did not find that as important. Price was used in this study to determine how cost cues influenced consumers' purchasing intentions of grass-fed beef. Of the consumers who had eaten grass-fed beef and were dissatisfied, 44.4% (*n* = 16) in the Northeast, 50.0% (*n*= 19) in the Midwest, 52.0% (*n*= 39) in the South, and 57.2% (*n*= 29) in the South, they stated that price was the reason. Consumers from each of these regions felt that price was either very important or extremely important. Price being an important factor when deciding what to purchase was supported by Cheung et al.'s

(2017) study that reported most consumers resorting to buying conventional beef because they could not pay the slight premium for grass-fed beef.

Certain intrinsic quality cues were important to their decision to purchase or consume beef. Respondents in all regions stated that flavor and freshness were extremely important (*Me* = 5.00). The rest of the quality cues were either very important or extremely important to consumers, with leanness being the only cue that was statistically different between the Western and Southern regions. Past research indicates that palatability was important to consumers, and many did not feel that grass-fed beef was as palatable as conventional beef (Daley et al., 2010; Duckett et al., 2014; Mirog, 2004; Van Elswyk & McNeill, 2014), although grass-fed beef is considered healthier (Cheung et al., 2017; Daley et al., 2010; McNeill et al., 2012). Research indicated a growing number of consumers are eating grass-fed beef to keep up with health trends; they might be learning how to cook grass-fed beef to improve its palatability.

Attitude was not statistically significantly different among the regions. Consumers in all regions had a weak positive attitude toward consuming grass-fed beef in their everyday diet, using the adjectives of good, positive, beneficial, healthy, and pleasant. Attitude is the most important factor that determines if someone will consume beef (Hoeksma et al., 2017). Attitude is one of the three components of the TPB that is used to determine if a person will perform a behavior (Ajzen, 1998). The weak positive attitude could indicate that respondents feel they will benefit from eating grass-fed beef.

Subjective norm was not statistically significantly different among the regions. The respondents were neutral about the influence important referents have on influencing

the decision to purchase grass-fed beef. Subjective norm, the second component of the TPB, was determined by how an individual will act based on how they believe others want them to act (Ajzen, 1998). Participants in this study may have not been concerned with whether or not family, friends, doctors, and dieticians want them to eat grass-fed beef. They might not have discussed with these individuals how they feel about eating grass-fed beef and therefore, can't answer positively or negatively.

Respondents' perceived behavioral control to purchase grass-fed beef was not statistically significant among the four regions. This third component of the TPB measures how much control individuals feel that they have over performing a behavior (Ajzen, 1998). Respondents felt they have adequate control over their ability to purchase grass-fed beef. They have the willingness, time, and resources to purchase grass-fed beef.

Objective 3: Compare frequency of beef information communication channels by region.

Communication channels used by beef consumers were similar in all regions, with few variations among regions. In all four regions, respondents stated that they often used social media, print publications, government agencies, Cooperative Extension, magazine articles and advertisements, radio commercials, and blogs to gather information about beef. Few producers advertised their beef products through direct mail, television, and radio (Gillespie et al., 2016). Consumers read less traditional print media, watch less traditional television, and listen to less radio programs, so producers might need to communicate about grass-fed beef through social media and websites since these were sometimes or often used by respondents in this study to access information about beef.

This conclusion is not surprising since the internet was a popular form of communication about beef products (FMI & FMRPE, 2018; Gillespie et al., 2016). Social media platforms, publications, magazine articles, blogs, as well as information from government agencies and Cooperative Extension are accessible through the internet. Due to grass-fed beef being a niche product, some regions in the U.S. lack established grass-fed beef markets, making it essential for producers to utilize multiple marketing channels (Gillespie et al., 2016).

Objective 4: Predict U.S. consumers' intentions to purchase grass-fed beef based on beef consumption, knowledge, quality cues, attitude, subjective norms, perceived behavioral control, and demographic characteristics.

The model explained only 55.0% of the variance, which indicated that the variables identified in the conceptual model influenced the intent to purchase grass-fed beef to some extent. A large amount of variance was still unexplained. Only subjective norms and perceived behavioral control were statistically significant predictor variables for the TPB. The fact that attitude was not significant predictor variable contrasted from Hoeksma et al.'s (2017) study. Perceived behavioral control was a statistically significant predictor variable for not only this study but that of other studies for consumers' intention to purchase meat (Hoeksma et al., 2017; Khattak & Khattak, 2017; Khattak & Naqvi, 2016). Considering the previous literature, it was surprising that some of the demographic characteristics and quality cues were insignificant in the logistic regression, such as annual household income, marital status, leanness and price. The conceptual framework encompassed numerous factors that would influence meat consumption behavior.

However, to include more factors would require a much larger number of respondents so that individual variance is less important and allows the behavioral patterns to be observable.

Recommendations for Research

Due to the lack of an existing instrument, the instrument used in this study was adapted from other studies measuring consumers' attitudes and perceptions of consuming mobile slaughter beef, conventionally raised beef, and grass-fed beef. Some items and measurements may need to be modified, such as the constructs measuring attitude, subjective norms, and perceived knowledge of grass-fed beef production practices. In-depth qualitative interviews or online focus group research with consumers in different regions could help get a better understanding for consumers' subjective norms, attitudinal factors, knowledge and eating habits that would influence their grass-fed beef purchases.

Several studies predicting consumers' intention to purchase meat have incorporated the New Ecological Paradigm to measure consumers' pro-environmental attitudes (Hoeksma et al., 2017); therefore, it is recommended to consider how this construct influences U.S. consumers' intention to purchase grass-fed beef.

Future research on this topic could explore how the processing of meat affects consumer attitude and intention to purchase grass-fed beef. This information would add to current knowledge about how beef is raised affects consumers' decision making processes and meat choices. This study only measured if they had the intention to purchase grass-fed beef and past grass-fed beef consumption and did not measure how

much grass-fed beef was purchased by respondents. Knowing this would allow grass-fed beef producers to have a better understanding of the market and demand. Researchers should compare consumers' perceptions and intention to purchase grass-fed beef to other niche products, such as organic and natural. In this research study, certain quality cues were important to consumers. Further research should be done to learn about consumers' current knowledge of these quality cues and to better understand why they are important. Taste panels could be formed to determine if participants could taste a difference in conventional and grass-fed beef. Future research should measure U.S. consumers' willingness to pay for grass-fed beef products by the four regions.

The examination of Extension's educational programming should be evaluated by collecting feedback from workshop participants to know the effectiveness of their recommended strategies for selling grass-fed beef products. Additionally, survey research should examine producers' and agricultural businesses' marketing efforts to determine their effectiveness in identifying and retaining direct-to-consumer and retail outlets for purchasing/selling their grass-fed beef products.

Recommendations for Practice

Cooperative Extension faculty should create and share information not only with grass-fed producers but also consumers because both stakeholder groups often look to Cooperative Extension for food-related information. They should hold educational workshops and create factsheets for both consumers and grass-fed beef producers. Agriculture Extension faculty should collaborate with Health and Wellness Extension

Faculty to create cooking demonstrations on video and at events and develop recipes using the most common grass-fed beef dishes selected by respondents. The findings of this study provide a regional consumer profile of those most likely to purchase grass-fed beef. This marketing plan uses information from meat and beef consumption, meal preparation, and quality cues across the regions. Grass-fed beef producers should use the communication channels identified in the study to communicate with consumers. This regional consumer profile can be used by farmers and ranchers, so they can target their audience and become a profitable business.

The regional consumer profile is organized by the 5 Ps of marketing: produce, place, price, promotion, and people (Table 18). Phillip Kolter created the 4 Ps of marketing: product, place, price, and promotion. Later, a fifth P was added: people. Products exist to satisfy the people they are being sold to. The product focuses on features, such as color, size, nutritional claims, origin, reputation, etc. Many of the intrinsic and extrinsic cues evaluated in this study helped to identify the grass-fed beef products consumers purchase. The second P, place, identifies where the product is sold and where consumers look for it. Grass-fed beef producers who are creating a marketing plan must take into account where their customers are looking to purchase their product. Then they can sell their product through those channels. Price is the third P, which focuses on how the price for a product is determined. Grass-fed beef is a niche market, which allows producers to sell this beef at a premium compared to conventional beef. It is important to note that this study did not focus on the willingness to pay or price of grass-fed beef products. The fourth P is promotion, focusing on where and how the product is

Table 18

Regional Consumer Profiles for Marketing Grass-fed Beef

	Region			
P of marketing	Northeast	Midwest	West	South
Product	Important traits: • Tenderness • Appearance • Freshness • Taste/flavor	Important traits: • Aroma • Appearance • Freshness • Taste/flavor	Important traits: • Aroma • Tenderness • Appearance • Freshness • Taste/flavor	Important traits: • Freshness • Taste/flavor
	Cut of beef: • Ground beef • Preformed hamburgers • Sirloin steaks • Roasts	Cut of beef: • Ground beef • Roasts	Cut of beef: • Ground beef • Roasts • Sirloin steaks	Cut of beef: • Ground beef • Roasts • Sirloin steaks • Ribeye • Preformed hamburgers
Place	Place of purchase: • National grocery store chain • Supercenter grocery store • Local grocery store	Place of purchase: • National grocery store chain • Supercenter grocery store	Place of purchase: • National grocery store chain • Supercenter grocery store	Place of purchase: • National grocery store chain • Supercenter grocery store • Local grocery store
Price	Importance of price: • Price is extremely important and second most common reason for dissatisfaction	Importance of price: • Price is very important and primary reason for dissatisfaction	Importance of price: • Price is extremely important and primary reason for dissatisfaction	Importance of price: • Price is very important and primary reason for dissatisfaction
Promotion	Product features: • Knowing where beef was raised • Humane treatment of animals • Supporting local economy • Health benefits of consuming beef • Living a healthy lifestyle • Farm preservation	Product features: • Supporting a local economy • Farm preservation • Humane treatment of animals • Living a healthy lifestyle • Health benefits of consuming beef	Product features: • Knowing how beef was raised • Living a healthy lifestyle • Health benefits of consuming beef • Humane treatment of animals	Product features: • Supporting a local economy • Knowing where beef was raised • Health benefits of consuming beef • Environmental impacts of beef production • Humane treatment of animals • Living a healthy lifestyle
	Communication channels: • Blogs • Cooperative Extension • Local food magazines • Government agencies • Newspapers • Marketing materials for business • Social media	Communication channels: • Cooperative Extension • Blogs • Local food magazines • Government agencies • Newspapers • Marketing materials for business • Social media • Cooking experts	Communication channels: • Radio • Cooperative Extension • Blogs • Government agencies • Marketing materials for business • Newspapers • Magazines • Social media	Communication channels: • Government agencies • Radio • Cooperative Extension • Blogs • Social media • Marketing materials for business

(*table continues*)

P of marketing	Region			
	Northeast	Midwest	West	South
People	Meat consumption: • 1-5 times per week • Chicken is most common	Meat consumption: • 1-5 times per week • Chicken is most common	Meat consumption: • 1-5 times per week • Chicken is most common	Meat consumption: • 1-5 times per week • Chicken is most common
	Preparation methods: • Grilling • Stir fried • Pan fried	Preparation methods: • Grilling • Pan fried	Preparation methods: • Grilling • Roasting • Pan fried • Stewed	Preparation methods: • Grilling • Stewed • Barbeque • Pan fried

advertised to consumers. Promotion will also include the quality cues that respondents found important and how grass-fed beef producers can use that information when communicating with consumers. The last P is people. The consumer profile created from this study identifies the demographic characteristics of consumers who are most likely to purchase grass-fed beef.

Northeast Region

Product. As grass-fed beef producers are working towards marketing these products to consumers in the Northeast, they will need to focus on the product features that are important to the consumers. Northeastern respondents indicated tenderness, appearance, freshness, and taste/flavor as extremely important intrinsic quality cues, with median scores of 5.00.

The cut of beef bought most frequently by Northeastern respondents was ground beef, followed by preformed hamburgers, sirloin steaks, and roasts. Grass-fed beef producers should consider this when determining which cuts of beef they want made by the processing plant and advertised to customers.

Place. Respondents in the Northeast identified national grocery store chains as their primary place to purchase beef, followed closely by locally owned grocery stores and supercenters. These respondents eat at home 80.6% of the time. This information shows grass-fed beef producers that they should market their product in grocery stores, specifically those that are national grocery store chains. However, processing and distribution are challenges for small-scale grass-fed beef producers and branded beef programs. National grocery store chains are a better fit for large-scale producers that have a brand and food label for their grass-fed beef products. Even though this study indicates that online or direct marketing are less frequently used as primary channels for Northeastern residents to buy beef, producers might consider those channels because grass-fed meat sales have been successful through online and direct to consumer venues (Gillespie et al., 2016).

Price. Only 16 respondents in the Northeast selected price as their reason for being dissatisfied after consuming grass-fed beef. These respondents considered price an extremely important cost cue on their decision to purchase beef. Grass-fed beef producers should focus on making sure that their prices are competitive and that consumers understand the value of their product.

Promotion. Respondents found several moderately important extrinsic quality cues (*Me* = 4.00), including knowledge of where their beef was raised, the humane treatment of animals, naturally raised animals, ease of preparation, health benefits of consuming beef, living a healthy lifestyle, and farm preservation. Grass-fed beef producers should highlight these quality cues when developing their marketing messages

about their grass-fed beef products.

When respondents in the Northeast are searching for information about beef, they often look to blogs, Cooperative Extension, radio, magazines, government agencies, newspapers, print publications, and social media, as presented in that order. Grass-fed beef producers should use a combination of these communication channels to promote their beef products to consumers and to share information about grass-fed beef practices since consumers' knowledge was limited in this region. They can do this by creating accounts on a social media outlet (Facebook, Twitter, Instagram) to reach a wide variety of consumers. A blog is a possible online communication channel where grass-fed beef producers could share information about their production practices, agricultural knowledge, availability of their products, share recipes, etc. Sharing recipes with consumers would allow them to feel connected with the producer and learn the cuts of beef and new ways to cook them. Tenderness and price were reasons for dissatisfaction with grass-fed beef, so producers should recognize these issues. They can share recipes that maximize tenderness and explain why their product is sold at a premium price. Producers should also work with local radio stations and newspapers to do interviews about the benefits of eating grass-fed beef and places to purchase cuts of grass-fed beef.

People. In the Northeast, most respondents eat meat one to five times per week and eat at home a majority of the time. Almost all of them eat chicken and beef products on a weekly basis. Their beef is most often prepared by grilling, followed by stir fried and pan fried. Only 40.0% of these consumers had eaten grass-fed beef in March 2018. This identifies a group of people that grass-fed beef producers can target as their consumers.

Producers know that they need to market products that can be prepared at home and is easily grilled, stir fried, or pan fried.

Midwest Region

Product. Grass-fed beef producers who market their product to consumers in the Midwest, should focus on the product features that they value. The intrinsic quality cues that respondents from the Midwest found very important (*Me* = 5.00) were aroma, appearance, freshness, and taste/flavor.

Consumers in the Midwest primarily eat ground beef, followed by roasts. Grass-fed beef producers should work with their processing plants to get these cuts and then market them to consumers. They should be willing to sell preformed hamburgers to customers in this region, as this is the third most common cut of beef eaten.

Place. As grass-fed beef producers are determining where to market their products in the Midwest, they should consider developing their own brand of grass-fed beef or join a branded grass-fed beef program to more easily market to national grocery store chains then supercenters for these are harder shopping channels to enter for small-scale producers and small branded programs (Cheung et al., 2017). These channels are important to consider because respondents eat their grass-fed beef products at home more often than in restaurants.

Price. The primary reason for dissatisfaction of consumers of grass-fed beef was price. Price was also valued as very important (*Me* = 4.00) for consumers in the Midwest. Grass-fed beef producers should recognize that their customers are price conscious and share with them the benefits of buying grass-fed beef.

Promotion. As grass-fed beef producers are looking for ways to advertise their niche market product, they should also look at what consumers find important in the beef that they buy. None of the intrinsic cues were extremely important; however, most of the intrinsic cues were very important: food safety concerns, supporting a local economy, farm preservation, humane treatment of animals, naturally-raised beef, ease of preparation, living a healthy lifestyle, and the health benefits of consuming beef.

Grass-fed beef producers should develop marketing messages that include the intrinsic cues of their products for their print publications (e.g., brochures, flyers). Several traditional and online communication channels are often used to learn about beef. Grass-fed beef producers could have their own website, blog, or social media platform for communicating about their farming practices and the benefits of beef, as well as marketing their grass-fed beef products. They should form relationships with local cooking experts and county Extension agents for those are individuals often used as sources of information, agreeing to use their grass-fed beef products in cooking demonstrations. The main reasons that Midwestern respondents were dissatisfied with grass-fed beef were the price and tenderness. As this product is being marketed, producers should share cooking techniques to make the meat more tender and the reason behind the premium price.

People. Grass-fed beef producers who market their products to consumers in the Midwest should be aware that most respondents consumed meat one to five times per week, with six to ten times per week also being common. Beef was the second most common meat consumed, with chicken being the most popular. Only 33.3% of

respondents had eaten grass-fed beef in March 2018. Respondents chose grilling, followed closely by pan fried for how they cook beef most often, making it important for grass-fed producers to sell cuts that are easy to prepare for these cooking methods.

Southern Region

Product. As grass-fed beef producers are creating marketing tactics to reach consumers in the South, they will need to focus on product features, or the quality cues, that are important to consumers in that region. Respondents from the South indicated that aroma, tenderness, appearance, freshness, and taste/flavor were very important intrinsic quality cues.

Consumers in the South eat ground beef most often, followed by roasts and sirloin steaks. Grass-fed beef producers, who wish to sell their products in this region, should make sure that these are the cuts available to consumers.

Place. Respondents in the South shopped for their beef most often at national grocery store chains then supercenters. Grass-fed beef producers should be aware of this and consider how to market their products in these outlets. Getting their product into grocery stores increases the amount they sell because this is where most Southern consumers shop for their meat. However, this strategy is more feasible for larger-scale producers who can reduce their production costs and join a branded program (Cheung, et al., 2017). Grass-fed beef producers should also be aware that few respondents purchased beef online, directly from the farmer or rancher, or from butcher shops. These consumers also ate at home 89.3% of the time.

Price. In the South, grass-fed beef producers should focus on ensuring that their

product is set at a fair price and is competitive with similar items. Respondents in the South stated that price was the primary reason for dissatisfaction after consumption with grass-fed beef. They also rated price as very important to them when selecting beef products to purchase.

Promotion. None of the extrinsic quality cues were identified as extremely important to Southern respondents' decision of buying grass-fed beef. Yet, respondents identified several very important extrinsic quality cues: knowing how their beef was raised, living a healthy lifestyle, knowing the health benefits of consuming beef, ease of preparation, naturally raised beef, humane treatment of animals, and food safety concerns. Grass-fed beef producers should highlight the living conditions of their animals and share the health benefits of consuming grass-fed beef with consumers.

Grass-fed beef producers should focus on advertising their products' relevant intrinsic quality cues using a variety of traditional and online communication channels to reach their potential customers in the South, specifically radio, television, newspapers, magazines. Grass-fed beef producers should reach out to their state farm bureau federation or state Extension for some produce a weekly program that shares cooking and food information on local television news outlets, letting the producers more affordably advertise their beef and work with a well-known personality or cooking expert to demonstrate recipes or cooking tips for their products. However, it is important to consider the return on investment by advertising through traditional media because it can be expensive. Many branded beef programs, such as the American Grass-fed Association, offer marketing materials, an online presence, and resources for their members to more

easily advertise grass-fed beef through traditional and online marketing channels. Additionally, grass-fed beef producers could advertise their cuts of beef, prices, and quality cues on their print publications (flyers or brochures), a website, social media platform, or a blog. Cooperative Extension and government agencies might help reach consumers through a local branding program, list-serves, and events that the grass-fed beef producers could use for advertising.

The main reason that consumers were dissatisfied with the grass-fed beef they had eaten was because of the price and tenderness. Through the advertising process, producers should share recipes that will make the grass-fed beef tender. They should also explain why there is a premium for this product.

People. Most Southern respondents stated they ate meat one to five times per week. They primarily consumed chicken on a weekly basis, but beef was also the second choice for meat consumption. Only 41.2% of them had eaten grass-fed beef in April 2018. Beef was most often cooked by grilling, while roasting, pan frying, and stewed were the next most common. Thus, grass-fed beef producers should sell and advertise beef products that can be eaten by grilling, roasting, pan frying, and in stews.

Western Region

Product. Consumers in the West reported that freshness and taste/flavor were very important in influencing their decision to purchase beef. As grass-fed beef producers are marketing their products to consumers in the West, they should make sure that the cuts these consumers eat most often are available to them. Ground beef was the most selected beef cut by respondents. Roasts and sirloin steak were also common among these

consumers, followed by ribeye and preformed hamburgers. Ground beef should be the cut that grass-fed beef producers make and advertise the most.

Place. In the West, consumers primarily purchase their beef from national grocery store chains and supercenters. Although not as commonly used, locally owned grocery stores and club stores were also selected by consumers. Larger-scale grass-fed beef producers or those who have joined a branded beef program should focus on getting their products into these stores, so they can reach the audience that shops there. Eighty percent of respondents' meals are consumed at home.

Price. Respondents in the West indicated price was their primary reason for dissatisfaction after consuming grass-fed beef. Price was also rated as very important to these consumers when deciding to purchase beef. As grass-fed beef producers are advertising to consumers in this region, they should focus on making sure that they are selling their product at a fair and competitive price.

Promotion. Knowing where consumers look to find information about beef is very important for grass-fed beef producers, as it allows them to advertise through those communication channels. Government agencies and Cooperative Extension would have access to consumers through branding programs, websites, newsletters, list-serves, and events where grass-fed beef producers could advertise their farming practices and beef cuts. Print publications, social media, or a blog could be effective communication channels that grass-fed producers create and maintain for their business. These communication channels should be utilized by produces who are wishing to reach a wide audience. They should work with local media outlets, such as agricultural radio programs

to discuss the benefits of eating grass-fed beef and accessibility to their products.

In their marketing tactics, grass-fed beef producers should focus on the intrinsic and extrinsic quality cues that are important to their customers, such as purchasing fresh from the producer. Respondents in the West stated that health benefits, environmental impacts of beef production, and how it was raised were very important extrinsic quality cues for the beef they eat. There are many health and environmental benefits to eating grass-fed beef that should be shared with customers. They should also share with consumers how the beef they eat is being raised. This knowledge will encourage them to purchase grass-fed beef. Price, tenderness, and flavor were the main reasons for dissatisfaction after consuming grass-fed beef, respectively. Producers of this product should share with consumers the reason why it is sold at a premium. They should also share recipes that enhance the flavor and tenderness of grass-fed beef.

People. Grass-fed beef producers who market their product in the West should be aware of what their customers want. Most respondents in this regions consumer beef one to five times per week. They primarily eat chicken and beef; however, pork was also popular. Only 48.0% of respondents had eaten grass-fed beef in April 2018. When asked how they prepare their meat, most respondents chose grilling, followed by stew, barbeque, and pan fried. They should also have beef cuts that are easily grilled, barbequed, pan fried, and used in stews.

Summary

Past research was compared to the conceptual model to analyze each research

objective. The demographics of U.S shoppers who intend to purchase grass-fed beef revealed that marital status, household size, children under 18 years old in the household, and household annual income were statistically significant. Other studies supported the findings that (1) those who are married or in a domestic partnership, (2) smaller households, and (3) those without children under 18 years old were more likely to purchase grass-fed beef. Annual income compared to intention to purchase grass-fed beef was different in this study compared to other studies, where those with a wider salary range were more likely to purchase. This study discovered that consumer meat and beef consumption habits were similar to past research. Grocery stores were the most common place to purchase beef from, this is supported by other studies. This study's finding that most meals are eaten inside the home was similar to other research. There were differences between this study and past research in regards to how grass-fed beef is prepared in the home. It was revealed that respondents showed a low knowledge of grass-fed beef production, a result that was also found in other research. Subjective norms and perceived behavioral control were predictive indicators of intent to purchase, while attitude was not. All extrinsic and intrinsic quality cues measured in this study, other than the importance of beef being raised locally, were similar to result from other research. The role that price plays in purchasing intention was also supported by past research. Social media, print publications, government agencies, Cooperative Extension, magazine articles and advertisements, radio commercials, and blogs were the most common communication channels used to gather information about beef. The decrease in traditional information outlets, such as television and print media, and increase in internet

sources is found in past research. These findings are useful for Extension faculty, researchers, and agriculture organizations as they work to help grass-fed beef producers market their products.

Future research recommendations include determining how the processing of meat affects consumer intention to purchase grass-fed beef. Another recommendation would include comparing consumer intention to purchase grass-fed beef with intention to purchase other niche products such as organic and natural. Researchers could also measure consumer knowledge of quality cues and their willingness to pay for grass-fed beef. Researchers could use taste panels to determine if consumers can taste a difference between grass-fed and conventional beef. A marketing plan was created for grass-fed beef producers with a consumer profile for each U.S. region.

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APPENDICES

Appendix A

Letter of Information

Page 1 of 2
Protocol #9270
IRB Approval Date: April 20, 2018
Consent Document Expires: April 19, 2021
IRB Password Protected per IRB Coordinator

v.8 3 May2017

Letter of Information

U.S Consumers' Perception, Intention, and Actual Purchase Behavior of Grass-fed Beef

Introduction

You are invited to participate in a research study conducted by Dr. Kelsey Hall, an assistant professor, and Graduate Student Investigator Elizabeth Crandall in the School of Applied Science, Technology, and Education at Utah State University. The purpose of this research is to explore consumer preferences of grass-fed beef and their intention to purchase this beef.

This form includes detailed information on the research to help you decide whether to participate in this study. Please read it carefully and ask any questions you have before you agree to participate.

Procedures

In order to complete this survey, you must be at least 18 years old and the primary grocery buyer for your home. Your participation will involve you completing an online survey where you will be asked questions relating to your current beef purchasing choices and demographics. It will also ask questions about your attitude, subjective norms, perceived behavioral control, intention, and experiences related to eating beef. This survey should take approximately 15 minutes to complete.

Risks

This is a minimal risk research study. That means that the risks of participating are no more likely or serious than those you encounter in everyday activities. The foreseeable risks or discomforts include loss of confidentiality. In order to minimize those risks and discomforts, the researchers will keep research records consistent with state and federal regulations. Only the principal investigator and graduate student investigator will have access to the data, which will be kept in a storage system. All information that is reported for the study will be done as a group and will not focus on a specific individual. Data files will be kept for 3 years and will be destroyed in March 2020.

Benefits

There is no direct benefit to you for participating in this research study. More broadly, this study will help the researchers learn more about consumer preferences of grass-fed beef. It will also help farmers and ranchers who produce grass-fed beef and those who market this product understand the needs of consumers and prepare a product that fits those needs.

Confidentiality

The researchers will make every effort to ensure that the information you provide as part of this study remains confidential. Your identity will not be revealed in any publications, presentations, or reports resulting from this research study.

We will collect your information through Qualtrics. This data will be securely stored in a restricted-access folder on Box.com, an encrypted, cloud-based storage system.

It is unlikely, but possible, that Utah State University or state or federal officials may require us to share the information you give us from the study to ensure that the research was conducted safely and appropriately. We will only share your information if law or policy requires us to do so.

The research team works to ensure confidentiality to the degree permitted by technology. It is possible, although unlikely, that unauthorized individuals could gain access to your responses because you are responding online. However, your participation in this online survey involves risks similar to a person's everyday use of the Internet.

Voluntary Participation & Withdrawal
Your participation in this research is completely voluntary. If you agree to participate now and change your mind later, you may withdraw at any time by closing out of the survey.

Compensation
For your participation in this research study, you will be compensated according to the terms and amount you agreed upon when entering into the survey with the panel company.

IRB Review
The Institutional Review Board (IRB) for the protection of human research participants at Utah State University has reviewed and approved this study. If you have questions about the research study itself, please contact the Principal Investigator at 435-797-3289 or kelsey.hall@usu.edu. If you have questions about your rights or would simply like to speak with someone other than the research team about questions or concerns, please contact the IRB Director at (435) 797-0567 or irb@usu.edu.

Dr. Kelsey Hall
Principal Investigator
(435) 797-3289; kelsey.hall@usu.edu

Elizabeth K. Crandall
Graduate Student Investigator
(505) 803-6286; bethkcrandall@gmail.com

Informed Consent
By clicking "agree" below, you agree to participate in this study. You indicate that you understand the risks and benefits of participation, and that you know what you will be asked to do. You also agree that you have asked any questions you might have, and are clear on how to stop your participation in the study if you choose to do so. Please be sure to retain a copy of this form for your records.

a) "Yes I am over the age of 18, am the primary grocery buyer for my household, and agree to participate in this study." OR b) "No I am not over the age of 18, I'm not the primary grocery buyer for my household, or I do not agree to participate in this study

Appendix B

Survey About Consumers' Purchasing of Grass-Fed Beef

Survey About Consumers' Purchasing of Grass-Fed Beef

Q1 Please fully review this letter of information document before deciding whether to proceed with this survey.

- ○ Yes I am over the age of 18 and agree to participate in this study. (1)
- ○ No I am not over the age of 18 or I do not agree to participate in this study. (2)

Skip To: End of Block If Please fully review this letter of information document before deciding whether to proceed with t... = No I am not over the age of 18 or I do not agree to participate in this study.

Q43 Are you the primary grocery shopper for your household?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If Are you the primary grocery shopper for your household? = No

End of Block: Primary Grocery Shopper Qualifying Question

Start of Block: Household Meat Consumption

Q3 Household Meat Consumption

Q4 How many times per week does your household consume meat products?

- ○ Never (1)
- ○ 1-5 times (2)
- ○ 6-10 times (3)
- ○ 11-15 times (4)
- ○ More than 15 times (5)

Q5 What types of meat does your household primarily consume on a weekly basis? (Choose up to three)

_____ Beef (1)
_____ Pork (2)
_____ Chicken (3)
_____ Turkey (4)
_____ Lamb (5)
_____ Fish (6)
_____ Other seafood (shrimp, shellfish, squid, etc.) (7)
_____ Meat other than listed (please specify) (8)
_____ Prefer not to eat meat (9)

Q6 Household Meat Consumption

Q7 In the past month, which cuts of beef have you purchased? (Select all that apply)

- ☐ Beef tri-tip (1)
- ☐ Roast (2)
- ☐ Ground Beef (3)
- ☐ Prime rib (4)
- ☐ Preformed Hamburgers (5)
- ☐ Rib eye (6)
- ☐ Sirloin steak (7)
- ☐ Stew meat (8)
- ☐ Other (please specify) (9) _____

Q8 From where do you primarily purchase your beef? (Choose up to three)
_____ Locally owned grocery store (1)
_____ National grocery store chain (i.e. Albertsons, Kroger, Winn Dixie, Safeway, Giant Eagle, Whole Foods, etc.) (2)
_____ Supercenter grocery store (i.e. Wal-Mart, Target, etc.) (3)
_____ Club store (i.e. Sam's Club, Costco, etc.) (4)
_____ Butcher shop (5)
_____ Directly from farmer or rancher (6)
_____ Restaurants (7)
_____ Online (i.e. Omaha Steaks, grass-fed beef website, etc.) (8)
_____ Other (please specify) (9)
_____ I do not purchase beef. (10)

Q9 Grass-fed Beef Production

Q10 In order for a meat product to be considered grass-fed, the animal it was produced from must not have eaten any grains during its lifetime.

○ True (1)

○ False (2)

Q11 In order for a meat product to be considered grass-fed, the animal it was produced from must have had a lifetime diet consisting of only grass and forages.

○ True (1)

○ False (2)

Q12 Grass-fed beef products must be certified by the U.S. Department of Agriculture or a third-party certifier.

- ○ True (1)
- ○ False (2)

Q13 In order for a meat product to be considered grass-fed, the animal it was produced from may not be given antibiotics.

- ○ True (1)
- ○ False (2)

Q14 In order for a meat product to be considered grass-fed, the animal it was produced from may not be given growth hormones.

- ○ True (1)
- ○ False (2)

Q15 Grass-fed Beef Consumption

Q16 In the past month, have you consumed grass-fed beef, that is, the animal eats grass and forages, but no grain?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If In the past month, have you consumed grass-fed beef, that is, the animal eats grass and forages,... = No

Q17 If you have eaten grass-fed beef in the past month, please rate your experience?

- ○ Not at all satisfied (1)
- ○ Slightly satisfied (2)
- ○ Moderately satisfied (3)
- ○ Very satisfied (4)
- ○ Extremely satisfied (5)

Q18 If you were not completely satisfied, what was the primary reason for your dissatisfaction?

- ○ Price (1)
- ○ Appearance (2)
- ○ Aroma (3)
- ○ Tenderness (4)
- ○ Flavor (5)
- ○ Other (please specify) (6) _____

Q20 Where have you eaten grass-fed beef in the last month?

- ○ My home (1)
- ○ Restaurant (2)
- ○ Other (please specify) (3) _____

*

Q21 What grass-fed beef dishes did you prepare the most? (Choose up to three)

- ☐ Stir-fry (1)
- ☐ Stew (2)
- ☐ Roasted (3)
- ☐ Deep fried (4)
- ☐ Grilled (5)
- ☐ Broiled (6)
- ☐ Barbecue (7)
- ☐ Braised (8)
- ☐ Pan-fried (9)
- ☐ Other (please specify) (10)

_____

Q23 How important are the following when deciding to purchase or consume beef products?

	Not at all important (1)	Slightly important (2)	Neutral (3)	Moderately important (4)	Extremely important (5)
Appearance (1)	○	○	○	○	○
Aroma (2)	○	○	○	○	○
Tenderness (3)	○	○	○	○	○
Juiciness (4)	○	○	○	○	○
Marbling (5)	○	○	○	○	○
Freshness (6)	○	○	○	○	○
Taste/flavor (7)	○	○	○	○	○
Leanness (8)	○	○	○	○	○
Price (9)	○	○	○	○	○
Health benefits of consuming beef (10)	○	○	○	○	○
Living a healthy lifestyle (11)	○	○	○	○	○
Ease of preparation (12)	○	○	○	○	○
Knowing how the beef was raised (13)	○	○	○	○	○
Animal welfare benefits (14)	○	○	○	○	○

Farm preservation (15)	○	○	○	○	○
Food safety concerns (16)	○	○	○	○	○
Naturally raised (no antibiotics or artificially added hormones) (17)	○	○	○	○	○
Environmental impacts of beef production (18)	○	○	○	○	○
Effects of beef production on the environment (19)	○	○	○	○	○
Knowing where the beef was raised (20)	○	○	○	○	○
Locally raised (21)	○	○	○	○	○
Knowing the farmer who produces the beef (22)	○	○	○	○	○
Humane treatment of animals (23)	○	○	○	○	○
Supporting the local economy (24)	○	○	○	○	○

Q24 How frequently do you use these channels to get information on beef?

	Always (1)	Often (2)	Sometimes (3)	Rarely (4)	Never (5)
Product label (1)	○	○	○	○	○
Product signage at the grocery store (2)	○	○	○	○	○
Menu/posters at restaurants (3)	○	○	○	○	○
Promotion by well-known personality/cooking expert (4)	○	○	○	○	○
Websites/Internet (5)	○	○	○	○	○
Blogs (6)	○	○	○	○	○
Radio commercials/stories (7)	○	○	○	○	○
Television commercials/stories (8)	○	○	○	○	○
Cooperative Extension (agent, website, materials, events) (9)	○	○	○	○	○
Government agency (website, fact sheets, materials) (10)	○	○	○	○	○
Cookbook (16)	○	○	○	○	○
Newspaper articles/advertising (11)	○	○	○	○	○
Magazine articles/advertising (12)	○	○	○	○	○

Print publications (flyers, newsletters, brochures, etc.) (13)	○	○	○	○	○
Social media (Facebook, Twitter, etc.) (14)	○	○	○	○	○
Other (please specify) (15)	○	○	○	○	○

Q25 Attitude Toward Consuming Grass-fed Beef

Q26 Please read each pair of adjectives and indicate which of the adjectives you agree applies to this statement: *Consuming grass-fed beef in my everyday diet would be...*

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Good	○	○	○	○	○	○	○	Bad
Negative	○	○	○	○	○	○	○	Positive
Beneficial	○	○	○	○	○	○	○	Harmful
Unhealthy	○	○	○	○	○	○	○	Healthy
Pleasant	○	○	○	○	○	○	○	Unpleasant

Q27 Subjective Norms Related to Purchasing Grass-fed Beef

Q28 The following statements refer to what others think of you buying grass-fed beef. Please note, you do not need to have previously bought grass-fed beef to complete these items.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
Most people who are important to me think I should buy grass-fed beef. (1)	○	○	○	○	○
People who are close to me approve of my buying of grass-fed beef. (2)	○	○	○	○	○

Q29 The following statements refer to what others think of you buying grass-fed beef. Please note, you do not need to have previously bought grass-fed beef to complete these items.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
Family members would want me to buy grass-fed beef. (1)	○	○	○	○	○
Doctors would want me to buy grass-fed beef. (2)	○	○	○	○	○
Dietitians would want me to buy grass-fed beef. (3)	○	○	○	○	○
My friends would want me to buy grass-fed beef. (4)	○	○	○	○	○

Q31 Please indicate your level of agreement with the statements seen below:

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
I am confident I can purchase grass-fed beef. (1)	○	○	○	○	○
I have the resources, time, and willingness to purchase grass-fed beef. (2)	○	○	○	○	○
The decision to purchase grass-fed beef is within my control. (3)	○	○	○	○	○

Q32 Intention to Purchase Grass-fed Beef

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
I intend to purchase grass-fed beef if it is available to purchase. (1)	○	○	○	○	○

Q33 Demographics

Q34 What is your sex?

- Male (1)
- Female (2)
- Prefer not to answer (3)

*

Q35 What is your age?

_____

Q36 Choose one or more races or ethnicities that you consider yourself to be.

- American Indian or Alaska Native (1)
- Asian (2)
- Black or African American (3)
- Hispanic, Latino, or Spanish (8)
- Middle Eastern or North African (9)
- Native Hawaiian or Other Pacific Islander (4)
- White (5)
- Other (please specify) (6) _____
- Prefer not to answer (7)

Q37 In which state do you currently reside?

▼ Alabama (1) ... I do not reside in the United States (53)

Q38 What is the highest level of education you have completed?

- Less than high school (1)
- High school diploma or GED (2)
- Some college (3)
- Certificate or Associate's (4)
- Bachelor's degree (5)
- Graduate of professional degree (6)

Q39 Which of the following categories best represents your 2017 annual household income?

- Less than $10,000 (1)
- $10,000 - $14,999 (2)
- $15,000 - $24,999 (3)
- $25,000 - $34,999 (4)
- $35,000 - $49,999 (5)
- $50,000 - $74,999 (6)
- $75,000 - $99,999 (7)
- $100,000 - $149,999 (8)
- $150,000 - $199,999 (9)
- $200,000 or more (10)
- Prefer not to answer (11)

Q40 What is your marital status?

- Single, never married (1)
- Married or domestic partnership (2)
- Separated (3)
- Divorced (4)
- Widowed (5)
- Prefer not to answer (6)

Q41 How many individuals live in your household, including yourself?

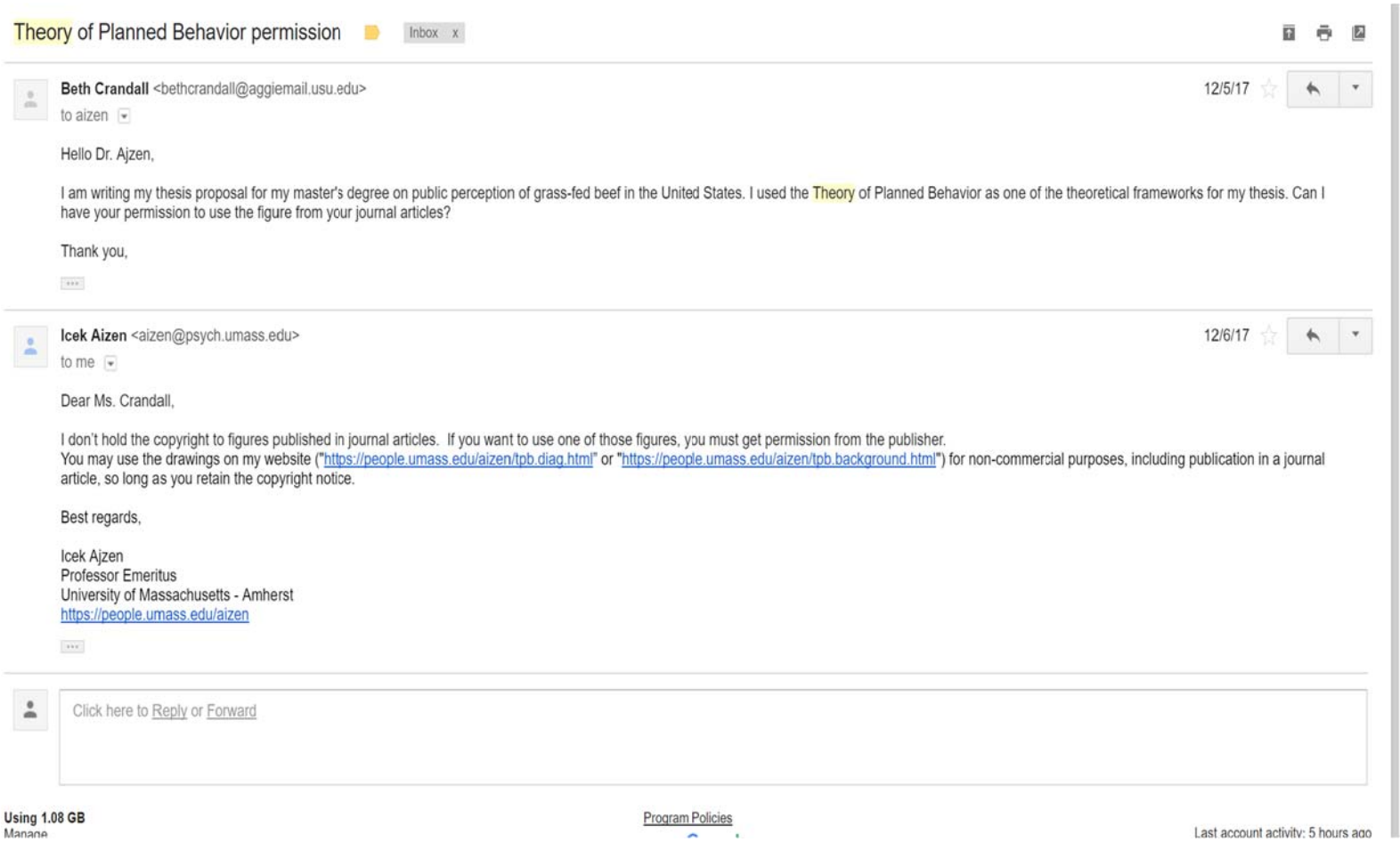
- 1-2 (1)
- 3-4 (2)
- 5-6 (3)
- 7 or more (4)

Q42 Do any children under the age of 18 live in your household?

- Yes (1)
- No (2)

Appendix C

Permission Letters



Theory of Planned Behavior permission Inbox x

Beth Crandall <bethcrandall@aggiemail.usu.edu> 12/5/17

to aizen

Hello Dr. Ajzen,

I am writing my thesis proposal for my master's degree on public perception of grass-fed beef in the United States. I used the Theory of Planned Behavior as one of the theoretical frameworks for my thesis. Can I have your permission to use the figure from your journal articles?

Thank you,

Icek Aizen <aizen@psych.umass.edu> 12/6/17

to me

Dear Ms. Crandall,

I don't hold the copyright to figures published in journal articles. If you want to use one of those figures, you must get permission from the publisher.
You may use the drawings on my website ("https://people.umass.edu/aizen/tpb.diag.html" or "https://people.umass.edu/aizen/tpb.background.html") for non-commercial purposes, including publication in a journal article, so long as you retain the copyright notice.

Best regards,

Icek Ajzen
Professor Emeritus
University of Massachusetts - Amherst
https://people.umass.edu/aizen

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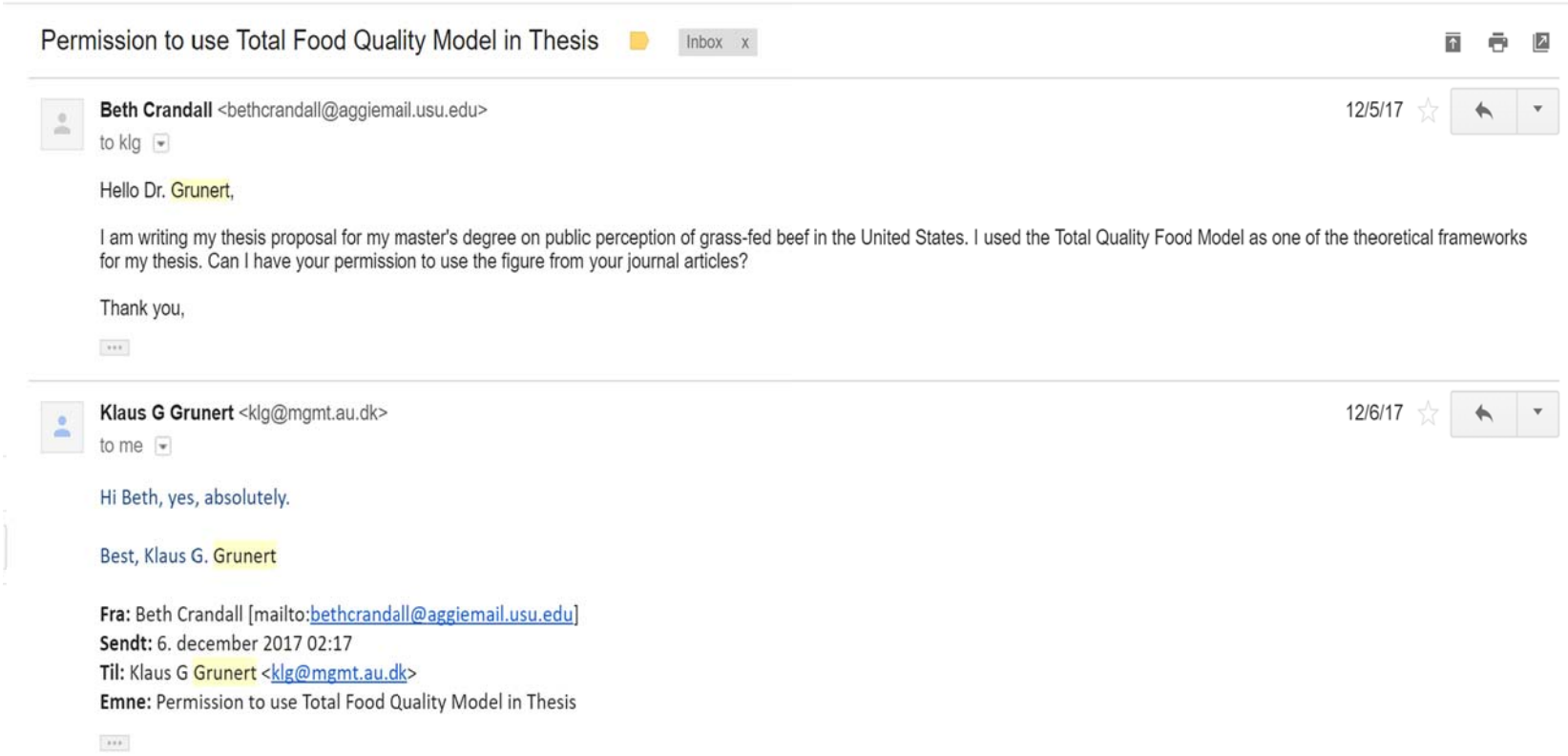
Last account activity: 5 hours ago



Permission to use Total Food Quality Model in Thesis Inbox x

Beth Crandall <bethcrandall@aggiemail.usu.edu> 12/5/17

to klg

Hello Dr. Grunert,

I am writing my thesis proposal for my master's degree on public perception of grass-fed beef in the United States. I used the Total Quality Food Model as one of the theoretical frameworks for my thesis. Can I have your permission to use the figure from your journal articles?

Thank you,

Klaus G Grunert <klg@mgmt.au.dk> 12/6/17

to me

Hi Beth, yes, absolutely.

Best, Klaus G. Grunert

Fra: Beth Crandall [mailto:bethcrandall@aggiemail.usu.edu]
Sendt: 6. december 2017 02:17
Til: Klaus G Grunert <klg@mgmt.au.dk>
Emne: Permission to use Total Food Quality Model in Thesis