

DISSEMINATING AGRICULTURE INFORMATION USING THE BBQ BOOT CAMP
MODEL

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MASTER OF SCIENCE

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ABSTRACT

The BBQ Boot Camp program was designed to educate consumers about agriculture production and sustainability, while teaching outdoor cooking methods with meat as the focus. Through the BBQ Boot Camp model, consumer impact was analyzed using a pre- and post-program test. The test questions focused on outdoor cooking, agriculture practices, and food safety issues. Data were collected from 3,112 attendees from 31 BBQ Boot Camps in 2009–2013. Data were analyzed using the MIXED procedure in SAS with fixed effects of year, time, age, sex, and city size (1=population>15k; 2=population between 2.5k-15k; and 3=population<2.5k) and all two-way interactions were tested and removed from the model if $P>0.1$. Consumer demographics included men and women representing five age categories (18-29, 30-39, 40-49, 50-59, and 60+). Data collected provided a unique opportunity to observe factors influencing consumer purchase decisions and the ability to evaluate the effectiveness of this form of extension programming.

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CHAPTER 1: LITERATURE REVIEW

Introduction

People are genuinely concerned about modern agriculture. These concerns stem from the fact that most Americans are three to four generations removed from a farm or ranch. Three generations removed would put the average Americans' Great Grandparents or Great Great Grandparents on the farm. Consumers are concerned about crop production, animal welfare, corporate farming practices, and the overall quality and safety of the American food system (Wachenheim et al., 2000). The body of literature to support these perceptions about modern agriculture is increasing (Wachenheim et al., 2000). It is important for those of us involved in agriculture research and instruction to provide up-to-date, fact-based information in the spirit of the university Land Grant model. The farther people are removed from agriculture makes them more unaware of modern agriculture practices. According to the American Farm Bureau Federation (2015), 2% of the United States population is actively involved in farming or ranching. As of July 1st, 2016, the United States population was 323.1 million people, leaving a mere 6.4 million people with active careers in agriculture. Active engagement in farming is defined by the USDA in CFR Title 7; in which significant contributions of (1) land, capital, or equipment, and (2) personal labor, active personal management, or a combination of personal labor and active personal management. The United States Department of Agriculture, National Agricultural Statistic Service (NASS), defines farms

“As a place where \$1,000 or more agriculture products were produced and sold, or normally would have been during a census year”.

USDA NASS as define ranches,

“Similar to a farm, except primarily involved in raising livestock, usually on pasture or range land”. (USDA NASS, 2004)

There is a growing disconnect between consumers and the food they consume. The Food and Agriculture Organization (FAO) branch of the United Nations warns that there will be a need to double our current worldwide food production by 2050 due to the combined effects of worldwide population growth, an increase in disposable income, and an increase in urbanization (Beachy 2009). In 2014, agriculture and agriculture-related industries accounted for 5.7% of the United States Gross Domestic Product (USDA ERS 2016). American farms and ranches contributed \$177.2 billion to the U.S. economy in 2014 (USDA ERS, 2016). In North Dakota (Quick Facts, 2017), farming and ranching comprised the largest section of the state’s economy at 25%. North Dakota’s huge agriculture sector brings in \$5 billion in cash receipts from farming and ranching each year (Quick Facts, 2017). Only 24% of the state’s population is actively farming or ranching in a state with fewer farms and ranches each year (Quick Facts, 2017). In 1935, there were 7 million farms and ranches in the United States; now there are only 2 million (USDA ERS, 2016). The United States Department of Agriculture, Economic Research Service (USDA ERS, 2016) defines rural areas as places with open countryside and communities with less than 2,500 people. Today only 14% of the Nations populations live in rural areas. All of this information indicates that many Americans do not know how their food is produced, simply because they do not produce (grow, raise) their own food. In the absence of first hand food production, American food consumers either do not know about modern production practices, or are receiving inaccurate information about modern agriculture. According to a U.S. Farmers and

Ranchers Alliance survey (2011), 72% of Americans know very little or nothing at all about modern agriculture.

History of the Land Grant University and Extension Service “Outreach”

The United States government passed legislation that would establish the Land Grant University system during President Abraham Lincoln’s time in office. The Morrill Act of 1862 allowed states to sell public land as a way to create funds to build these universities. As stated in Sec. 4 of the Morrill Land Grant College Act of 1862,

“And be it further enacted, That all moneys derived from the sale of the lands aforesaid by the States to which the lands are apportioned, and from the sales of land scrip hereinbefore provided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the moneys so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished, (except so far as may be provided in section fifth of this act) and the interest of which shall be appropriated, by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”.

Land grant universities are a public learning institution where people could (and can) obtain an advanced education. In the early years, most land grant universities focused on agriculture and mechanics, but were not to exclude the scientific and classical arts. Now land grant universities are more diversified. Through the decades as the economy grew and different education and scientific demands became apparent, land grant colleges offered educational programs beyond agriculture and mechanical arts, but still included sciences and classical arts. While some land grant universities have minimized agriculture and mechanic arts education, most still maintain a college of agriculture, which is an element to the basis on which the universities were created in the 1860's (National Academy Press, 1995). Having a college of agriculture allows a university to keep its original roots and most colleges of agriculture have a cooperative extension program (National Academy Press, 1995). In 1887, colleges acquired a research function through the Hatch Act. It was recognized that research was needed to enhance agricultural education and innovation (National Academy Press, 1995). As stated in Sec. 2 of the Hatch Act of 1887,

“As used in this Act, the term ‘‘State agricultural experiment station’’ means a department which shall have been established, under direction of the college or university or agricultural departments of the college or university in each State in accordance with an Act approved July 2, 1862 (12 Stat. 503), entitled ‘‘An Act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts’’; or such other substantially equivalent arrangements as any State shall determine.”

Extension Service legislation was passed in 1914 as the Smith-Lever Act, which provided cooperative agriculture extension between agriculture colleges and the state. As stated in Section 2 of the Smith-Lever Act of 1914,

“Cooperative agricultural extension work shall consist of the development of practical applications of research, knowledge, and giving of instruction and practical demonstrations of existing or improved practices or technologies in agriculture, uses of solar energy with respect to agriculture, home economics, and rural energy, and subjects relating thereto to person not attending or resident in said colleges in the several communities, and imparting information on said subjects through demonstrations, publications, and otherwise and for the necessary printing and distribution of information in connection with the foregoing; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges or Territory or possession receiving the benefits of this Act.”

The extension service would be an important part of the land grant university system because faculty (researchers) who worked for the university could educate farmers and consumers. Eventually universities became a system of teaching, research, and extension, which was to serve the land grant mission (National Academy Press, 1995). Extension programs are in part created to educate people outside of the colleges and (or) universities. Trained professionals stationed on the main campus and others located throughout the states (county level) would be able to take information from research and deliver that information to statewide constituents. Most extension programming has focused on agriculture and what was originally referred to as

home economics (now Consumer and Family Science). According to the North Dakota State University Extension Service,

“Extension work moreover shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges, ...and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the state agricultural college or colleges receiving the benefits of this Act” (NDSU 2017).

The Land Grant University Extension system has evolved over time. In its adolescence, faculty from the university would conduct the extension outreach. As the extension service grew, it morphed into a system that spread across states to serve the rural population and their issues. There were university affiliates in every county that could take research to the people that desired it. Extension is “*cooperative*” because it involves federal, state, and county resources. Federal resources help fund research at the state run land grant universities to which the county agents take that information and distribute it to the constituents of the state. As the world has changed, so have the Land Grant Universities and the Extension Service. Today, agriculture comprises only a portion of extension programming. Currently, there is a need for Land Grant Universities to not only reach rural communities, but also serve the diverse urban communities that have a majority of the nation’s population. Cooperative Extension’s role is to educate in four areas agriculture, home economics, 4-H youth development and community services. The Extension Service is looking more to collaborative efforts with constituent groups that would

provide funding for research as well as extension programming. Serving the diverse urban communities has become just as (if not more) important than the more traditional attention provided to the agriculture community. Reductions in Federal and State budgets over the years have forced university faculty, staff, and graduate students to work more closely with outside special interests and agriculture allied industries. Collaboration between special interests such as the National Cattlemen's Beef Association, Corn and Soybean Growers Association, National Pork Board, and other agriculture-allied industries have contributed many dollars for agriculture, home economics, 4-H youth development, and community service programs. In the Land Grant model the term "Outreach" is replacing those of "Extension and Public Affairs", according to Bonnen et al. (1998). Outreach as defined by the author,

"The corporate activities of a university, beyond its immediate civic responsibilities, which involve conscious commitment by academic units of the university to some role in the problem-solving efforts of society, and which are focused on the developing of human, national, and community resources. It involves a purposive extension or linkage of the university's special competence and resources to organizations and individuals outside the university."

The author explains that outreach will lead institutions to create new organizations or programming to facilitate problem solving (Bonnen et al., 1998). University outreach is a response from the University to local, state, regional, national, or international needs (Bonnen et al., 1998). "Outreach" is the combination of university teaching, research, and service that are combined to aid problem solving missions that are conceived to be in the public interest but within the constraints of the university's special competencies,

resources, and societal environment (Bonnen et al., 1998). It can be conceived that as culture changes over time, so does the University's role within the system for teaching, research, and extension which have combined together to form "outreach". The university has an obligation to the people to enhance their knowledge by creating programming that meets the needs of local, state, regional, national or international communities to enhance improve quality of life. Davis et al. (2002) described extension outreach as unique in the way that it involves communities, stakeholders, and universities in an ongoing conversation that defines issues and problems that can provide a focus for educational programming. Peters et al. (2002) referred to this programming as "*practical public work*", which extension outreach continually uses to improve community development.

A key component of this "*practical public work*" involves an active local constituency which is engaged with the local agent in "*planning and developing programs, non-formal teaching, facilitating meetings and community forums, providing technical expertise, and applying research-based knowledge to the problems of individuals, families, businesses, and communities*" (Peters, 2002)

Faculty and staff, as well as those representing the university at the county level, have a duty to offer practical knowledge to enhance the lives of the people in local communities and around the Nation and world. Through research and education, life can be enhanced.

Barbecue and Community

Barbecue is an American pastime that some may even consider way of life. Barbecuing meat has become a tradition that has either been passed down generations or become a new love.

Barbecuing is a means for community and friendship. The basic principle of barbecue grew from a means for impoverished Southern Americans to enjoy low valued cuts of meat that would otherwise be tough by using prolonged heat exposure at lower temperature to improve palatability. As Claire Suddath (2009) writes in her book *A Brief History of Barbecue*,

“Barbecue is not merely throwing meat on the grill...real barbecue is cooked over indirect heat for a very long time.”

Britannica academic online describes barbecue as an outdoor meal usually in the form of social entertainment, at which meats or protein and or vegetables are roasted over an open wood or charcoal fire.

“The word barbecue originated with the Spanish who adopted the term from the Arawak Indians of the Caribbean, to which the term ‘barbacoa’ originated from the adaptation of using green wood to roast or dry meat over a fire”. (Britannica, 2010)

Barbecuing has been around as long as man has been able to roast meat over an open fire, dating back to prehistoric time. Barbecuing or outdoor grilling were only regarded as an alternative way to prepare food until post World War II when it became a “fad” (Miller, 2010). Pre-World War II, there were very few books or articles about outdoor cooking. Those that were available had simple recipes; recipes that could be considered “cowboy” in their simplicity and use. One would imagine a group of men placed around a fire roasting meat and telling stories under a night sky. The role men played in the home changed after the World War II. Over time, more back yards would be home to outdoor cooking apparatuses. Outdoor grilling became popular due to multiple factors; “togetherness” was the most important (Miller, 2010). Outdoor grilling

became a way for people enjoy the outdoors and to do something as a family. Today 75% of U.S. adults own a grill or barbecue, most of those being homeowners (HPBA 2015). The trend to own or use a grill or barbecue is continually on the rise. People desire the experience of outdoor cookery and wish to expand their culinary adventurism. Jack Goldman, president and CEO of the Hearth, Patio, and Barbecue Association (HPBA 2015) said,

“Our national pastime for gathering around the grill is not only strong but also showing all indications that the passion will increase in the months and years ahead.”

According to the HPBA State of the Barbecue Industry Report, 71% of people grill because they believe it improves flavor, 54% get personal enjoyment from outdoor grilling, followed by time with family/friends (42%), cooking convenience (32%), and hobby/experimentation (23%). Owners of grills or barbecues (smokers) continually seek to learn new skills or enhance their techniques. The HPBA Industry Report also concluded that 43% of grill owners researched new grilling techniques or recipes, 22% researched techniques to improve food quality when grilling, and 31% smoked or slow cooked meat (PRWeb, 2015).

Pork was the first protein widely used in the United States for barbecue because hogs were economical to rear and widely available. Large cuts of pork would be slow cooked until tender. Barbecue in the United States has evolved encompassing many different forms dependent upon region. Texas, Kansas City, Memphis, and Carolina-style barbecue all have slight differences in the preparation or final barbecued product. Memphis barbecue well known for its spicy dry rubs and mild sauce is unlike the vinegar-based sauces used in the Carolinas, or the sweet tomato based sauces associated with Kansas City barbecue. Texas is famous for their use

of mesquite wood and love for the fatty tough cut of beef known as the brisket. Slow cooking the brisket for many hours allows the fat and connective tissue to melt away leaving a tender moist cut sought out by barbeque faithful. Moss et al. (2010) said it best,

“Barbecue has the enduring power to bring people together.”

Barbecue has the power to bring people together no matter their ethnicity, age, sex, and personal or political views. Barbecuing is about community and friendship. The community spirit of barbecue fits perfectly with the outreach educational mission of the Land Grant University fused together as a great means for delivering a message.

Food Networks and Food Perceptions

Food media (social networks, television, radio, or print) can have a profound effect on people’s attitudes toward food. Examples of food media include television (Food Network, Travel Channel), print (Food and Wine, Bon Appetite, Foodie), and computer/smart phone applications such as iMunchie, Foursquare, and Urbanspoon According to Adam Bryan of Urban Tastebud (2017),

“Food apps are the most important thing a foodie can have on their mobile phones.”

Food information is available anywhere, at any time, to anybody. Modern technology even makes it possible to by-pass waiting in line for food at a particular store or restaurant because of mobile apps. Television shows such as **Chopped** on the Food Network, where chefs compete against each other for prizes, have gained popularity by providing food enthusiasts a visual experience with food from a unique perspective. Some shows provide the viewer a chance to visit the world and to see food culture. Andrew Zimmer’s **Bizarre Foods** television show travels

the world in search of foods that may seem unusual to the average American. These foods are “*bizarre*” to U.S. consumers, yet they are culturally specific to indigenous peoples, mostly because of their availability. Most Americans have become complacent to where their food comes from and this show provides people an opportunity to see that food can be more than what is available at the local grocery store. When surveyed regarding the origin of several common products purchased in the United States, the respondents said that fuel came from a pump in the ground, lumber for houses came from a large retail store, and food came from a grocery store, restaurant or convenience store (Beachy, 2009). Americans spend less than 10% of their income on food, which includes meals in home and out of home (USDA ERS, 2016). Americans eat out as much as they eat at home. For example, in the 1920’s, disposable income spent on food was 24%, in the 50’s it was 20%, in the 70’s, 13% and since the 1990’s has been less than 10% (USDA ERS, 2017). By comparison China (a large importer of U.S. produced agricultural products), spends an average of 29% of disposable income on food (USDA ERS, 2017). Cameroon, Kenya, and Nigeria, all African countries, spend 45% or more of their disposable income on food with Nigeria spending nearly 57% (WSU, 2017). Americans are very fortunate to have readily available, inexpensive food. Consumers demand quality and availability of food, especially unique foods that may not have available in past years.

Fantasy and food are sometimes intertwined. Shows on the Food Network are a great illustration of how fantasy dominates part of our cultural space and helps sustain consumer capitalism (Ketchum, 2005). An example of a popular agriculture fantasy is “**American Gothic**”. One of the most popular depictions of a traditional farm “couple” is Grant Woods’ painting “*American Gothic*” (1930). However, this is not a husband and wife couple, but rather a

farmer and his daughter. The portrayal is of a woman standing next to a man who is holding a pitchfork, the setting, in front of a one-window farmhouse where both the man and the woman look passive. The Art Institute of Chicago (2013) writes,

“American Gothic, often understood as a satirical comment on Midwestern character, quickly became one of America’s most famous paintings and is now entrenched in popular culture.”

In many cases, modern agriculture is miss-understood, even though without agriculture there would be no food and no popular shows on the Food Network or other portrayals of food and living. The Food Network encourages people to see connections and bonds that are created through the acquisition and display of goods such as food (Ketchum, 2005). Modern television is dominated by reality TV shows that have changed the focus of series television once dominated by non-fiction programming that revolved around geography, history, movies, sitcoms, or fictional series. Reality television could fit into many genres but those concerning food would be described as instructional programming (Timberg, 2000). Ultimately, instructional reality television shows lead people to make critical food decisions regarding what or what not to consume (Ketchum, 2005). Meister et al. (2001) concluded that the Food Network is successful because it portrays “*the good life*” and this is the relationship between food and living. Whether or not that message being portrayed to consumers is true in nature could be argued. The term “the good life” would fit into the Land Grant University Extension Outreach mission in which the purpose of extension programming is to enhance people’s lives through knowledge. For many, outdoor grilling and barbecue is symbolic for family/friends. In many cultures, food equals happiness. Extension outreach programs bring knowledge to diverse populations of

people. When food, community, and extension outreach are brought together, they can form a harmony that enhances people's lives.

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CHAPTER 2: DISSEMINATING AGRICULTURE INFORMATION USING THE BBQ BOOTCAMP MODEL¹

Abstract

The BBQ Boot Camp program was designed to educate consumers about agriculture production and sustainability, while teaching outdoor cooking methods with meat as the focus. Through the BBQ Boot Camp model, consumer impact was analyzed using a pre- and post-program test. The test questions focused on outdoor cooking, agriculture practices, and food safety issues. Data were collected from 3,112 attendees from 31 BBQ Boot Camps in the summers of 2009 – 2013. Data were analyzed using the mixed procedure in SAS with fixed effects of year, time, age, sex, and city size (1 = population > 15k, 2 = population between 2.5k and 15k, and 3 = population < 2.5k) and all two-way interactions were tested and removed from the model if $P > 0.1$. Consumer demographics included men and women attendees representing

¹ The material in this chapter was co-authored by A. J. Germolus, E. P. Berg, P. T. Berg, R. J. Maddock, A. N. Lepper, D. S. Buchanan, J. M. Young, L. L. Baranko, S. A. Wirt, and D. J. Newman. A. J. Germolus, E. P. Berg, P. T. Berg, R. J. Maddock, A. N. Lepper, D. S. Buchanan, J. M. Young, L. L. Baranko, S. A. Wirt, and D. J. Newman were all at North Dakota State University at the time they participated in this project. A. J. Germolus set up events, presented material, and assisted with data management. E. P. Berg helped design the survey and presented program material during the program years. P. T. Berg helped design the survey and presented program material during the program years. R. J. Maddock assisted with survey design and presented program material during program years. A. N. Lepper was a presenter. D. S. Buchanan helped with statistical design and input and presented during the program. J. M. Young worked with statistics and managed data. L. L. Baranko was a coordinator and presenter. S. A. Wirt was a coordinator and presenter. D. J. Newman was the principle investigator and director of the program.

five age categories (18 to 29, 30 to 39, 40 to 49, 50 to 59, and 60+). The data collected provided a unique opportunity to observe factors influencing consumer purchase decisions and the ability to evaluate the effectiveness of this form of extension programming.

Key words: consumer, barbeque, education

Materials and Methods

Collaborative Effort

BBQ Boot Camp continues to be a collaborative effort that includes a variety of individual people, businesses, and groups. The program has been a collective effort of Animal Science faculty, staff, graduate students, undergraduate students, and administrators. The BBQ Boot Camp program would not have been possible without the support and collaboration of special interests and local businesses; North Dakota Beef Commission, North Dakota Pork Producers, ND Extension Service, ND Animal Sciences, North Dakota Lamb and Wool Producers, Minnesota/North Dakota Turkey Growers, Northern Plains Distributing, Big Green Egg, Traeger Grills, Cloverdale Meats, and Excalibur Seasoning. BBQ Boot Camp has relied heavily on local and county university extension personnel to organize the program location and logistics as well as to recruit local constituent consumers to attend each of 31 programs held across the state of North Dakota. Through University Extension, Animal Science, and special interests, funding of the program allowed the program to become mobile; taking it to the people.

Pre-Post-Survey Design

The BBQ Boot Camp program is comprised of four stations that focused on specific topics related to food (meat), outdoor cooking, and agriculture. A pre- (see Appendix A) and post-survey (see Appendix B) was given to participants to gauge their understanding of the topics

presented during the program. University faculty, staff, extension staff, students, and stakeholders collaborated to develop the questions. The pre-survey had eleven multiple choice questions “A, B, C, D” and five “Yes” or “No” questions that asked attendee’s basic information about food, food safety, and cooking. Those questions were followed by six questions that asked attendees to rank each question on a Likert, 5-point scale, 1 = not important, 5 = very important. The last six questions collected participant’s perceptions of food, livestock stewardship, and tools educators use to communicate food and agriculture information. The post-survey was the same as the pre-survey: eleven multiple choices and five “yes” or “no” questions. Six new questions at the end of the survey asked participants to rank food production, animal welfare, pricing, and tools educators can use to communicate using a Likert 5-point scale (1 = not important, poorly, absolutely not or not useful at all and 5 = very important, very well, absolutely, and very useful). The very last questions asked the participants to circle their sex and age category (18 to 29, 30 to 39, 40 to 49, 50 to 59, and 60+).

Survey Administration

As program participants arrived, they were immediately checked in, given a name badge, handed a booklet, and a pre-survey. They were asked to complete the pre-survey and return it to the check in table before the program began. Immediately following the program, attendees would be given a post-survey in which questions 1 – 16 were replicated. The last six questions of the post-survey were changed to ask sex, age, and questions regarding participants’ willingness to change habits or decisions based upon what they had learned during the program. The program was designed to last 2 h with a 10 m introduction in which presenters were recognized and groups of participants split so each group would go to a different station. At each station,

program presenters would talk for approximately 30 min, or until all other groups had been dismissed. Each group would then rotate to the next station until they had visited all four stations. The entire educational program took approximately 2 h (30 m at each station). At the conclusion of the program, a short “Thank you” would be given to the program sponsors including the county extension agent who assisted with local program facilitation and other sponsors. The role of the county agent was to promote the BBQ Boot Camp program as to get as many participants as possible, find sponsorship for food and door prizes, and to find and set up a location in their county or city.

Station 1: Grilling, Grill Maintenance, Grill Selection and Meat Nutrition

Grilling, Grill Maintenance, Grill Selection

At this point in the program, participants would learn about outdoor cooking and grilling basics. Key topics included grill maintenance, grill selection, grill types, lighting a grill, grilling meat and vegetables, and the importance of meat in the human diet. Grill maintenance covered cleaning the grill, how to winterize a grill, and general troubleshooting such as loose bolts that may have loosened from moving the grill. Grill cleaning included tips for improving the lifespan of your grill such as scraping the grill grate, cleaning up fat that had dripped off meat, and disposal of spent charcoal. Winterizing covered the essentials such as cleaning a grill of all material build up on the inside and outside and removing any spent charcoal as it may harbor moisture and lead to rust. A few methods covered how to light gas or charcoal grills. Gas lighting is simple and instructions typically come with a new purchase, but most attendees did not know that special instructions should be given when using propane bottles as the valve would need to be turned slowly to release propane. Different methods of lighting a barbecue or charcoal

grill were explained. Grilling meat and vegetables was an important part of this station, as it is not covered well by any of the other stations. Direct versus indirect cooking was discussed and how each is important for different types of cuts.

Meat Nutrition

The various health benefits of different cuts of meat were discussed. Nutrients such as essential amino acids, iron, and vitamin B12 are more bio available from meat compared to other plant foods. Umami (from the Japanese for savory or delicious), which is the fifth taste sense, was also discussed. Grilled food has more umami than non-grilled food. Foods with natural umami like aged meat, ripe tomatoes, mushrooms, aged cheeses were also discussed. A common attraction of this station was to provide samples of a grilled beef patty made with bleu cheese, dill weed, salt, pepper, and garlic. The point of the sample was to discuss ground beef and fat content as well as umami. Fat will drip away as the meat is cooked making grilling more appealing to health conscious consumers. Umami was discussed because the bleu cheese and beef combination enhance the “*umami*” taste sense. Umami is described by Merriam-Webster (2017) as a taste sensation that is meaty or savory and is produced by several amino acids and nucleotides (such as glutamate and aspartate).

Station 2: Degree of Doneness and Food Safety

Degree of Doneness

This station focused on final cooking temperature of steaks and chops commonly referred to in cooking circles as degrees of doneness. The final degree of doneness has a profound impact on a person’s eating experience and overall palatability of the meat being served. Food safety and the importance of cooking to a correct internal temperature was also discussed. The primary

objective of this station was to teach consumers that over cooking certain cuts of meat can be counterproductive and lead to an unsatisfying eating experience. Boneless Pork Strip Chops and Beef Strip Steaks are used as tasting examples for program participants. Three chops and three steaks were cooked to medium rare (145°F), medium (160°F), and well done (175°F), cut into cubes, and distributed to participants for tasting. This provided people an opportunity compare the varying degrees of doneness.

Food Safety

Food safety was an important aspect of this station. It was very important for the participants to see correct ways to use a meat thermometer and to understand how meat degree of doneness can affect food safety. It was explained that poultry and ground items must be cooked to a higher degree of doneness. Ground beef must be cooked to 160°F because of the increased surface area because of grinding and mixing whole muscle cuts of meat. The mixing during the grinding process may combine meat that has potentially been exposed to pathogenic bacteria with non-exposed. Poultry would need to be cooked to a higher temperature because the prominence of *Salmonella* and *E-Coli* bacteria. Cross contamination and emphasis on clean food preparation surfaces was also discussed briefly in this station.

Station 3: Spices, Rubs, Marinades and Animal Sciences

Spices, Rubs, Marinades

Flavoring of food is an important aspect in enjoying food. This station discussed the spices, herbs, and many other ingredients that could be used to create flavorful rubs or marinades as a compliment to meat and other foods. The three most popular spices/ingredients for seasoning meat are; salt, pepper, and garlic. Some more common and regularly used spices/herbs

(in no specific order) are oregano, dill, cumin, parsley, fennel, red pepper, white pepper, rosemary, cinnamon, basil, and paprika. At this station, the presenters displayed and discussed a full array of pre-mixed rubs that incorporated the combinations of the aforementioned spices, which allowed participants an opportunity to try different flavor combinations associated with cultures around the world. Rubs were made reflecting East Indian culture, Hispanic culture, Asian, and American. Participants were taught a basic spice combination of salt, pepper, and granulated garlic and then instructed on what they could add to build on the basic and create the ethnic/cultural differences.

Dry rubs and spices are not the only way to enhance the flavor of meat. Marinades serve two functions, enhance flavor and denature protein as a means of improving the tenderness of less tender cuts of meat. Ingredients including spices and non-spice ingredients were discussed in depth. Again, an array of marinades were made in advance to give participants an opportunity to taste different recipe combinations. A discussion of the functionality of different marinade ingredients were provided so attendees could understand that certain enzymes or acid/base combinations either quickly or slowly influence protein denaturation. The acid in lime or lemon juice and the enzymes in papaya or pineapple influence the overall palatability of meat via different mechanisms. It was stressed in this station that over-marination of an enzyme-based marinade can lead to development of a “mushy” mouthfeel.

Animal Science

The aspects of meat-animal production such as; how livestock are raised, how do livestock get to market, then how does meat get to the supermarket were addressed in this segment of the spices, marinated, and rubs station. Because of the mission of the program, the

program instructors felt it very important to describe the mission and work responsibility of university Animal Sciences faculty and staff. It was necessary for the attendees to understand how these personnel fit into the extension outreach model and how each plays a role in improving the quality of life of North Dakota citizens and the citizens of the world. Many of the Animal Sciences Department faculty conduct research that has a global impact on animals, the people who raise them, and the people who consume those animals as food. Similar to the disconnection between food production and consumers, there often are misconceptions as to the role and duty of the university employee, especially for those employees within the University College of Agriculture. Duties and responsibilities of faculty and staff are therefore presented, as are the daily activities of these personnel. This station also highlighted the diversity of talents and people employed within the Animal Sciences department. BBQ Boot Camp instructors came from all over the United States and the world.

Station 4: Slow Cooking and Barbecue and Modern Agriculture

Slow Cooking and Barbecue

This station was the anchor to all the other stations because it alone contained the essence of the program within its title. BBQ Boot Camp was about barbecue and disseminating modern agriculture. Here the focal point focused on how to start with a tough cut of meat and end up with a cut that was juicy, tender, and flavorful. The keys to great barbecue are *temperature, time, and humidity*. Science would be used to describe how muscle, fat, and connective tissue would change during low temperature and slow cookery that incorporated humidity. Participants at this station are able to learn about different types of wood that can be used. They would learn how each type of wood creates different flavor profiles in meat during the smoking process.

Discussion and presentation of various styles and types of barbecue grills were a popular focal point of this presentation. Various grill designs and smokers were discussed and how designs could be utilized depending on the wants or needs of the user.

Modern Agriculture

The facts about modern agriculture were presented during this portion of the program. This incorporated common, modern livestock production views from a university perspective. Research and statistics would be a focal point of discussion during this talk. Participants were told that most consumers were 3 – 4 generations removed from the farm and direct involvement with growing food. It was emphasized that people directly involved in agriculture production make up 2% of the United States population and that by 2050, these fewer and fewer people will have the responsibility of feeding twice as many people across the world. Advances in agricultural research and technology would be discussed. Participants were educated on various quality assurance programs that are made available through livestock commodity groups. Most attendees did not know who pays for animal welfare programs. It was vital that the instructor at this station was an expert on the broad nature of modern farming and ranching because the discussion quite often lead to a wide range of audience questions regarding clarification of general agriculture facts versus fiction.

Statistical Analysis

All the survey data from 2009 to 2013 (questions and answers) were compiled and analyzed using the MIXED procedure of SAS (v. 9.4, SAS Institute, Inc., Cary, NC). No random effects were included in the analysis. Fixed effects included year, sex, city size, survey time point (pre/post), and age. Two-way interactions were tested and removed from the model if $P >$

0.1. Means for each fixed effect were calculated using the LSMEANS statement in the mixed procedure. Letters for mean separation were determined using the pdmix800.sas macro program at a significance level of $P < 0.05$ (Saxton, 1998). Main effects and interactions between main effects will be the focal point to this paper.

Results and Discussion

The percent correct pre- and post-survey results for all program participants can be found in Figure 2.1. This showed the accuracy results for pre- and post-survey questions from consumers attending the BBQ Boot Camp Program. The results showed a 15 percentage point improvement in test scores after completion of the BBQ Boot Camp program (pre-test average score = 67%; post-test average score = 82%). This indicates that the BBQ Boot Camp was successful in educating consumers about agricultural, food, food cookery, food safety, livestock stewardship, and BBQ.

In Figure 2.2, results for overall percent correct were analyzed using city sizes. Size of these North Dakota cities was dependent on population. Large +15 k; Medium < 15 k; Small < 2,500 k. From the results, we can see that when answering the survey questions, consumers from the smaller cities (less populated) answered correctly less often than the large cities. We can assume from these results that there are little differences in size of community when it comes to overall knowledge of agricultural, food, food cookery, food safety, livestock stewardship, and BBQ. Although there was a statistical difference between larger populated cities and the medium and small cities, numerically there was little difference.

In Figure 2.3, we see the overall percent correct for each year and the effectiveness of the program. Each year differs in correct total percentage points, the years 2009 – 2011 had the

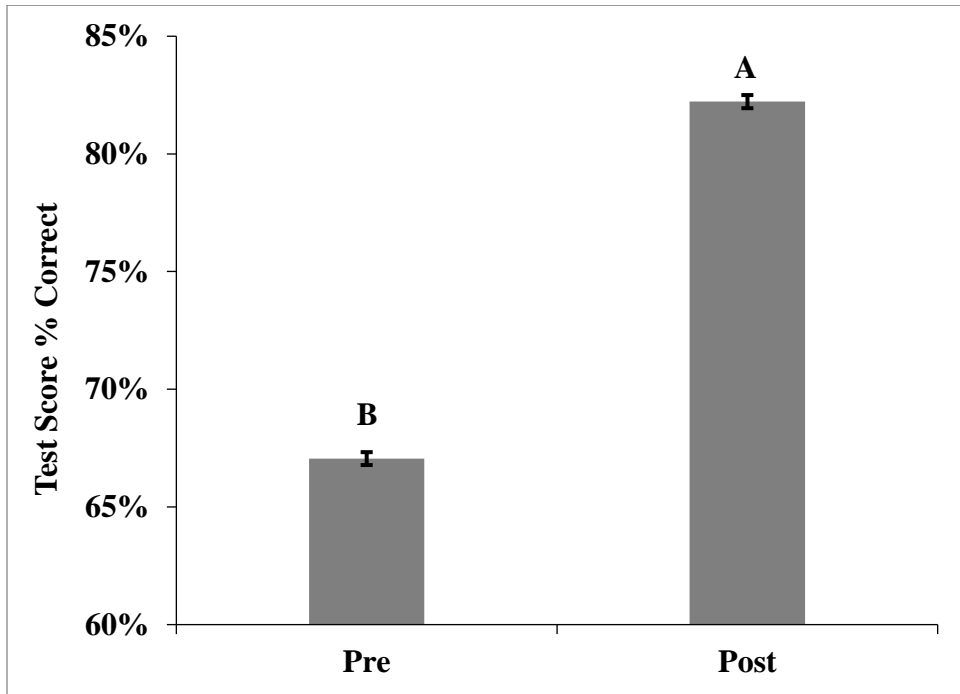


Figure 2.1. Overall percent correct by time. Means with different letters differ by $P < 0.05$.

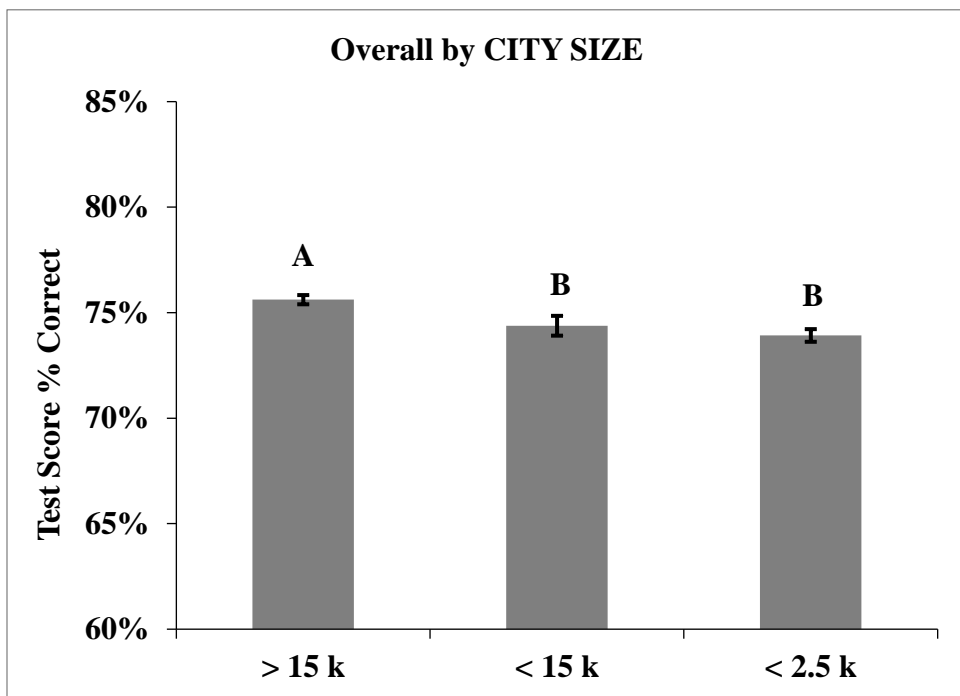


Figure 2.2. Overall percent correct by city size. Means with different letters differ by $P < 0.05$.

greatest total impact on consumer knowledge. In 2012 the total percentage points for correct on post evaluation were 12 percentage points lower (67%) than the highest year in 2009 (79%), this could be due to a change in programming. In 2012, the personnel that taught each station had changed slightly from previous years and this could have effect post-survey results.

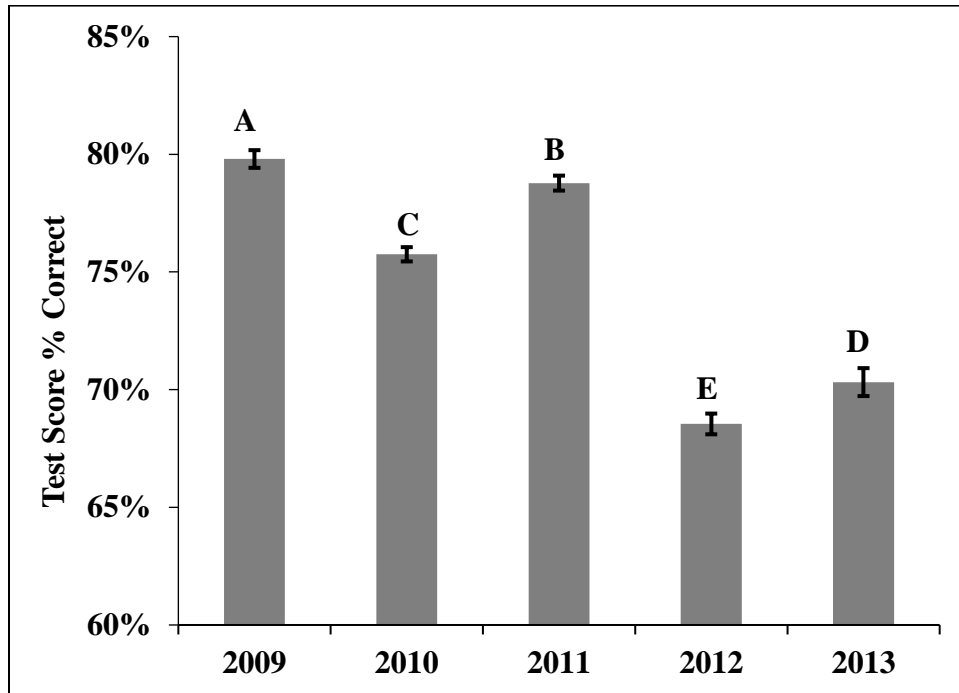


Figure 2.3. Overall percent correct by year. Means with different letters differ by $P < 0.05$.

In Figure 2.4, we can see consumers knew and answered more correctly when asked the same questions after attending the BBQ Boot Camp in consecutive years. Consumers in 2009 and 2010 showed a higher capacity to learn from the program, which is seen by a 20% increase in correctness from pre- to post-survey. In 2012 and 2013 there was a minimal change in percent correct from pre- to post-survey. It is hard to conclude why there was only a slight increase in knowledge gained in the later years of the program compared to the early years.

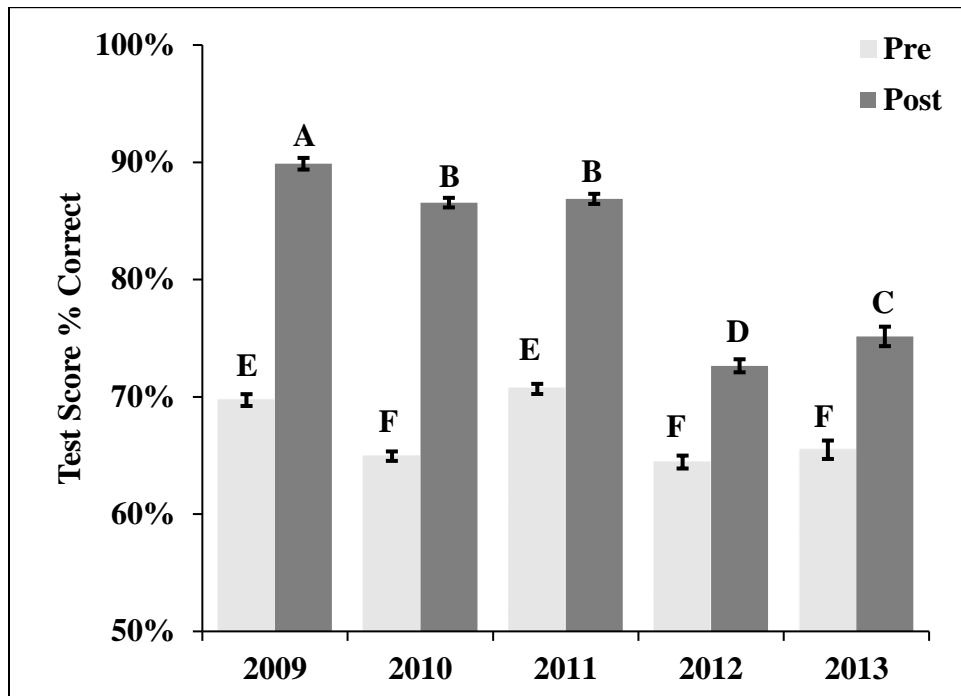


Figure 2.4. Overall percent correct by time × year interaction. Means with different letters differ by $P < 0.05$.

In Figure 2.5, we can see both women and men answered better after attending the BBQ Boot Camp. Women and men both achieved 80% correctness for the survey questions. There was little to no difference between overall women and men questionnaire answers, yet women had a slightly higher percent correct in post-survey. This is a good analysis for the program because it shows that women and men had equal knowledge regarding questions asked on the pre-survey and ended the program gaining the same amount of knowledge.

In Figure 2.6, we can see all age ranges gained knowledge from attending the BBQ Boot Camp reaching over 80% correct accuracy. However, before attending the BBQ Boot Camp program, middle aged and senior aged people had slightly better knowledge of cooking meat products than the younger generation. It could be concluded from these results that younger people are less likely to cook than their parents or grandparents. A USDA Economic Research

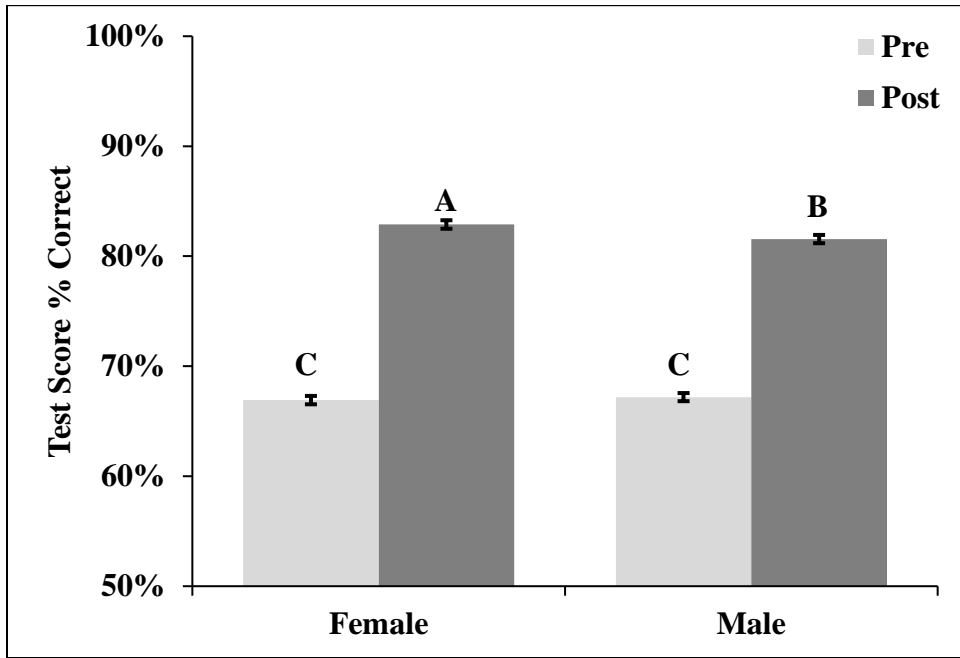


Figure 2.5. Overall percent correct by time \times sex interaction. Means with different letters differ by $P < 0.05$.

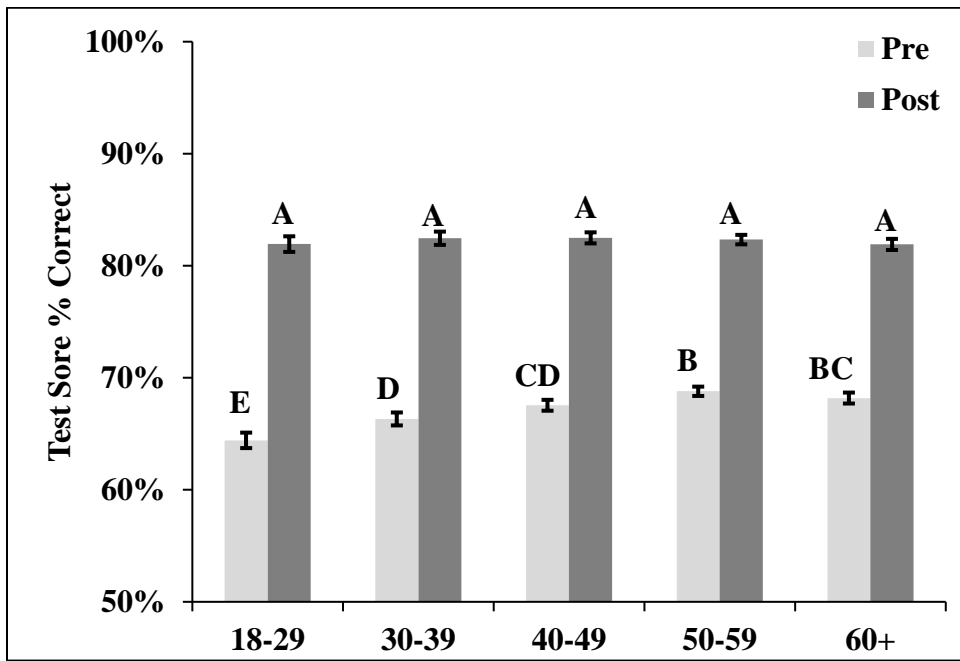


Figure 2.6. Overall percent correct by time \times age interaction. Means with different letters differ by $P < 0.05$.

Service statistic from 2014 shows that eating out of home was 50% of the annual food expenditure for consumers. There was a significant difference ($P < 0.05$) between the 18-29 age group and the 60+ age group in the pre-survey results.

When asked whether or not a majority of fat (> 50%) in beef ribeye steaks and pork chops was saturated fat (Figure 2.7), consumers answered “YES” more in the pre-survey than in the post-survey in years 2010 and 2011. The opposite would be true for years 2012 and 2013. Consumer answers were more correct pre- vs. post- survey, with an average of 44-percentage correct pre- BBQ Boot Camp and 25 percentage points correct post- BBQ Boot Camp. According to the USDA Agricultural Research Service National Nutrient Database (2017) a beef, ribeye steak contains more mono- and poly- unsaturated fat than saturated fat. Pork has the

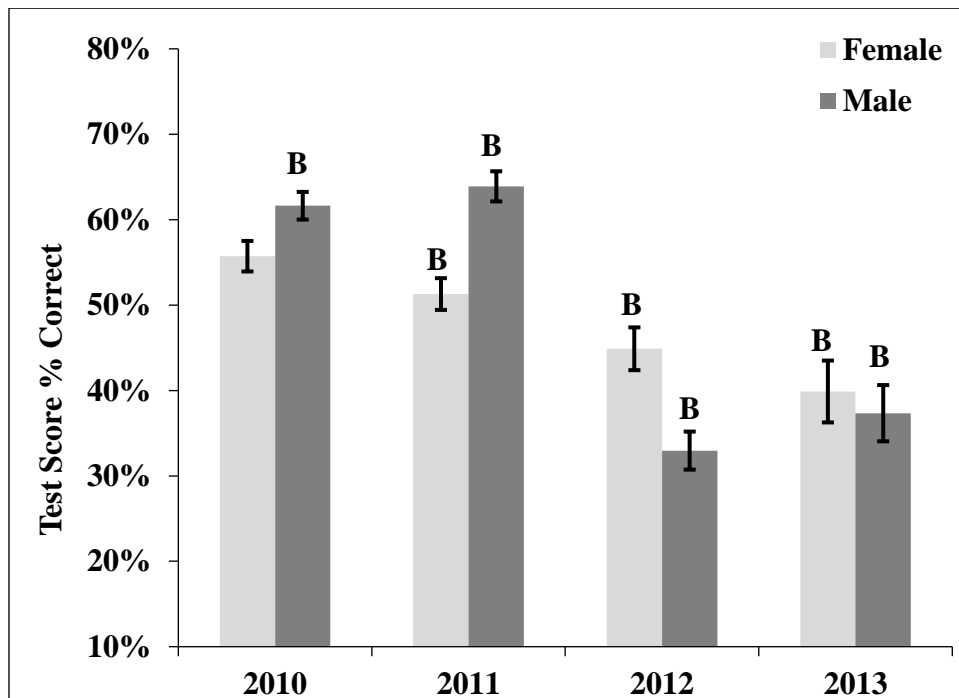


Figure 2.7. Percent correct by year \times sex interaction when asked if the amount of saturated fat in beef ribeye steaks and pork loin chops was (>50%). Means with different letters differ by $P < 0.05$.

same results as beef. We can see that in 2012 and 2013 people were 15 – 20 percentage points more accurate in their answer in the pre-survey than in the post-survey. It could be concluded that this information may not have been portrayed the best during the program or there was a misunderstanding between the presenter and the audience.

When consumers were asked what temperature ground beef should be cooked to improve safety, the percentage correct was higher in post-test applications in the early years of BBQ Boot Camp compared to the last two years of the program (Figure 2.8). Overall, consumer pre-survey answers remained constant from 2009 – 2013, but in years 2012 and 2013 there were only slightly more correct post- BBQ Boot Camp. The year 2009 had the greatest increase in correctness with a 25-percentage point increase from pre- to post-survey. In years 2012 and 2013, a logical answer to the decrease in percentage of post-survey questions answered correctly

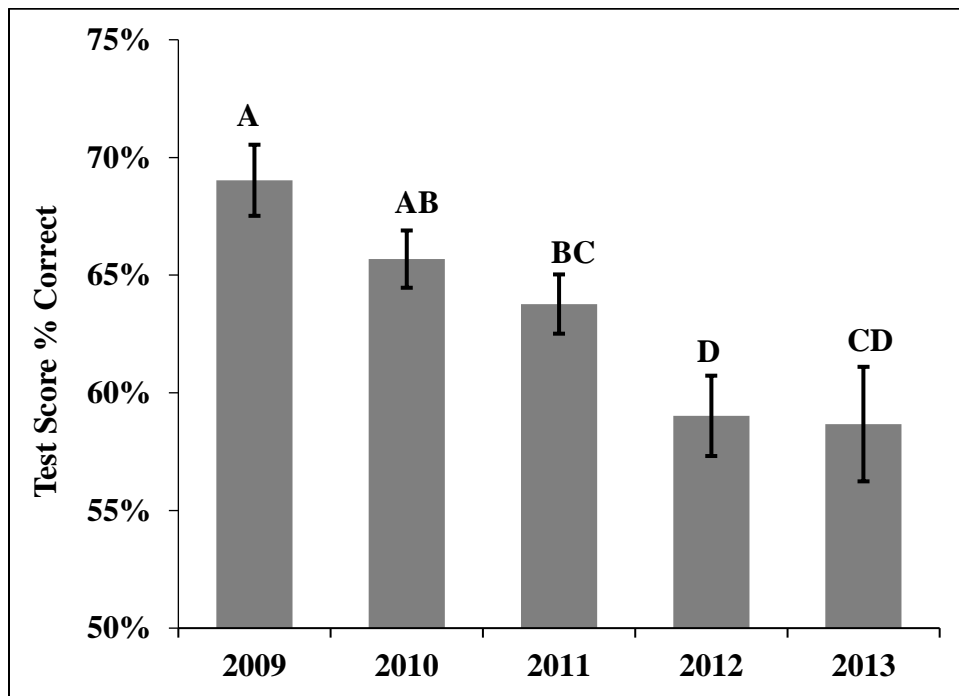


Figure 2.8. Percent correct by year when consumers were asked the safe internal temperature of ground beef. Means with different letters differ by $P < 0.05$.

could be related to a changes made in presenters over the years. The new instructor may not have been as familiar with the questionnaires and may have covered topics that were more in touch with their area of specialization. It is interesting to note that consumer's answers stayed relatively flat on pre-survey correctness, 2012 having the least impact on consumer's overall perception on safe internal temperature of ground beef.

Prior to attending BBQ Boot Camp, consumer's thermometer use was very low (Figure 2.9). In 2009 and 2010, thermometer use averaged 12 percentage-points. Participants in 2011 – 2013 had a higher rate of thermometer use at 40 and 45 percentage-points prior to attending BBQ Boot Camp. It can be concluded that participants realize that thermometer use is important for food safety and food quality and will utilize thermometers more in future cooking events. It can also be concluded that some consumers may have taken the program multiple times 2009 – 2013 or had heard from friends, family, or neighbors about the program. Thermometer use during cooking may have been discussed over casual conversation. There is a large increase (> 30%) from 2010 – 2011 in percent of consumers acknowledging that they use a meat thermometer when cooking. There was a slight increase from 2011 to 2013 of people acknowledging they used a meat thermometer when cooking meat. Lando et al. (2012) found that educational programs should focus on encouraging thermometer ownership before speaking about thermometer usage.

Consumers were asked about the safe internal cooking temperature of pork chops; could pork be cooked to a medium degree of doneness. In Figure 2.10, we see that women and men answered the same numerically on the pre-survey and post-survey. Both had high percentage

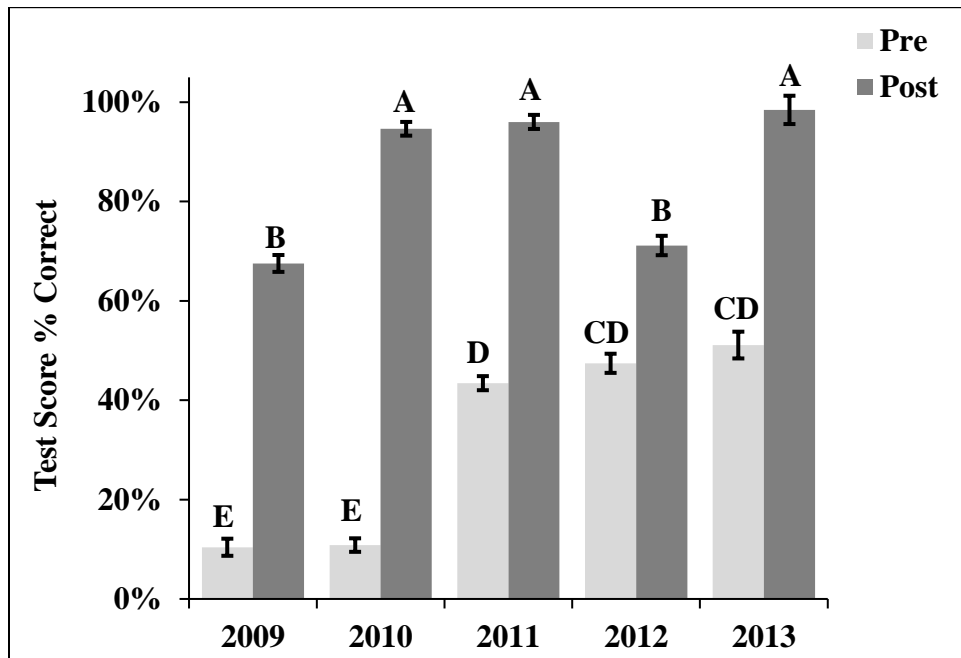


Figure 2.9. Percent correct by time × year interaction when consumers were asked on the pre-survey about their current thermometer use and post-survey if they intend to use a thermometer when cooking. Means with different letters differ by $P < 0.05$.

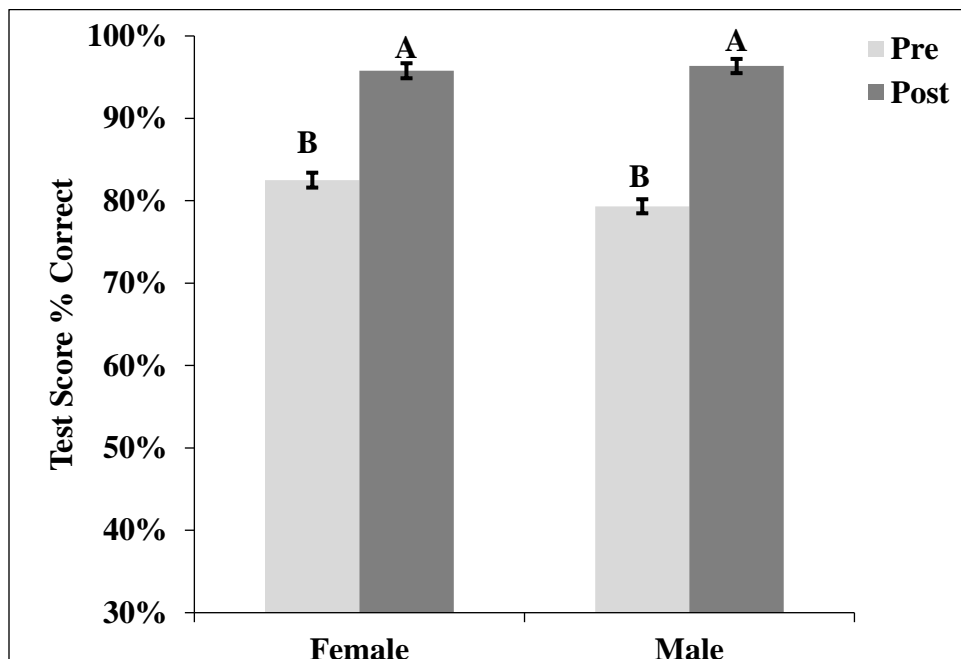


Figure 2.10. Percent correct by time × sex interaction when asked if pork chops could be safely cooked to a medium degree of doneness. Means with different letters differ by $P < 0.05$.

points for correctness on the pre-survey but we can see that they did gain knowledge as the post-survey showed a 12-percentage point increase in answering correctly that, yes, pork chops can safely be cooked to a medium degree of doneness.

The results for time * age interaction for whether or not pork chops can be safely cooked to a medium degree of doneness are illustrated in Figure 2.11. It should be noted that the 50-59 age group had a 20% advantage answering correctly (pork chops can be cooked to medium degree of doneness) on pre-survey questionnaire over their 18-29 age group counterparts. It can be concluded that the older age groups may have more experience with cooking and therefore understand that pork does not need to be overcooked.

The results for time*year interaction for whether or not pork chops could be safely cooked to a medium degree of doneness are illustrated in Figure 2.12. There is a trend line for

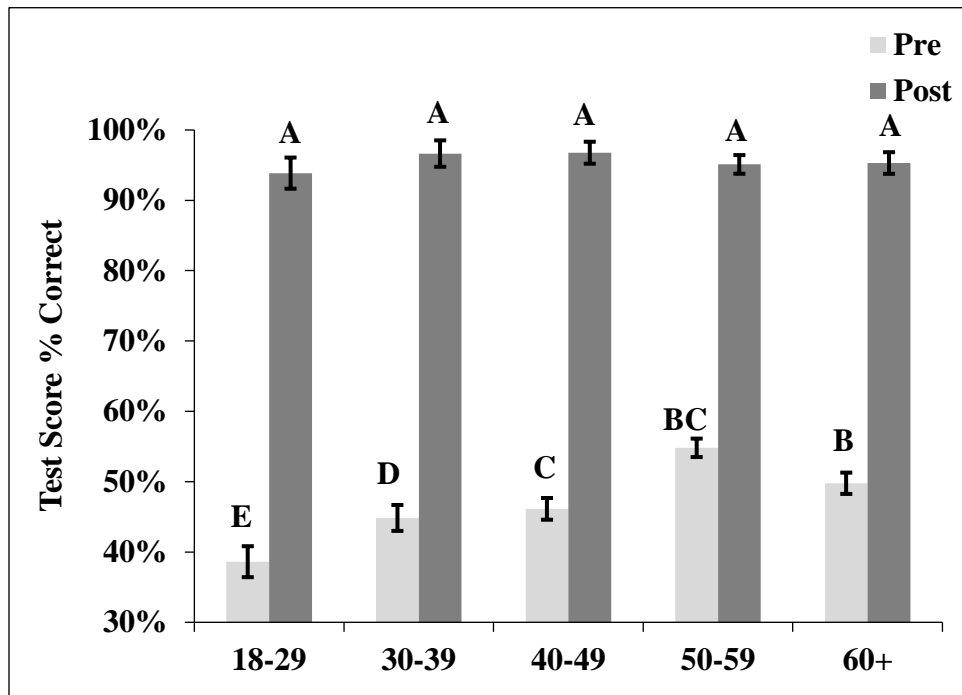


Figure 2.11. Percent correct by time × age interaction when asked if pork chops could be safely cooked to a medium degree of doneness. Means with different letters differ by $P < 0.05$.

the years. Each year is numerically different then the next starting in 2009. Consumers had a higher percentage correct on pre-surveys each consecutive year. This may be attributed to marketing information provided through the National Pork Board, USDA, or FDA regarding safe internal temperatures of pork. A large-scale effort was implemented by these organizations in 2011. We can conclude that consumers were gaining knowledge through other sources from 2009 – 2013 in this area. All participants answered above 90 percentage on post-survey correctness.

When women and men are asked about the three keys to slow cooking (Figure 2.13), men answered 10 percentage points higher on the pre-survey than women, but women slightly outscored men on the post-survey. It can be concluded that women learned slightly more than

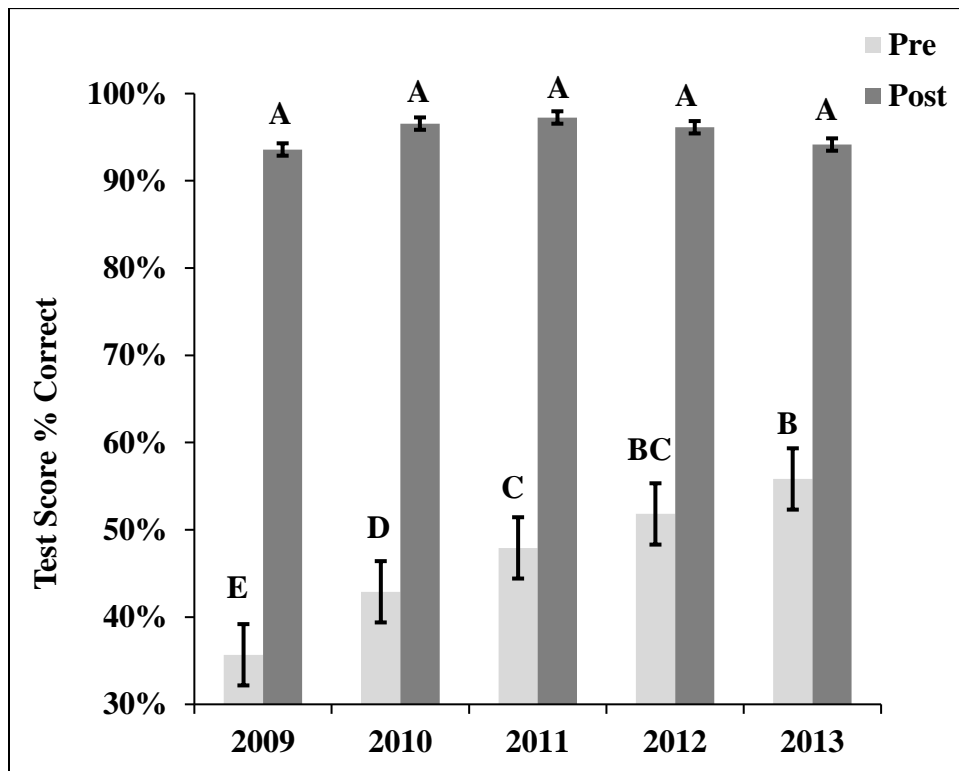


Figure 2.12. Percent correct by time × year interaction when asked if pork chops could be safely cooked to a medium degree of doneness. Means with different letters differ by $P < 0.05$.

men but men knew more than women prior to BBQ Boot Camp. Both sexes gained knowledge by attending BBQ Boot Camp as their answers increased in correctness by more than 20 percentage points.

In Figure 2.14., when looking at the results for the three keys to slow cooking time*age interaction, we see that the 30-39 age group numerically knows more than other age groups but know significantly more about slow cooking than the 50-59 and 60+ age groups. All age groups had similar scores on the post-survey. All participants left with knowledge in the area of slow cooking.

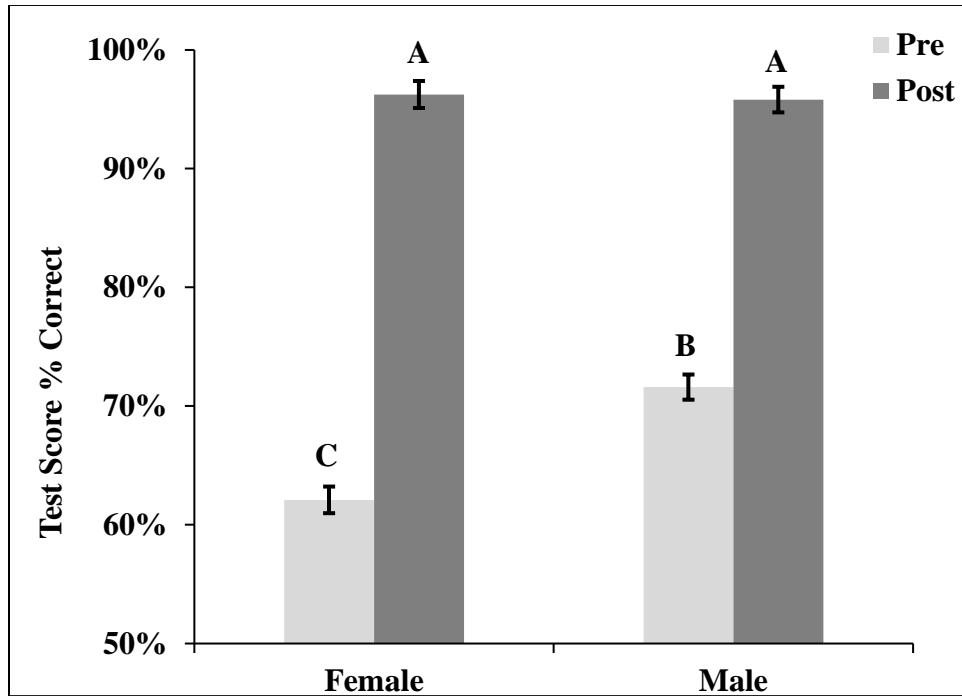


Figure 2.13. Percent correct by time \times sex interaction when asked what the three keys to slow cooking are. Means with different letters differ by $P < 0.05$.

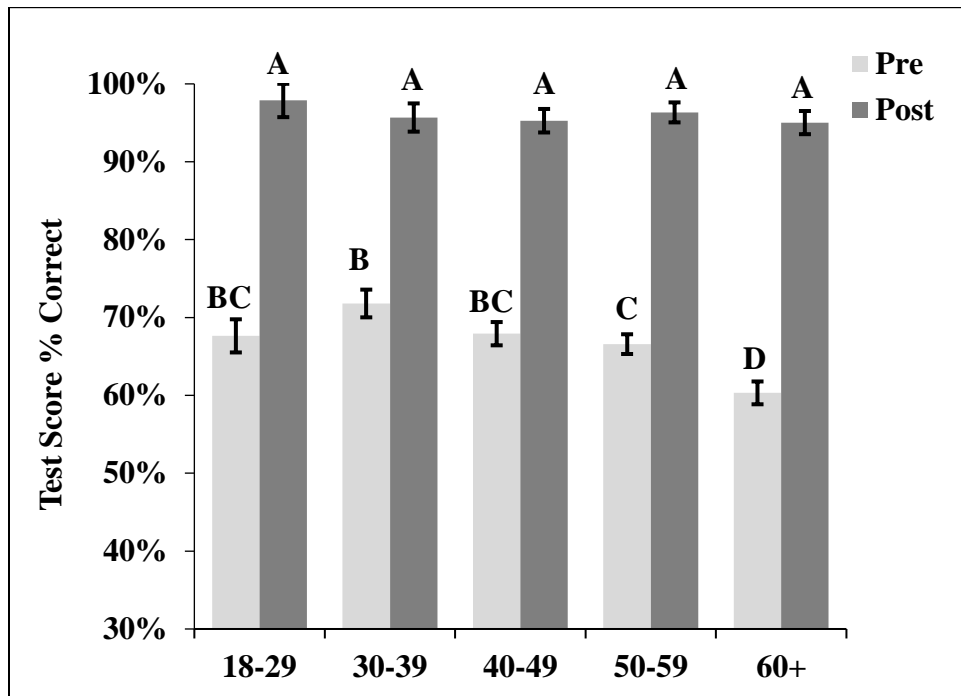


Figure 2.14. Percent correct by time × age interaction when asked what the three keys to slow cooking are. Means with different letters differ by $P < 0.05$.

Consumers were asked who pays for livestock quality assurance programs (Figure 2.15).

There was a time*year interaction and we see that most pre-survey scores are below 25 percentage points, with minimal increases in post-survey percentage points. In 2009, the most significant increase in pre- to post-survey correctness was seen and in 2012, the least positive results were seen, with a lower post-survey correctness than pre-survey correctness. It can be concluded that consistency in program messaging was not adhered to and affected improvements between pre- to post-survey correctness. The message may not have been taught as well in subsequent years after 2009. It may be concluded that this is one perception people tend to get wrong about the livestock industry. The answers to the question, which states,

“Beef and pork quality assurance programs help ensure the delivery of safe, wholesome meat products raised under strict animal welfare and environmental

guidelines. The programs are paid for by: (A) USDA (B) FDA (C) Livestock producers (D) Humane Society of the United States (HSUS). The correct answer to the question would be (C) Livestock producers.”

with livestock producers (C) being the correct answer.

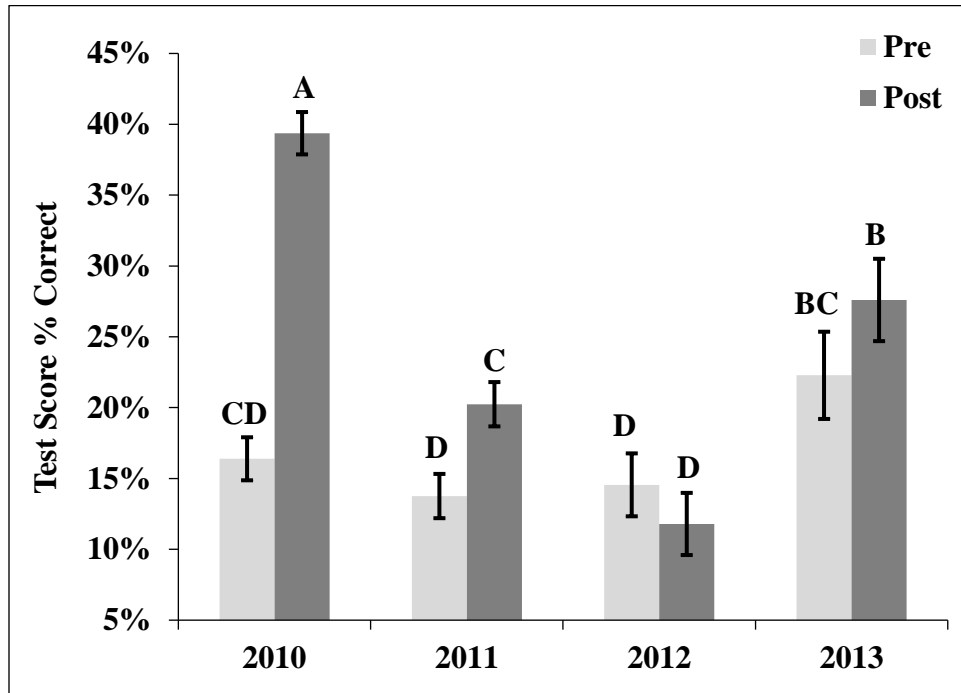


Figure 2.15. Percent correct by time × year interaction when consumers were asked who pays for livestock quality assurance programs. Means with different letters differ by $P < 0.05$.

A significant difference between age groups was observed with people over the age of 50 scoring a higher percent correct than those younger regarding who pays for quality assurance programs (Figure 2.15). It may be concluded that an older generation understands that farmers/ranchers are the ones who pay for their own animal welfare programs.

Consumers were asked if meat from another country were cheaper, would you buy it using a five point Likert scale (1 = not very useful; 5 = very useful). It is interesting to point out that 2011 was significantly different ($P < 0.05$) than other years where people said they would be

more willing to buy food from another country if it were cheaper (Figure 2.16). Other years did not differ in that people were less likely to buy food that was produced in another country regardless of price.

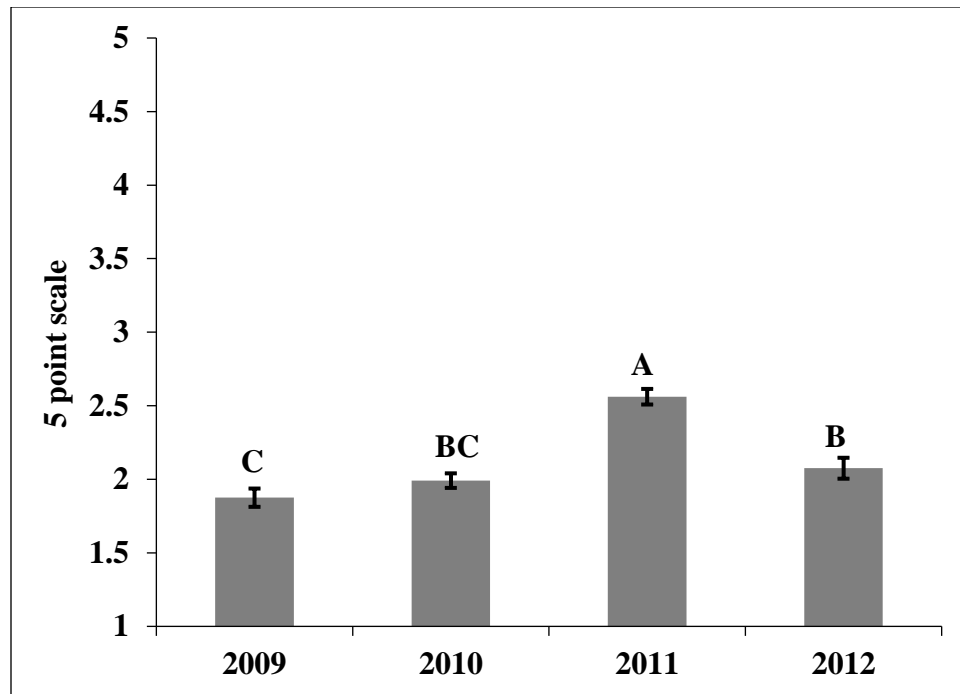


Figure 2.16. Average mean by year when consumers were asked if meat from another country was cheaper, would you buy it using a Likert, 5 point scale (1 = not very useful; 5 = very useful). Means with different letters differ by $P < 0.05$.

In Figure 2.17, the younger age groups of 18 – 29 were less concerned about where their food was produced compared to an older age group. More concern was placed on food production as the age group increased until the 60 + age group. It may be concluded that disposable income may reflect a person's or particular age group's attitude toward food.

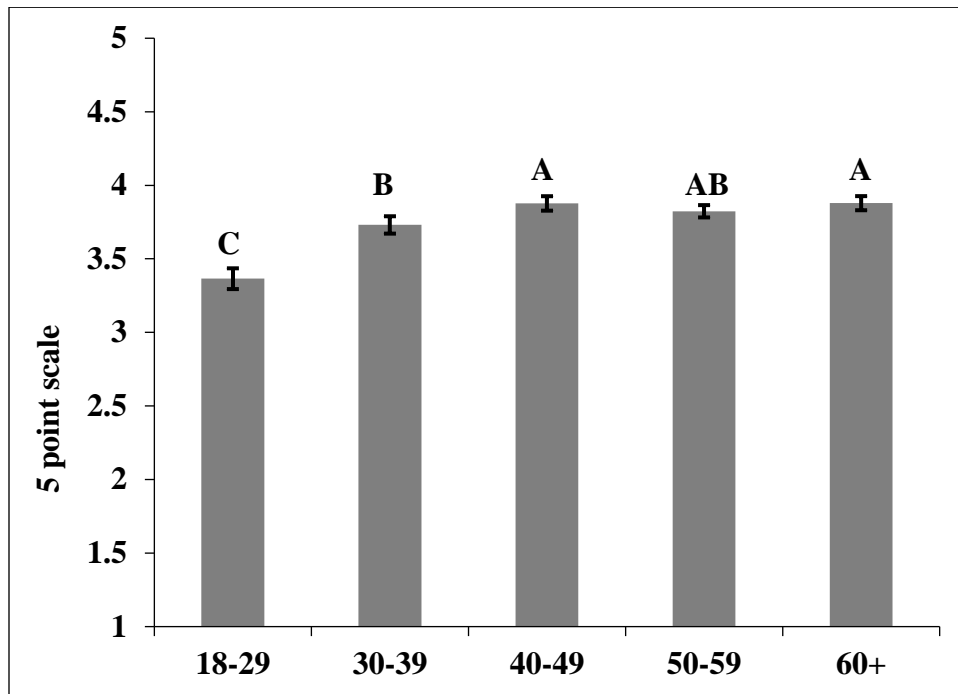


Figure 2.17. Average mean by year when consumers were asked about the importance of knowing where their food is produced using a Likert, 5 point scale (1 = not very useful; 5 = very useful). Means with different letters differ by $P < 0.05$.

In Figure 2.18, participants were asked using a 5-point Likert scale (1 = not very useful; 5 = very useful) which category of communication they prefer regarding learning about agriculture related topics. Overall, in-person events ranked the highest out of the five categories. Media was second and websites third. From this figure, it can be interpreted that more 18 – 29 year olds receive information via social network relative to their parents or grandparents who tend to prefer in-person events and media. The younger groups were more likely to get information via technology, social media or websites.

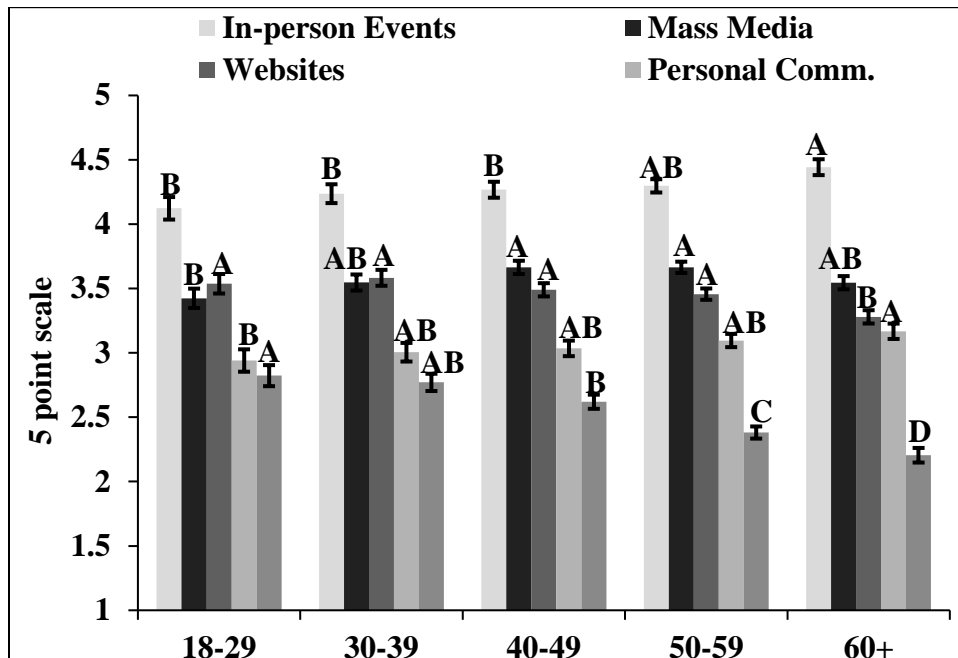


Figure 2.18. Average mean by age when consumers were asked about their preferred types of communications using a Likert, 5 point scale (1 = not very useful; 5 = very useful). Means with different letters within a communication type differ by $P < 0.05$.

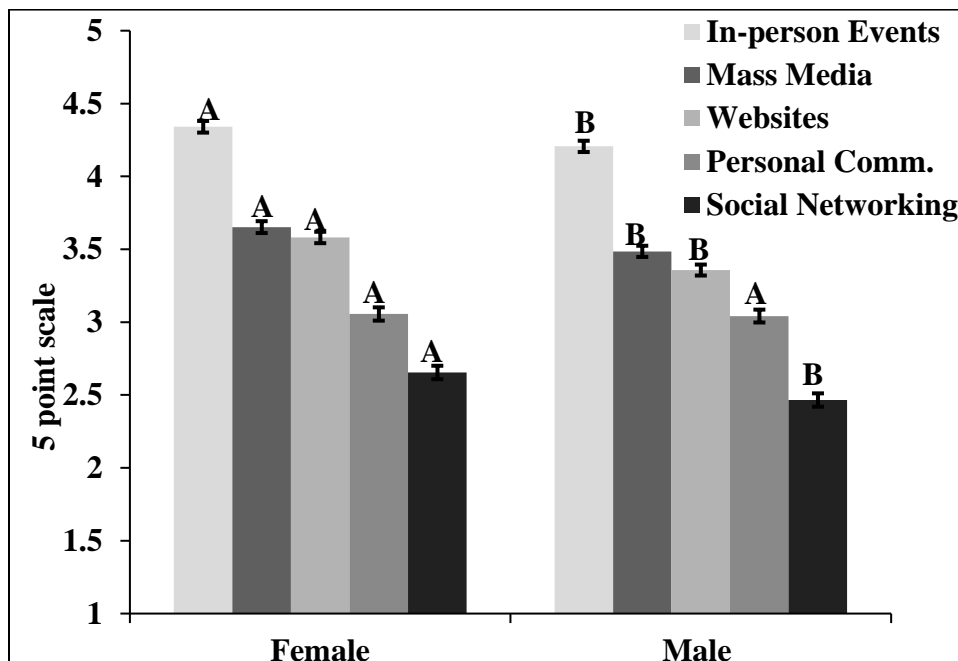


Figure 2.19. Average mean by sex when consumers were asked about their preferred types of communications using a Likert, 5 point scale (1 = not very useful; 5 = very useful). Means with different letters within a communication type differ by $P < 0.05$.

In Figure 2.19, participants were asked using a 5-point Likert scale (1 = not very useful; 5 = very useful) which category of communication they prefer. From this graph, we can see that women prefer in-person events slightly more than men. Women also show a high preference for websites information. Men were least likely to use social media as a source of information.

Conclusions and Implications

Many tools are available for educators to use to disseminate information in educational topics. Being creative in an educational atmosphere can have a positive impact on consumer behavior. The use of barbecue as a means to educate consumers about agriculture and food has proven to be successful. The implications of a successful program were realized through positive feedback and results when comparing pre- and post-survey responses. It can be concluded that inviting people into a fun atmosphere to learn and have open dialogue can be an effective means to tell a story. In the case of BBQ Boot Camp, it is the agriculture story that is being told. The mission of Extension Outreach is to enhance the lives of people through research, education and community and BBQ Boot Camp encompasses all three of those core values. The implications of Pre- and Post-survey questions are a successful means to gauge the attendee's attitudes and behaviors toward modern food production and to rate the effectiveness of the program instructors. The data collected over the five years period provides insight into people's behavior in North Dakota. It is interesting to see that even in a state that depends primarily on agriculture; people are disconnected from agriculture roots. It can be concluded that the BBQ Boot Camp program did have an impact on people's behavior. It could also be concluded from the data that more attention is necessary to focus on the core objectives of the program. Instructor training would be important for a consistent message. The results presented in this paper will add to the

overall body of research regarding attitudes and knowledge of food consumers of basic food knowledge, food safety, cookery, livestock stewardship, and barbecue. The information collected support the use of effective programs of this nature to influence consumer behaviors and perceptions of food purchasing decisions. Through the BBQ Boot Camp model, we were able to disseminate agriculture information and document program effectiveness of using pre-survey and post-survey results to gauge consumers' awareness and to rate the overall effectiveness of educational extension programming. In the case of BBQ Boot Camp, there are very positive results for learning and this information can be used to recreate other extension programming in a similar manner.

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APPENDIX A. BBQ BOOT CAMP PRE-SURVEY QUESTIONS

BBQ Boot Camp Pre-survey ID Sticker: _____

Please circle the letter that corresponds to your answer, or fill in the blank.

City where you attended BBQ Boot Camp: _____

1. The recommended temperature for safe preparation of ground beef is:
a. 145 F b. 150 F c. 160 F d. 165 F

2. The three keys to slow cooking are:
a. temperature, marinades, and rubs
b. oven cooking bags, spices, and tenderizers
c. specialized grills, cooking for at least 24 hours, and spices
d. time, temperature, and humidity

3. The proper heating method and time of cooking for large cuts of meat or cuts with lots of connective tissue is:
a. Indirect heat with fast time
b. Direct heat with fast time
c. Indirect heat with slow time
d. Direct heat with slow time

4. Beef and pork quality assurance programs help ensure the delivery of safe, wholesome meat products raised under strict animal welfare and environmental guidelines. These programs are paid for by:
a. USDA
b. FDA
c. Livestock producers
d. Humane Society of the United States (HSUS)

5. Marinades serve what two main functions?
a. enhance color and texture
b. enhance tenderness and flavor
c. enhance flavor and marbling
d. enhance nutrition and tenderness

6. For the most favorable eating experience spice rubs should be applied to fresh meat *before* cooking:
a. True b. False

7. If you want to use part of your marinade as a dipping sauce you should:
- look for marinades that contain vinegar.
 - reserve part of it in a separate container.
 - only use commercially-made marinades
 - use the same marinade you soaked the meat in.
8. What is the most popular spice?
- Cumin
 - Paprika
 - Basil
 - Black pepper
9. What is the best way to determine degree of doneness of steaks and chops?
- testing the firmness of the meat with a fork
 - checking the internal color
 - using a meat thermometer
 - checking the external color
10. True or False: You can safely cook pork chops to a medium degree of doneness.
- True
 - False
11. After you remove a 1-inch-thick steak from a hot grill, the internal temperature (doneness) will:
- rapidly decrease
 - increase by about 10 degrees F
 - decrease slightly
 - not change at all
12. At about what temperature (F) is medium rare?
- 110 F
 - 140 F
 - 160 F
 - 180 F
13. True or False: Placing a frozen steak on a hot grill will provide the best eating experience.
- True
 - False
14. The majority (>50%) of the fat in a beef ribeye steak and pork chop is saturated fat.
- True
 - False
15. Do you use a food thermometer when grilling?
- Yes
 - No
16. What is/are the safest way(s) to defrost food?
- Cool water bath
 - Microwave
 - Refrigerator
 - All of the above

APPENDIX B. BBQ BOOT CAMP POST-SURVEY QUESTIONS

BBQ Boot Camp Post-survey ID Sticker: _____

Please circle the letter that corresponds to your answer, or fill in the blank.

City where you attended BBQ Boot Camp: _____

1. The recommended temperature for safe preparation of ground beef is:
a. 145 F b. 150 F c. 160 F d. 165 F

2. The three keys to slow cooking are:
a. temperature, marinades, and rubs
b. oven cooking bags, spices, and tenderizers
c. specialized grills, cooking for at least 24 hours, and spices
d. time, temperature, and humidity

3. The proper heating method and time of cooking for large cuts of meat or cuts with lots of connective tissue is:
a. Indirect heat with fast time
b. Direct heat with fast time
c. Indirect heat with slow time
d. Direct heat with slow time

4. Beef and pork quality assurance programs help ensure the delivery of safe, wholesome meat products raised under strict animal welfare and environmental guidelines. These programs are paid for by:
a. USDA
b. FDA
c. Livestock producers
d. Humane Society of the United States (HSUS)

5. Marinades serve what two main functions?
a. enhance color and texture
b. enhance tenderness and flavor
c. enhance flavor and marbling
d. enhance nutrition and tenderness

6. For the most favorable eating experience spice rubs should be applied to fresh meat *before* cooking:
a. True b. False

7. If you want to use part of your marinade as a dipping sauce you should:
- e. look for marinades that contain vinegar.
 - f. reserve part of it in a separate container.
 - g. only use commercially-made marinades
 - h. use the same marinade you soaked the meat in.
8. What is the most popular spice?
- a. Cumin
 - b. Paprika
 - c. Basil
 - d. Black pepper
9. What is the best way to determine degree of doneness of steaks and chops?
- a. testing the firmness of the meat with a fork
 - b. checking the internal color
 - c. using a meat thermometer
 - d. checking the external color
10. True or False: You can safely cook pork chops to a medium degree of doneness.
- a. True
 - b. False
11. After you remove a 1-inch-thick steak from a hot grill, the internal temperature (doneness) will:
- a. rapidly decrease
 - b. increase by about 10 degrees F
 - c. decrease slightly
 - d. not change at all
12. At about what temperature (F) is medium rare?
- a. 110 F
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13. True or False: Placing a frozen steak on a hot grill will provide the best eating experience.
- a. True
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14. The majority (>50%) of the fat in a beef ribeye steak and pork chop is saturated fat.
- a. True
 - b. False
15. Do you use a food thermometer when grilling?
- a. Yes
 - b. No
16. What is/are the safest way(s) to defrost food?
- a. Cool water bath
 - b. Microwave
 - c. Refrigerator
 - d. All of the above

