Risk information seeking and processing of beef producers in the Southeast United States

by

Rachel Elaine Waggie

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Major Professor
Jason D. Ellis

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Abstract

The beef industry is ever evolving and plays a vital role in the United States economy. Many factors determine the impact of a beef operation and its contributions to the industry as a whole. Beef cow-calf operations in the Southeast United States are often criticized for being behind-the-times in management practices used and being slower to adopt new technologies. Is there a reason these producers manage differently than those in other regions? What impact, if any, do communication practices have on the management decisions for these operations?

The purpose of this study was to better understand how Southeast beef cow-calf producers seek and process risk information about herd management and to determine communication preferences of these producers. The Risk Information Seeking and Processing (RISP) model was used to develop a survey, which was distributed through various beef producer organization channels to 11 Southeast states: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The specific research objectives were to 1) define demographic and sociocultural characteristics of beef cow-calf producers in the Southeast United States, and 2) determine the perceived knowledge gap of beef cow-calf producers in the Southeast United States as it relates to risk management knowledge. The research question addressed by this study asked how beef cow-calf producers in the Southeast United States use different communication channels to influence their level of knowledge regarding risks facing their operations. Researchers proposed the following hypothesis, based on the RISP model: as the level of perceived risk increases, beef cow-calf producers in the Southeast United States will seek risk information through nonroutine channels.

A majority of respondents identified their beef operations as having moderate risk in the areas of animal health, breeding management, calving management, animal growth, economic management, and marketing/selling calves. Perceived risk of weaning was categorized as moderately low. The preferred channel to receive beef-related information was through print magazines, and the preferred source of information was local extension. Additionally, respondents appeared to generally seek heuristic messages about beef risk management. In this study, no information was collected to assess the processing of these messages.

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Chapter 1 - Introduction

Beef Production and the U.S. Economy

Beef cattle production is the United States' top agricultural industry, responsible for $67.1 billion in cash receipts in 2018 (USDA ERS, 2019). The United States is the top producer and consumer of beef in the world (USDA ERS, 2019), making the beef industry vital to the nation and its economy. Unlike other meat animal production industries, the beef industry is segmented rather than vertically integrated (Drouillard, 2018). The beef industry consists of two major segments: cow-calf and cattle feeding. The cow-calf industry is the practice of maintaining cows and raising calves from birth to weaning. Cattle feeding is the process of feeding market cattle to a finished weight for harvest. A third, slightly less prevalent beef industry segment is known as stocking/backgrounding and occurs between the move of animals from the cow-calf segment to the feedlot segment. As of January 1, 2019, the total U.S. cattle herd (beef and dairy) was reported to be 94.8 million head (USDA NASS, February 28, 2019). In the same report, Beef cows and heifers that have calved were reported at 31.8 million head while cattle and calves on feed totaled 14.4 million head. Beef production is a significant industry and remains complex as markets shift and environmental factors fluctuate.

The Cattle Cycle

The beef market is cyclical, like most economic markets. While it is not possible to manage for sudden changes to the market, some volatility is predictable and management decisions can be implemented in preparation for these variations (Feuz & Umberger, 2003). Taylor and Field (1998) emphasize these risks in the beef industry by noting that "weather, changes in cattle prices, changes in input costs, equipment breakdown, changes in government regulations, variability in animal and crop performance, disease, and labor and human [resource]

issues" can "bring uncertainty to the management decision process" (p. 93). Feuz and Umberger (2003) define the cattle cycle as "the period of time from the lowest U.S. inventory of cattle and calves to the next lowest inventory, or from trough to trough" (p. 351), meaning the cattle cycle is focused around the increase and decrease of the total beef cow herd. This cycle is largely influenced by the cattle market, although feed prices and weather conditions are also major factors in beef production and cyclicality (Anderson, Robb, & Mintert, n.d.).

There are four phases to the cattle cycle: expansion, peak, consolidation, and liquidation (Anderson et al., n.d.; Feuz & Umberger, 2003). Expansion occurs when producers retain or buy more heifers and cull fewer cows, thereby increasing their individual herd size. As the number of producers expanding their herds increase, the national herd size also increases. This phase has historically averaged six to seven years, partially due to the biologic gap between retaining a heifer calf and when that calf matures and produces its own offspring (Feuz & Umberger, 2003). Expansion is a result of increased profitability, meaning calves are worth more when it comes time to sell, so producers aim to sell more calves during these high times (Anderson et al., n.d.). Beef supply is influenced by demand, and as supply increases and surpasses the demand level, prices begin to go down. When beef prices decrease, maintaining large herds of cattle becomes less profitable, ultimately leading to liquidation (Anderson et al., n.d.). Before this liquidation phase is reached, two other phases occur in the cycle.

As expansion begins to slow, the national herd approaches a peak number. This is not a pre-determined number; various economic factors contribute to the slowing of expansion (Anderson et al., n.d.), the height of which is aptly called the peak. Once the peak herd number has been reached, producers retain fewer heifers, thus moving them into the consolidation phase. Consolidation historically lasts one to two years before turning to liquidation. During

consolidation, herd size decreases from the peak number, but remains steady for a time before continuing to decline.

Herd size contracts during the liquidation phase, which lasts three to four years, on average. As noted previously, liquidation occurs due to the fall of beef prices, leading to decreased profitability in cattle production. As profitability of a beef operation falls, the number of retained heifers goes down and cull cows increase, ultimately reducing the beef supply available. Eventually, supply falls below demand once again and the industry cycles back into the expansion phase, causing total herd numbers to begin rising and restarting the cycle.

Feuz and Umberger (2003) list "weather, grain prices, agricultural trade, government policy and regulations, shifts in demand due to changes in consumer tastes and preferences, structural changes, and technology" (pp. 353-354) as factors that affect the beef cycle and how long each phase lasts. Currently, the beef industry is in the consolidation phase, having reached a peak in August 2018 and remaining steady in the year since (Peel, 2019). Supply and demand factors influence the market price for beef cattle (Anderson et al., n.d.; Johnson, Doye, Lalman, Peel, Raper, & Chung, 2010; Taylor & Field, 1998). Producers are price-takers as sellers, which means they have little control over the price they earn for their product, while also being price-takers as consumers, or having little to no control over the price they pay for their purchased goods and services (Taylor & Field, 1998).

Cattle Feeding in the United States

The cattle feeding industry is focused primarily in the plains region of the United States. More than 72% of cattle on feed are concentrated in the central United States, with 19.8% in Nebraska, 18.9% in Texas, 17.5% in Kansas, 9% in Iowa, and 7.1% in Colorado (Drouillard, 2018). The number of cattle on feed as of July 1, 2019, was 13.6 million, with slightly less than

84.5% of all cattle on feed in feedlots with 1,000-plus head capacity (USDA NASS, July 19, 2019). About 40% of fed cattle are in feedlots with a capacity of 32,000-plus (USDA ERS, 2019). Feedlot production is centralized in the Midwest due to the easy access to cereal grain and grain byproducts, which make up a large portion of finishing cattle diets (Drouillard, 2018).

Feedlots operate using one of two primary methods: they either purchase cattle to feed or feed cattle for clients who have retained ownership of their animals through the feedlot phase, called custom feeding. The main difference is where profit comes to the feedlot; in feedlot-owned cattle, the income is realized at harvest, while income in a custom feeding situation results from up-charging the owners of the cattle for feed, processing, medicine, yardage, and other expenses associated with feeding out cattle for harvest.

Between the point of origin and the feeding facility, calves are introduced to a variety of stressors that can affect their performance in the feedlot. Calves are hauled to feedlots from all over the country, spending hours in a trailer covering hundreds to thousands of miles of the country. Due to the stress of traveling and lack of access to food and water while on the trailer, calves experience a phase called "shrink," where they lose a percentage of their body weight between the start of the trip and stepping off the trailer in the feedlot. Shrink percentage changes depending on length of trip, level of preconditioning, trailer conditions, and other factors (Barnes, Smith, & Lalman, n.d.). These stressors should be managed prior to loading the trailer at the point of origin and are addressed upon arrival to the feedlot.

Once cattle arrive in the feedlot, they are initially processed and receive growth-promoting implants, dewormer, and other vaccinations, are tagged with distinct feedlot ear tags, and are castrated and dehorned as necessary. After processing, calves are moved to pens where they will likely spend the remainder of their time in the feedlot. At the beginning of feeding,

cattle are typically fed a high-forage diet to simulate the forages their digestive systems are accustomed to from the ranch or backgrounding operation. This diet is carefully adjusted with added energy as their stomachs acclimate to each mix, eventually ending on a primarily energy-based diet as cattle gain their final pounds to finished weight.

Throughout their time in the feedlot, cattle health is monitored daily by pen riders. Cattle that become sick or lame are pulled from their contemporaries and moved to a hospital area of the feedlot where they are treated according to their illness or injury. Upon completion of treatment, cattle are either moved back to their respective pens or held in a hospital pen, depending on the severity of the ailment. Generally, cattle remain on feed for 90-200 days until they reach the desired harvest weight, which currently averages 1,450 and 1,323 pounds for steers and heifers, respectively (Waggoner, 2020). Steers make up the majority of fed cattle, followed by heifers at around 28-30% (Drouillard, 2018), and a small portion comes from cull cows from both beef and dairy operations. Cull cattle are typically sent straight to harvest, but occasionally are fed for around three months in a feedlot before being slaughtered (Drouillard, 2018).

Fed cattle are often marketed on a grid system. As certain thresholds are met, sellers receive an increased dollar amount per pound. Other marketing systems exist, such as Certified Angus Beef®, in which black-hided, Angus-influenced cattle can receive a premium for reaching a minimum of choice quality grades in the slaughterhouse, among meeting other specific criteria (Certified Angus Beef, n.d.). Drouillard (2018) notes that more than 60% of fed cattle in the United States have some degree of Angus influence.

In the same vein, cattle that exhibit undesirable carcass traits receive discounts, both in price and in quality grade. Some of these negative traits include non-castrated males (bulls), dark cutters, and animals greater than 30 months of age (Herrington & Tonsor, 2012).

Cow-Calf Production in the United States

The other major segment of the beef industry is cow-calf production, defined by McBride and Mathews (2011) as "cow maintenance during breeding, gestation, and calving to when calves are weaned" (p. 348). The 2017 Census of Agriculture data indicated that the largest percentage of farms had between one and nine beef cows, while the largest percentage of actual cattle numbers came from farms with a herd size of 200-499. Farms with herd size one to nine made up 33.6%, followed by herd size 20-49 at 25.2% of farms. As for cattle numbers, 21% of cattle are in herd sizes of 200-499, followed by herd sizes of 100-199 at 17.9%. These numbers demonstrate that most beef operations have less than ten animals, but the largest percentage of beef animals are controlled by mid- to large-scale operations. Despite a national average herd size of 43.5 cows, 9.9% of beef operations consist of 100 or more beef cows and 56% of the beef cow inventory (USDA ERS, 2019).

Within the cow-calf sector, there are different types of operations. Purebred producers breed cattle that are of pure blood, meaning their pedigrees can be traced back within their respective breed and the producer knows what genetics each animal possesses. Most purebred producers register their animals within their respective breed associations and have the ability to contribute to a breed-wide dataset called expected progeny differences, or EPDs, which allow producers to estimate the genetic ability of an animal and its offspring. These purebred breeders are commonly referred to as seedstock producers, and their goal is to improve genetics within a herd or breed and sell their stock for breeding purposes. Alternatively, commercial producers

often utilize hybrid vigor, or the genetic superiority of animals that are crossbred. These animals are usually not registered, though some crosses have become so common new breeds have developed around them. Some of these composite breeds include Black Hereford (Angus x Hereford, more commonly known as black baldies), Brangus (Brahman x Angus), Shorthorn Plus (at least 25% Shorthorn genetics), and Balancers (Gelbvieh x Angus/Red Angus). The end goals of these different types of operations are usually one of two: to sell breeding stock to other producers, or to sell beef. There are various types of production models within these two breeding methods, but in the broadest sense, all beef operations fall into either the purebred or commercial categories.

Cow-Calf Management

Maintaining mature cows involves, at the least, some form of management in the areas of health, reproduction, and feeding. While a small percentage of cow-calf operations are intensively managed, meaning cows are confined year-round, the majority of cow-calf herds are extensively managed, or kept on pasture or harvested forage year-round (Taylor & Field, 1998). Feed costs are usually the largest expense associated with owning cattle in any aspect of the beef industry, including comprising 40-60% of cow-calf production costs (McBride & Mathews, 2011; "Profit tip," 2017; Short, 2001).

Managing reproduction in beef cattle is key to an efficient, profitable operation. It is commonly said that there is no production without reproduction. Cows that do not calve or do not calve regularly are not contributing to the success of an operation. Cows should raise one calf per year – or have a calving interval equal to or less than 12 months – with those calves going on to provide the main source of revenue from the herd when sold at or following weaning (Feuz & Umberger, 2003; Taylor & Field, 1998). Calving interval is defined by Taylor & Field (1998) as

the "time (days or months) between the birth of a calf and the birth of a subsequent calf, both from the same cow" (p. 628), following a gestation length of roughly nine and a half months, or 283 days (Ensminger, 1987).

According to Feuz and Umberger, "profitability is highly variable from year to year and among cow-calf production enterprises. Beef production is a competitive industry; thus, no long-run economic profits exist" (2003, p. 347). Because of this volatility, beef producers look for other ways to increase their net income and/or decrease cost of production. There are three avenues competitive producers use to accomplish increasing net income: sell more total pounds of cattle, sell the same number of pounds for more money, or reduce the production cost on that same number of pounds (Fuez & Umberger, 2003). Prevatt (n.d.) highlights four main methods to decrease unit production costs, which are similar or complementary to increasing net income: (1) produce the same amount of calf pounds with decreased production costs, (2) maintain current production costs but increase pounds of calf produced, (3) lower production costs by more than lowered pounds of calf, and (4) increase pounds of calf more than increased production costs.

Additionally, Feuz and Umberger found economies of scale in 1996 USDA ERS data: "the average size of the low-cost [cow-calf] operation was more than four times the average size of the high-cost [cow-calf] operation" (2003, p. 349). Economies of scale are often referenced in other reports, indicating that as herd size increases, fixed costs associated with an operation decrease (McBride & Mathews, 2011; NAHMS, 2013; Ramsey, Doye, Ward, McGrann, Falconer, & Bevers, 2005; Short, 2001).

While cow-calf production exists in all 50 states, major beef cow-calf producing states share the characteristic of having an ample supply of grassland to sustain cow-calf herds (Feuz &

Umberger, 2003). Feuz and Umberger remark "land that has remained in grass has been used for grazing beef cattle, which is one of the most effective means of converting the lower valued grass into higher valued animal protein" (2003, p. 342). However, the number of cows per acre varies from region to region. Although operations in the Northern Plains have, on average, nearly 4.5 times the acreage compared with operations in the Southeast, McBride and Mathews (2011) also note "the pasture acreage in these regions [North Central and Southeast] supported more beef cows (about 3 acres per cow) than that in other regions (10-20 acres per cow)" (p. 355), an idea more commonly referred to as stocking rate. Stocking rates vary depending on the characteristics of an operation and its location, but, on average, one cow and her calf in the Kansas Flint Hills require 7.5-8 acres (Fick, 2014). For the same single cow-calf pair, about 1.5-2 acres is assumed in Alabama ("Stocking rates for cow-calf operations," 2019), where rainfall totals are higher and the climate is generally more temperate. On native grasses in Texas, this cow-calf pair could require anywhere from 8 to 15 acres ("Livestock management," n.d.). Understanding stocking rate for an operation's location is important to maintaining a profitable cow herd and healthy land on which to raise future generations of the herd.

There are many important components of cow-calf production, including timing and length of calving season, age and weight at weaning, and age and weight at time of sale (Feuz & Umberger, 2003), which require management on the part of the operator. A defined and controlled calving season is the result of a defined and controlled breeding season. Approximately 64% of calves are born in the spring calving months of February, March, and April (Feuz & Umberger, 2003), meaning those cows were exposed and receptive to breeding 283 days prior, or late April through late July (Ensminger, 1987). Age at weaning is a management preference; calves are commonly weaned anywhere between six and nine months of

age (McBride & Mathews, 2011). Many factors affect weaning weight, but McBride & Mathews (2011) say calves often weigh between 400-700 pounds at weaning. Management practices that greatly affect weaning weight include age at weaning, calving season, use of growth implants, feed, genetics, and health (Taylor & Field, 1998), among others. While genetics play a big role in an animal's propensity for performance, ultimately the environment in which a calf is raised will dictate weaning weight.

Cow-calf producers must implement some level of management techniques in order to remain profitable. Feuz and Umberger (2003) list five factors that characterize profitable beef cow-calf producers:

> (1) costs are controlled without jeopardizing cow herd productivity or net revenues, (2) harvested feed and supplement costs are minimized, (3) superior genetics complement available resources, (4) diverse marketing strategies are used, (5) key management decisions are done on a timely basis and are based on factual information rather than "hype." (p. 350)

Producers must keep records and document day-to-day activities and decisions on their operation in order to control costs, keep a factual overview of the operation, and have the necessary information to make strategic management decisions that will benefit their herd and their profitability. Jones (2000) sums up the importance of record keeping by saying, "It is impossible for cow-calf producers to manage aspects of their operation that they do not measure, document, and evaluate" (p. 18). Directing producer attention to better management of the three important cost categories (labor, feed, and capital) could improve the efficiency and profitability of an operation (Jones, 2000). Cow-calf producers, especially those who operate smaller herds, often neglect many of these basic management practices, as will be noted in the coming pages.

Marketing Calves

Marketing weaned calves is primarily conducted in one of the following four ways: sale barn, private treaty, stocker/backgrounder, or via retained ownership. Calves that are sold through a sale barn generally bring a base market price, though sale barns will sometimes hold value-added or special sales to market calves or cows that are of superior quality or meet certain criteria. Private treaty sales are transactions between the producer and a private buyer. In other words, calves do not go through a sale ring and are sold based on merit or a private showing. Private treaty is more often seen in seedstock sales but can be found in selling animals intended for more immediate harvest. Some cow-calf producers choose to send or sell their calves to a stocker or backgrounder, who will then put weight on freshly weaned calves before sending them on to a feedlot. Some calves, known as calf-feds, are sold directly to a feedlot following weaning without first going through a backgrounding phase (Drouillard, 2018). Finally, some producers retain ownership of their calves through the feedlot phase and earn their income at harvest.

> Marketing beef calves should be a thoughtful process. Taylor and Field (1998) state: Marketing begins with the decision about what will be produced. Thus, for cow-calf producers marketing actually starts at breeding time. However, most producers do not begin thinking about marketing decisions until a few weeks or days prior to weaning the calves. (p. 152)

Southeast Cow-Calf Production

Seventy-two percent of U.S. cow-calf only operations are in the Southeast region of the country (McBride & Mathews, 2011), making this part of the country significant to the beef industry. Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, Tennessee, and Virginia are the southeastern states surveyed by the USDA-NAHMS to collect report information (USDA

NAHMS, 2013). Though the Southeast is home to such a large portion of cow-calf only operations, it lacks notably in the areas of individual animal identification, castration, reproductive technology, and record keeping (USDA, 2013), among other common management practices. For example, McBride and Mathews (2011) found that only 35% of producers in the Southeast keep individual cow records, compared with at least 50% in other regions of the country. McBride and Mathews (2011) summarize their findings on producers who only operate cow-calf herds by saying "cow-calf only producers were less likely than other cow-calf producers to use many beef cow-calf production practices" (p. 351).

One possibility for this difference in management practices and subsequent risk management is the difference between operation scale seen in the Southeast when compared to other regions. The majority of cow-calf operations in the Southeast are classified as small scale, defined by USDA-NAHMS (2013) as an operation with fewer than 100 cows. Average herd size in the Southeast is significantly lower than average sizes in other regions; average herd size in the West region is 213, while herd size in the Southeast averages 78 (McBride & Mathews, 2011). Additionally, around 70% of calves from the Southeast and Southern Plains regions are sold at weaning, while that number is closer to 50% in the Northern Plains and West regions due to increased prevalence of producers backgrounding their calves on the ranch (McBride & Mathews, 2011). As will be discussed in chapter two, there are advantages to holding calves over after weaning and/or implementing preconditioning practices to prepare weaned calves for their future in feedlots or as breeding stock.

Preconditioning is a term used to encapsulate the various management tactics used to prepare calves for life after weaning, typically the transition to a feedlot. Varying levels of preconditioning exist, but usually consist of some health protocol and training practices for

calves to thrive after moving on from the cow-calf scenario (Dhuyvetter, Bryant & Blasi, 2005). Some common preconditioning practices include calves being a minimum of 30 days weaned, trained to eat from a bunk and drink from a water trough, dehorned if necessary, castrated, administered specific vaccinations, tagged, and heifers guaranteed open (Roeber & Umberger, 2002). Many value-added programs require some level of preconditioning practices. For example, the Virginia Quality Assured Feeder Cattle Program's Gold Tag Program requires cattle to have been owned for at least 120 days by the consignor; vaccinations administered according to label at no less than four months of age and boosters administered no less than 14 days before shipment; required vaccines include 7-way clostridial, modified live bovine respiratory disease complex (IBR, PI3, BRSV, BVD types 1 & 2), and Pasteurella with Leukotoxoid; have a minimum weight of 400 lbs.; frame score of L1M1 or L2M2 and body condition 4-6; heifers guaranteed open and steers castrated and healed; all calves polled or dehorned and healed prior to shipment; and bunk- and automatic water trough-broke (Virginia Cattlemen's Association, n.d.).

A second goal of preconditioning is the development of a uniform group of cattle. In the cattle industry, uniformity refers to the similarities between animals. Buyers often prefer to buy a large group of animals that are very similar in weight, age, color, and vaccination history. Such uniformity can more easily be achieved by breeding and raising animals in the same way, but can also be attained by pooling together cattle and maintaining them until they reach a more uniform goal.

Purpose of Study

As discussed in this chapter, beef cow-calf production in the United States is a large and complex industry. It has been evidenced that management practices of cow-calf producers vary

across the nation, depending upon a variety of factors (Prevatt, n.d.). Cow-calf production in the Southeast is unique due to geographic location, producer characteristics, and management practices, among other qualities. Previous studies have addressed why these stark contrasts may exist between producers in the Southeast and producers from other, more progressive beef producing regions. The present study is interested in studying the risk perceptions and risk-seeking practices of these producers and how those habits affect their collection of beef cow-calf management information. This study intends to help communicators in the beef industry better target Southeast cow-calf producers through preferential information channels and sources, as well as adjusting communication practices to meet the risk management information needs of producers in this region.

Chapter 2 - Literature Review

Chapter two provides an overview of the current literature on risk information seeking and processing, as well as contributing theories to this model. The main risks addressed by this study are examined and prior research on the communication preferences and practices of beef producers are reviewed.

Key Terms and Definitions

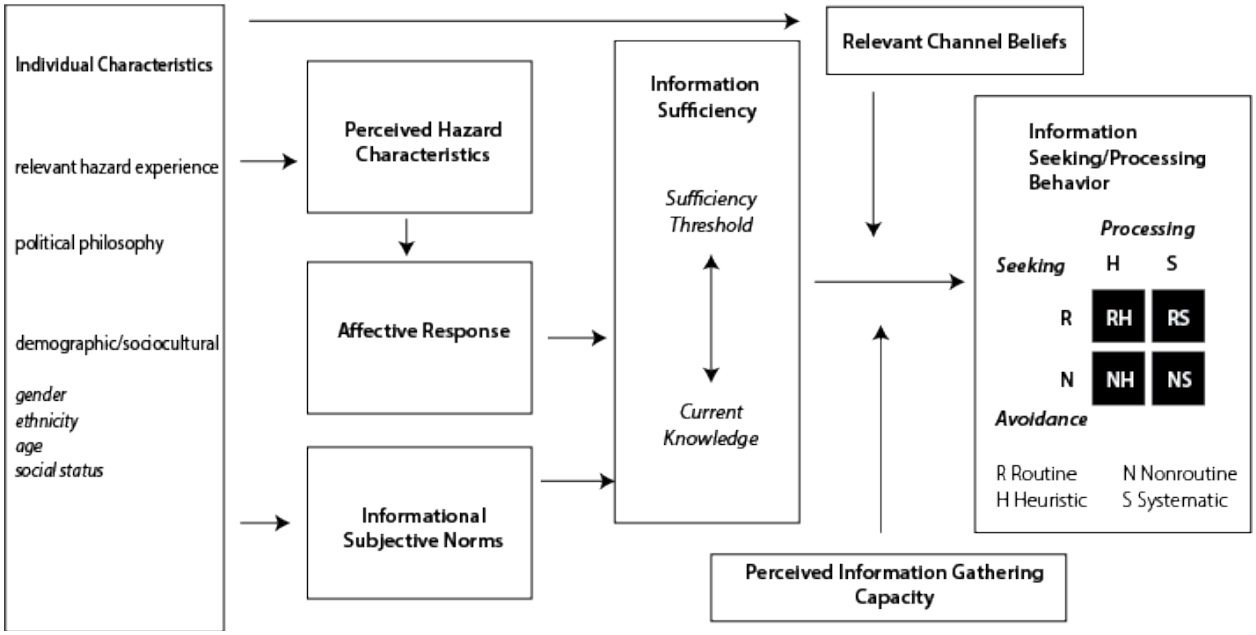
Risk has a variety of connotations; for the purpose of this research, Merna and Al-Thani's (2008) citation of Rowe (1977) in defining risk as "the potential for unwanted negative consequences of an event or activity" (p. 10) is primarily used. It is proposed that "risk is composed of four essential parameters: probability of occurrence, severity of impact, susceptibility to change and degree of interdependency with other factors of risk" (Merna & Al-Thani, 2008, p. 10).

Risk communication is defined by Covello, von Winterfeldt, and Slovic (1986) as "any purposeful exchange of information about health or environmental risks between interested parties" (p. 172). In the context of this study, risk communication is the purposeful exchange of information about beef production risks between interested parties. Interested parties, in this case, include beef producers and industry sources of risk information, such as veterinarians, extension specialists, industry publications, et cetera. Covello et al. (1986) point out, "risk communication takes place in a variety of forms, ranging from warning labels on consumer products to interactions among government officials, industry representatives, the media, and members of the public…" (p. 171).

Theoretical Groundwork

The risk information seeking and processing (RISP) model proposes two main ways through which individuals look for and process information related to risks (Griffin, Dunwoody, & Neuwirth, 1999; Yang, Aloe, & Feeley, 2014), derived from Eagly and Chaiken's (1993) Heuristic-Systematic Model (HSM) and Ajzen's (1985) Theory of Planned Behavior (TPB). What sets the RISP model apart from others is that it also accounts for multichannel information collection and processing and therefore is measured on a continuous scale to allow for the representation of simultaneity in processing styles (Griffin et al., 1999, Figure 2.1).

Figure 2.1
RISP Model (Griffin et al., 1999)



HSM posits there are two processes through which individuals analyze information: heuristic and systematic, as indicated by the theory name (Eagly & Chaiken, 1993). Heuristic processing involves using superficial cues, such as message length, number of arguments, spokesperson, and general consensus, to make a decision about an issue (Eagly & Chaiken,

1993; see also Griffin et al., 1999; Trumbo, McComas, & Besley, 2008; Yang et al., 2014). It is important to note that heuristics are learned traits stored subconsciously in the memory of an individual (Griffin et al., 1999), allowing previously learned information to be accessed quickly to make a rapid decision regarding an issue. Alternatively, systematic processing requires a more cognitive approach, using cues such as message content and personal relevance to make decisions about an issue (Eagly & Chaiken, 1993; see also Griffin et al., 1999). While heuristic and systematic processes are distinctly different cognitive strategies, these processing routes can occur simultaneously (Griffin et al., 2012). According to HSM, the two key factors that decide which primary route an individual will take to process a message are (1) their *ability* to process relevant information and (2) a person's *motivation* to process the information (Eagly & Chaiken, 1993).

Dunwoody and Griffin (2015) cite Chaffee (1986) in two related factors that guide individuals in information seeking: (1) the cost [monetary, temporal, and effort] of accessing any particular information channel and (2) the likelihood that a channel will contain information relevant to the need. Griffin et al. (1999) alter these factors slightly, in combination with the premises of Ajzen's Theory of Planned Behavior, to highlight three influencers of RISP: (1) information sufficiency, (2) perceived information gathering capacity, and (3) relevant channel beliefs.

Information sufficiency refers to the amount of knowledge an individual believes they should have in order to be able to make an informed decision on an issue. Information sufficiency is measured as a threshold, where the amount of information perceived as necessary is dependent upon each individual. Related to information sufficiency is the idea of a knowledge gap. A knowledge gap describes the difference between the current knowledge an individual

possesses and the knowledge they believe they should have (information sufficiency) about a topic (Griffin et al., 1999). Theoretically, as the knowledge gap grows larger, the likelihood of an individual employing a systematic cognitive process increases (Griffin et al., 1999). Individuals should seek and process information more cognitively if their current knowledge is less than their perceived sufficiency threshold (Griffin et al., 1999). Dunwoody and Griffin (2015) posit "a low [information sufficiency] threshold may induce heuristic processing, while a high threshold may catalyze more intensive information gathering and analysis" (p. 106).

Perceived information gathering capacity is influenced by the interactions of information sufficiency and the effort one puts forth into processing (Griffin et al., 1999), or "an individual's perceived ability to perform the information seeking and processing steps necessary for the outcome her or she desires" (Griffin, Dunwoody, & Yang, 2013). That is, it is the individual's perception of their ability and capacity to gather and process additional information relevant to the issue.

Relevant channel beliefs refer to an individual's beliefs about various forms of media and their credibility (Griffin et al., 1999). For example, one may believe local newspapers are less biased and more trustworthy than a mass media television outlet, which therefore impacts where that individual routinely seeks information. Understanding these beliefs is beneficial to providing risk information to targeted audiences through a channel that is regularly used by said audience.

The above factors of RISP are affected to some extent by affective responses to the risk, subjective norms about information gathering and knowledge related to the risk, perceived hazard characteristics, and characteristics of the individual (Griffin et al., 1999). Affective responses include emotions such as anger, worry, and fear. Generally, more positive affective states are associated with increased likelihood of heuristic processing, while negative affective

states are more likely to result in systematic processing (Griffin et al., 1999). However, the exception to this rule comes when the affective state is *extremely* negative; in this case, heuristic processing is more likely to be employed (Griffin et al., 1999), possibly in attempt to avoid the feeling altogether.

The theory of planned behavior was developed from the shortcomings of the theory of reasoned action (Ajzen, 1991) and proposes that information seeking and processing style of information related to behaviors and hazard characteristics influence "the stability of cognitive structure" (Griffin et al., 1999, p. 239). TPB includes three determinants of behavior: attitude toward the behavior, subjective norms, and perceived behavioral control (Doll & Ajzen, 1992). These determinants "influence the extent to which a person will seek out risk information in both routine and nonroutine channels and the extent to which he or she will spend time and effort analyzing the risk information critically" (Griffin et al., 1999, p. 232).

Subjective norms are the "various social normative forces that might affect [an individual's] intention to perform a particular behavior" (Griffin et al., 1999, p. 241). Put another way, they are one's beliefs that relevant peers would expect them to possess a certain level of knowledge about the risk (Ajzen, 1991; Griffin et al., 1999). These normative forces, described by Griffin et al. (1999) as normative belief structures, represent an individual's normative beliefs, or perceived expectations of important others in one's life, and their motivation to comply with these beliefs.

Perceived behavioral control is an individual's self-assessment of their ability to perform a certain behavior (Ajzen, 1991), in this case a behavior to mitigate risk. In the case of beef production, producers may have a lower perceived control of ability to utilize artificial insemination technology if they do not have access to a head catch and chute of some kind.

Without the proper restraint system, artificially inseminating cows is not possible, therefore decreasing the likelihood of one's ability to perform that specific behavior. This behavioral control might also be more psychological. If a producer is intimidated by their cattle, they are less likely to catch and tag calves for identification purposes.

Griffin et al. (1999) describe perceived hazard characteristics as the way an individual believes a risk could impact them. It is proposed by Griffin et al. (1999) that previous hazard experience relevant to the current risk would be expected to increase the level of systematic processing employed by the individual. For example, if a cattle producer has experienced the loss of a calf due to blackleg, they are likely more inclined to vaccinate for blackleg in the future so as to avoid running the risk of losing another calf to the disease.

Individual characteristics are the final factors that influence RISP. There are several characteristics which make up this variable, belonging to demographic and sociocultural categories. Griffin et al. (1999) point out that while a subset of these individual characteristics do generally account for some statistically significant portion of variance, it is rarely a large piece of the equation. Gender, ethnicity, age, and socioeconomic status are examples of traits that are commonly used in identifying individual characteristics.

Gregory and Mendelsohn (1993) outlined six variables that influence an individual's personal assessment of a risk and its associated dread, which Griffin et al. (1999) modified (in parenthesis) and added variables seven through nine. These variables include:

1. Number of deaths if the year is average (personal risk perception)
2. Potential for catastrophic outcome (on a personal level)
3. Immediacy of effect (on an individual level)
4. Economic benefits of the risk (to an individual)

5. Pleasure benefits of the risk (to an individual)
6. Estimated impact on future generations
7. Personal control over a person's susceptibility to harm
8. Trust in risk management that is already in place
9. Perceived threat to personal values

Seeking and processing are separate dimensions and therefore can differ in applied cognitive effort. Griffin et al. (1999) note two aspects of information *seeking*: routine and nonroutine. Routine information seeking refers to the collection of information through media channels that are habitually used by an individual (Griffin et al., 1999). Nonroutine information seeking, then, is the collection of information through channels that are not commonly used by an individual (Griffin et al., 1999). Following this line of thinking, there are four combinations of the information seeking and processing variables (routine, nonroutine, systematic, and heuristic) illustrated in Figure 2.2.

Figure 2.2
Four most likely processing combinations (adapted from Griffin et al., 1999)

	Systematic	Heuristic
Routine	Critically processing information from habitually used outlets	Superficially processing information from habitually used outlets
Nonroutine	Critically processing information from new outlets	Superficially processing information from new outlets

Sources of Information for Beef Cattle Producers Overview

Taylor and Field (1998) name people, hard copy publications, and electronic media as the primary sources of information for beef producers. Books, scientific periodicals, popular periodicals, research proceedings, and university publications are the main sources of hard copy publications (Taylor & Field, 1998), most of which are now available electronically as well. In a

study of Mississippi cattlemen, industry magazines and cattlemen's association newsletters were the most preferred method of receiving information through mass contact; veterinarians, county extension agents, and local feed dealers were the preferred methods of individual contact; and cattlemen's tours, field days, research unit demonstrations and farm demonstrations were the most popular methods of group contact (Steede, 2012). A similar study of North Carolina cattle producers concluded that producers preferred hard copy information from channels such as newsletters, extension materials, and trade publications (Joseph, 2013). Electronically and verbally receiving information were equally preferred after hard copy information, with 14.2% and 14.8% preference respectively (Joseph, 2013). This study also revealed that producers prefer their information to come from the Cooperative Extension Service.

Tucker (2012) found that stocker producers' trust was highest when management information was delivered face-to-face, and had average trust in management information from meetings and printed materials, such as magazines, bulletins, and brochures. The lowest amount of trust in management information was attributed to website, podcast and electronic newsletter sources.

Similar to Tucker's study, Vergot, Israel, and Mayo (2005) assessed sources of information for beef cattle producers in 12 Florida counties. These producers ranked other cattle producers and county extension agents as information sources consistently higher than other sources, including veterinarians, feed dealers, university specialists, sales representatives, and private consultants, among others. Preferred channels of information were also assessed in this study. County extension newsletters, industry magazines, extension bulletins, and observing other producers were the top-ranked channels of information for the surveyed producers. The least preferred channels included websites, regional beef conference, and radio shows.

Beef Industry Risks

As with any industry, the beef industry is not without its share of risks. The cattle market, as discussed in chapter one, can be volatile. Cow-calf producers are price-takers from their consumers, who are typically stocker-growers or feeders. Cattle buyers generally base their price on a breakeven, which is made up of what they expect to receive for the animals based on current and projected markets and the costs they will incur while caring for the animals (Bradley, 2017). Likewise, producers should take into account the cost of production from birth to sale of their calves and calculate a breakeven for themselves, so they know what their minimum price is before taking on a loss for their animals (Bradley, 2017).

According to Bradley (2017), cash marketing is the highest-risk market practice for beef producers. Those who choose to sell on a cash basis are at the mercy of the markets; they stand to profit the most during an upswing, but will also be the biggest losers if the market is low when their animals are ready to be sold. Alternatively, low-risk marketing practices include forward and futures contracting (Bradley, 2017). Both of these practices essentially mean the producer is locking in a price they will receive for their cattle at a certain point in the future. There is a chance the cash market will increase at the time the cattle are sold; if this happens, producers miss out on profit. However, if the cash market falls at the time the cattle are sold, the producer benefits, earning more for his or her product than other producers who sell on the cash market at the same time. The challenge for cow-calf producers with forward contracting or selling on a futures market is that prices are often based on 50,000 pounds liveweight, or a full trailer load, which would equate to around eighty-three 600-lb calves. As noted in chapter one, many of the cow-calf producers this research targets have much smaller operations, making it hard to put together an entire load to sell on a forward or futures contract. One solution to this lack of

numbers is the formation of a cooperative, where producers pool together to create a truck load of uniform animals to aid in finding a buyer for the livestock and bringing a higher premium for a full load of uniform animals.

Animal health, especially in the case of catastrophic disease outbreaks, can present its own risks. Controlling health-related risks starts at the cow-calf level, as management practices at the origination point of calves are connected to animal health later in life (Speer, Young, & Roeber, 2001). Bovine respiratory disease (BRD) is of major concern in feedlots, but can also impact stocker-grower and cow-calf operations. BRD is the leading cause of morbidity in feedlots, affecting cattle in 96.9% of feedlots (USDA NAHMS, 2013). Around 75% of total morbidity cases and approximately 45-55% of mortality in feedlots are attributed to BRD (Speer et al., 2001). Studies have shown calves that are preconditioned before leaving the cow-calf operation have a decreased rate of morbidity and mortality due to BRD (Hilton, 2015). Implementation of preconditioning practices has the potential to decrease risks associated with raising cattle, especially in health management areas. A 2013 USDA-NAHMS report credits vaccination against respiratory diseases as one way to reduce BRD occurrence in the feedlot. Roeber et al. (2001) note that cattle buyers generally look for cattle that have been through a preweaning program "because of their significant role in determination of profitability and economic risk" (p. 39). Speer et al. (2001) cite a CattleFax® study in which the five most important pieces of information cattle buyers ask for are (1) vaccination program, (2) date weaned, (3) breed of sire and/or breed composition of cow herd, (4) have calves been weaned, and (5) weaning ration/nutrition program, listed in order of importance. Items one, two, four, and five are directly related to health management of the calves. Speer et al. (2001) state "any effort to reduce stress and/or improve immunocompetency" (p. 5) will aid in improving health and

therefore reduce the risk of BRD upon arrival to the feedlot. It is important to realize that BRD is not the only type of illness that affects feedlot cattle and can be better controlled by increased health management at the cow-calf level; however, due to the high impact BRD has on the beef industry, learning to better control BRD is of utmost importance to cow-calf producers and cattle feeders alike.

Animal health is a very broad risk in the production of any livestock and can be further broken down in the cow-calf industry. Health of an animal affects its growth, which is important to maintaining a uniform calf crop and earning as much as possible for that animal at the time of sale. In addition to genetics, growth is influenced by environment and management practices. Calves can be creep fed to bolster growth rates. Creep feeding is a practice that involves allowing calves to eat grain without interference and competition from the cows. Some producers opt to administer growth-promoting hormones to their calves to achieve the highest rate of gain, in turn influencing a calf's weight at the time of sale and subsequent price received for the animal.

Weaning is a risk area closely related to animal growth, with the added factors of controlling stress during a major change in the animal's life. A few ways stress at weaning can be minimized is by practicing fence line weaning, where the cows and calves are separated by a fence but they can still see, hear, and smell each other; moving the cows to a new area but leaving the calves in a familiar environment; and making sure the calves are appropriately vaccinated, castrated, and dehorned prior to weaning to ensure maintenance of health despite stress to the body. Alternatively, weaning can be made more stressful by crowding calves onto a trailer and hauling them either directly to a sale barn or feedlot, either of which can be many miles away from the operation.

Other risks include those associated with breeding, such as synchronizing females to cycle, and ideally breed, at the same time; calving, such as selecting bulls to control dystocia and birth weights; and economic, such as average yearly costs per cow. The aforementioned risks were taken into consideration when forming the following research objectives, question, and hypothesis.

Research Objectives, Question, and Hypothesis

The aforementioned risks led researchers to investigate the communication practices and preferences of cow-calf operators in the Southeast United States in relation to risk management. There are two research objectives that guide this study, as well as one research question and one hypothesis:

RO1: Define demographic and sociocultural characteristics of beef cow-calf producers in the Southeast United States.

RO2: Determine the perceived knowledge gap of beef cow-calf producers in the Southeast United States as it relates to risk management knowledge.

RQ1: How do beef cow-calf producers in the Southeast United States use different communication channels to influence their level of knowledge regarding risks facing their operations?

Researchers proposed the following hypothesis in regard to this study:

H1: As the level of perceived risk increases, beef cow-calf producers in the Southeast United States will seek risk information through nonroutine channels.

Summary

The Risk Information Seeking and Processing model is the foundation for this study. Several prior studies use the RISP model to analyze information, but none were found focused

around beef producer risk management practices. Previous beef producer studies were reviewed and national data collected to compare results from this study to a national scale. Chapter three outlines the methods of collecting and analyzing data in this study.

Chapter 3 - Methods

Surveys, interviews, and focus groups have commonly been used to conduct studies using the risk information seeking and processing model (Cross, Heeren, Cornicelli, & Fulton, 2018; D'Angelo, 2017; Griffin, Powell, Dunwoody, Neuwirth, Clark, & Novotny, 2004; Rose, Toman, & Olsen, 2017; Yang, Rickard, Harrison, & Seo, 2014). Due to the necessity of individuals' perceptions regarding the selected risk, internet surveying is the most efficacious method to collect data regarding perception from an audience in a wide geographical range (Denscombe, 2014), such as in the present study.

While some research has been conducted on communication preferences of beef producers in some of the states of interest (Joseph, 2013; Steede, 2012; Taylor & Field, 1998), no research was found addressing the risk communication practices of these producers. Researchers primarily focused on the RISP model areas of individual characteristics, information sufficiency, and perceived information gathering capacity to determine beef cow-calf producer information seeking and processing behavior. Unique to this region of the United States is the mix of small operations with large operations scattered throughout the Southeast. Using industry knowledge, prior experience and consultation of trade and other resources, the researcher self-identified the risk areas to be used in this study. The researcher noticed trends in risk management of cattle both on cow-calf operations in the Southeast as well as in a Great Plains feedlot setting.

Instrumentation

To address the aforementioned research objectives and questions, an online survey was developed and distributed to beef producers in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia (Appendix B). Questions on the survey assessed cow-calf management practices, producer communication

preferences, determined perceived risks in beef management, and collected demographic and sociocultural data on targeted producers, which will be described in more detail in the coming pages.

Surveying is a broad, frequently used mode of gathering information about a specific audience. The intent of a survey is "motivated by the desire to collect information to answer a particular question or solve a particular problem" (Dillman, Smyth, & Christian, 2014, p. 2). Online surveys have become popular in part due to their speed and decreased cost (Denscombe, 2014; Dillman et al., 2014).

Dillman et al. (2014) suggest two primary ways to increase benefits, decrease costs, and build trust with respondents through a mixed-mode survey. The first of these suggestions is to employ multiple modes of communication to reach the audience. In today's world, individuals are so inundated with emails they are likely to discard messages from unrecognized senders or emails he or she did not anticipate receiving. Alerting intended respondents to the pending email through a postal letter on official letterhead, perhaps with some incentive enclosed, may help increase response rate and build trust (Dillman et al., 2014). In regard to the present study, researchers worked with producers' trusted sources, as noted in reviewed literature to be veterinarians, cattlemen's associations, and state extension programs, to make the audience aware of the study and encourage their response before sending out emails containing the survey link. Making intended respondents aware of the survey from a trusted source aided in decreasing discard rate of follow-up emails containing the survey link. Researchers were aware that some organizations may not be willing to share contact information for members; to respect their privacy, an email was drafted for organizations to send out through their respective channels. It

is suspected this might have also helped increase response rate, as the survey link came directly from a trusted source.

Secondly, Dillman et al. (2014) discuss offering multiple modes of survey response to improve survey response. This study used a mixed-mode survey to achieve the highest possible response rate. Dillman et al. (2014) explain that mixing survey modes allows compensation for weaknesses in one mode to be made by strengths in another and increases the chance of response from a wider audience. The present survey will be distributed primarily online, but with the option for participants to receive a paper survey in the mail, accompanied by a pre-addressed envelope and postage to return the completed survey.

The overarching strategy in this mixed-mode scenario is the "use of multiple *response* modes to collect respondent answers, while using only one mode of contact" (Dillman et al., 2014, p. 403). A second strategy, using multiple response and contact modes, was used to a lesser degree. The researcher's sources made contact with producers through social media and via email lists.

The survey for this study was tailored to meet the needs of both the researchers and the targeted respondents. Dillman et al. define tailored design as

> customizing survey procedures for each survey situation based upon knowledge about the topic and sponsor of the survey, the types of people who will be asked to complete the survey, the resources available, and the time frame for reporting results. (2014, p. 16)

Survey questions were carefully developed to ensure ease of understanding, use of appropriate formatting, and an organized flow throughout the survey (Dillman et al., 2014) with the targeted audience in mind. In closed-ended questions, researchers worked to provide "all reasonable

possible answers" (Dillman et al., 2014, p. 135) as options for respondents so that responses were as accurate and representative as possible.

The current survey consisted of 49 questions divided into seven sections. Sections are based on groupings of like questions, as advised by Dillman et al. (2014). The first section consisted of six questions focused on individual characteristics of targeted beef cow-calf producers. Section two included five questions regarding the operational characteristics of these beef cow-calf operations. The third section consisted of 14 questions targeting communication practices of producers. Section four assessed management practices through a series of ten questions while two questions in section five measured perceived risks related to producing beef. Section six consisted of four questions regarding producers' information sufficiency. The seventh and final section used eight questions to gather demographic and sociocultural characteristics. Dillman et al. (2014) recommend placing sensitive questions, such as those regarding demographics, nearer to the end of the questionnaire. With these questions closer to the end, respondents have the chance to answer more interesting questions and become engaged with the survey, as well as build trust in the surveyor, before answering the more intrusive-feeling questions (Dillman et al., 2014). Survey questions were compiled using similar research surveys as reference and with the help of experts in the beef industry to identify common management practices and risks faced by beef producers.

Distribution

The survey was distributed to various organizations within the beef industry to distribute to their members and contacts within the Southeast United States. A complete chart of all participating organizations, both nationally and by state, can be found in Table 3.1.

Table 3.1
Participating Organizations, by State

State	Organization(s)
Alabama	Alabama Cooperative Extension System
Florida	University of Florida Animal Sciences Department
Georgia	Georgia Cattlemen's Association
Kentucky	Kentucky Cattlemen's Association, UK Cooperative Extension
Louisiana	-
Mississippi	Mississippi State Extension
N. Carolina	Rockingham County (NC) Cooperative Extension
S. Carolina	-
Tennessee	Tennessee Cattlemen's Association
Virginia	Virginia Cattlemen's Association, Virginia Cooperative Extension
W. Virginia	-
National	American Association of Bovine Practitioners

Dillman et al. (2014) recommend contacting the audience multiple times as well as varying the message within each contact. Cook, Heath, and Thompson's (2000) results suggest "the number of contacts, personalized contacts, and precontacts were the factors most associated with higher response rates in the Web studies [they] analyzed" (p. 833). In accordance with these results and others (Dillman et al., 2014), the researcher made contact a total of four times. Initial contact was made with sources of respondents (cattlemen's associations, extension personnel, and veterinarians) before sharing the survey link with the target audience, which is considered precontact.

The researcher first made contact with the participating organizations to outline the research project and determine the organizations' role in collecting data. Once the survey instrument was approved by the University's Institutional Review Board (Appendix A), the survey link was activated and shared with participating organizations. Email contact with potential respondents was made by the providing source (veterinarian, cattlemen's association, or state extension) to make producers aware of the study and share the survey link. Following this initial contact, two follow-up reminders were sent to the organizations to share again with their producers.

The Qualtrics online survey system was used to construct and distribute the survey. The Qualtrics system assists the surveyor in constructing useful surveys and aids in survey layout. Qualtrics provides both desktop and mobile versions of the questionnaire to reach respondents on either platform, as suggested by Dillman et al. (2014). Additionally, the Qualtrics software is available through the university at no cost to the researcher.

Participant Selection

Nonprobability sampling was employed to collect data through a survey. Due to the high number of operations and logistical and financial challenges associated with reaching every producer, researchers believe nonprobability sampling was the ideal choice for collecting a sample of the targeted population. However, because nonprobability sampling does not provide a representative sample, results of this study should not be generalized to the larger population (Dillman et al., 2014). The target audience for the present study was beef cow-calf producers in the Southeast United States. Based on the 2017 Agriculture Census, there were 729,046 farms with an inventory of beef cows, slightly up from 727,906 farms in 2012. In the 11 southeastern

states studied, there were 199,106 farms with a total of 6,390,654 beef cows reported in the 2017 census (USDA NASS, 2019). These numbers are illustrated by state in Table 3.2.

Table 3.2
Beef Farms and Cows in the Targeted Region, by State

State	Farms	Numbers
Alabama	20,004	718,472
Florida	18,493	882,355
Georgia	14,869	488,415
Kentucky	33,864	1,031,675
Louisiana	12,051	469,483
Mississippi	14,752	503,388
N. Carolina	16,407	369,922
S. Carolina	6,917	176,801
Tennessee	32,960	906,108
Virginia	18,453	638,418
W. Virginia	10,336	205,617
	199,106	6,390,654

Note. From 2017 Agriculture Census

Data Analysis

Multiple tests and analyses were applied to answer the research questions, including frequency and descriptive statistics, means comparisons, and correlations. SPSS was used for data analysis.

Frequency and descriptive statistics were employed to address RO1. Survey questions involving RO1 included asking for respondents' age, gender, ethnicity, education level, yearly income, and geographic location. Operational characteristics were also analyzed, including years of experience, type of operation, herd composition, number of cattle owned, and industry involvement.

RO2, determining producers' perceived knowledge gap, was assessed by asking respondents about their perceived levels of risk for different management areas, their current knowledge about the management areas, and their perceived sufficiency threshold for the same areas. A knowledge gap was calculated for each risk area, as well as overall risk, by subtracting producers' current knowledge from their perceived sufficiency threshold. A negative number indicates producers having less current knowledge than deemed sufficient to efficiently attend to risks potentially faced by their operation. A positive number would indicate the producer perceives they have more than enough current knowledge to address a risk.

RQ1, regarding the influence of communication channels on management, was assessed by asking respondents about their preferred communication channels and sources. Respondents were asked to report their top three most preferred channels and sources from a comprehensive list. The researcher computed new variables and ran frequencies in SPSS to organize the most popular responses in both channels and sources.

H1 was addressed using a table where respondents selected the type of information channels used to collect information regarding specific risk areas. Those areas previously indicated on the survey to have lower perceived risk should correlate with preferred, or routine, information channels. Areas previously indicated to have increased perceived risk should, therefore, be marked with nonroutine channels, or those not indicated as commonly used by the

respondent. SPSS was used to divide responses into one of four categories: “agree-choice” for channels that were selected both as a preferred general channel and as preferred for a specified risk area; “agree-nonchoice” for channels that were not selected both as a preferred general channel or as preferred for a specified risk area; “added” for channels that were not selected as a preferred general channel but were selected as preferred in a specific risk area; and “dropped” for channels that were originally selected as preferred but not selected as preferred in a specific risk area. Tables were developed in Microsoft Excel to compare results and calculate percentages for each of the four selection categories. Channels commonly selected as agree-choice were considered routine, while those commonly added were considered nonroutine.

Summary

An internet-based survey was developed using preexisting surveys following the RISP model and the Dillman et al. (2014) text as a guide. The survey was distributed to cattlemen’s associations, extension services, and veterinarians across 11 target states: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. These organizations and individuals were asked to share the survey with members and clients to reach a minimum of 300 valid responses from cow-calf producers in the Southeast United States. Results from the survey are included and summarized in the following chapters.

Chapter 4 - Results

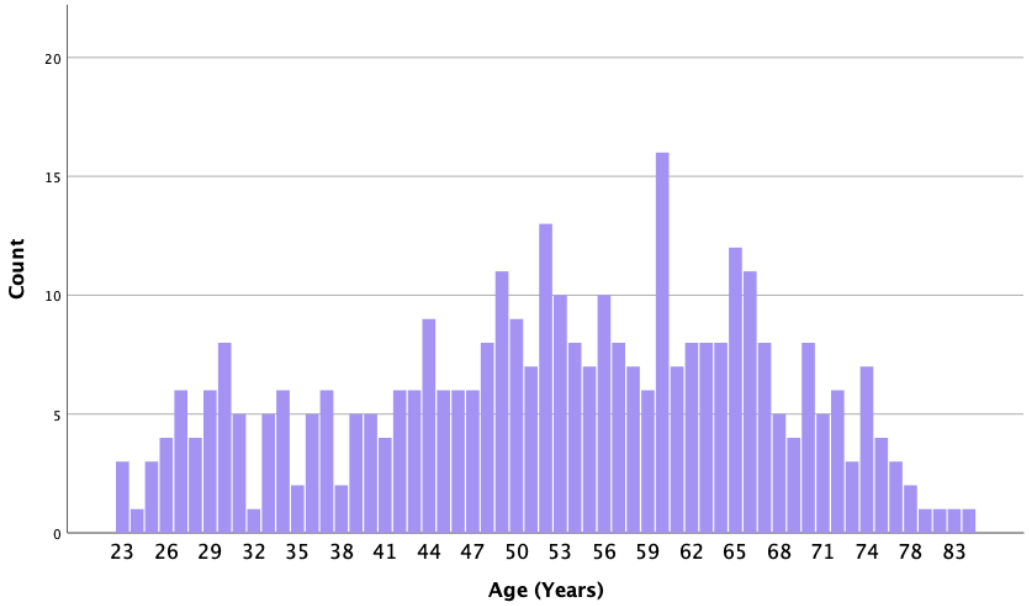
This chapter includes the results from the survey that received 504 responses. Eighty-six responses were discarded, including 34 incomplete responses and 52 responses that did not indicate the state in which the operation was located. This yielded 418 usable responses. Because this is a non-probability sample, results cannot be generalized to the entire population. The chapter starts with demographic characteristics of the respondents, then presents data about social network use, represented states, experience, operational characteristics, management characteristics, communication practices, risk perception, and sufficiency thresholds. It concludes with a summary of key findings that provide a broad understanding of Southeast beef producers' information seeking and processing.

Demographics

Of the producers who provided a response, 81.8% (n = 311) of respondents were male, 17.6% (n = 67) female, and 0.5% (n = 2) preferred not to answer. There were 38 missing responses from this question.

Age of producers ranged between 23 and 85 years (Figure 4.1); when grouped by decades, the largest groups of respondents were between 60-69 years old (20.8%, n = 87) and 50-59 years old (20.4%, n = 85). Average age of respondents was 52.5 and the median age was 53.

Figure 4.1
Frequency of Respondents' Age



The majority of respondents were Caucasian (*n* = 373, 89.2%), followed by African American (*n* = 3, 0.7%), American Indian/Alaska Native (*n* = 2, 0.5%), both Asian and Hispanic (*n* = 1, 0.2%), and Other (*n* = 3, 0.7%) (Table 4.1). There were 35 respondents who declined to respond to or skipped this question.

Table 4.1
Race (N = 383)

Race	*n*	%
Caucasian	373	89.2
African American	3	0.7
American Indian/Alaska Native	2	0.5
Asian	1	0.2
Hispanic/Latino(a)	1	0.2
Native Hawaiian/Pacific Islander	-	-
Other	3	0.7

Nearly a third of respondents' highest level of completed education was a bachelor's degree (*n* = 123, 32.3%), followed by a master's degree (*n* = 69, 18.1%) and a high school diploma/GED (*n* = 63, 16.5%) (Table 4.2). Respondents who had completed a doctorate degree account for 14.7% (*n* = 56); associate degree 10.5% (*n* = 40); trade or technical school 7.6% (*n* = 29); and some high school 0.2% (*n* = 1).

Table 4.2
Completed Education Level (N = 381)

Level	*n*	%
Bachelor's degree	123	29.4
Master's degree	69	16.5
High school/GED	63	15.1
Doctorate degree	56	13.4
Associate degree	40	9.6
Trade/technical school	29	6.9
Some high school	1	0.2

Income was represented as average household yearly in $20,000 intervals, beginning with less than $20,000 and going to $100,000-plus (Table 4.3). The majority of respondents (*n* = 191, 51.9%) had an average yearly household income of more than $100,000. Average yearly household income was $60,000-$79,999 for 19% (*n* = 70) of respondents and $80,000-$99,999 for 16% (*n* = 59) of respondents. The $40,000-$59,999 bracket accounted for 9.8% (*n* = 36); $20,000-$39,999 3% (*n* = 11); and 0.2% (*n* = 1) fell in the less than $20,000 bracket. At least 51% of income was made off-farm for the majority of respondents (*n* = 325, 86.2%). Collectively, 13.8% of respondents earned the majority (51+%) of their yearly household income

on-farm; 8% (n = 30) of respondents said the majority of their income came from their beef cattle operations while 5.8% (n = 22) have a major revenue stream on the farm other than beef cattle.

Table 4.3
Average Annual Household Income (N = 368)

Income	*n*	%
$100,000+	191	45.7
$60,000 - $79,999	70	16.7
$80,000 - $99,999	59	14.1
$40,000 - $59,999	36	8.6
$20,000 - $39,999	11	2.6
< $20,000	1	0.2

Social Network Use

Respondents were asked to report their social networking use. Nearly three-quarters of respondents (n = 279, 73%) reported having any social media accounts. By far, Facebook was the most popular social network site (n = 252, 60.3%), followed by Instagram (n = 105, 25.1%). Other sites measured include Twitter, Snapchat, Pinterest, LinkedIn, YouTube, and "Other" (Table 4.4). Respondents were instructed to select as many platforms as they had an account with, resulting in a percentage sum greater than 100. Social media presence can be indicative of internet use, and subsequent comfort in using the internet to gather risk information.

Table 4.4
Social Media Presence of Southeast Beef Producers

Site	*n*	%
Facebook	252	60.3
Instagram	105	25.1
LinkedIn	96	23.0
YouTube	95	22.7
Twitter	75	17.9
Snapchat	65	15.6
Pinterest	63	15.1
Other	8	1.9

Represented States

All 11 Southeast states were represented with at least one valid response to the survey (Table 4.5). Kentucky had the most respondents (n = 140, 33.5%), followed by Tennessee (n = 99, 23.7%) and Virginia (n = 83, 19.9%). Because of the small response size for many of the states, state-specific comparisons were not conducted. Kentucky and Tennessee are the states with the greatest number of cattle in the surveyed region (USDA NASS, 2019). Virginia has the fifth greatest number of cattle in the region.

Table 4.5
States, by Number of Responses (N = 418)

State	*n*	%
Kentucky	140	33.5
Tennessee	99	23.7
Virginia	83	19.9
Georgia	25	6.0
Florida	24	5.7
Louisiana	14	3.3
North Carolina	13	3.1
West Virginia	9	2.2
Alabama	8	1.9
Mississippi	2	0.5
South Carolina	1	0.2

Experience

Years of experience in the beef industry was measured in ten-year increments, starting with 0-9 and ranging to 50+ (Table 4.6). The largest number of respondents (*n* = 92, 22%) had 0-9 years of experience, followed by 10-19 years (*n* = 79, 18.9%). The gap is much smaller after the top two: 40-49 years (*n* = 65, 15.6%), 30-39 years (*n* = 62, 14.8%), and both 20-29 and 50+ years accounting for 14.4% (*n* = 60) of responses.

Table 4.6
Years of Experience in Beef Industry (N = 418)

# of years	*n*	%
0-9	92	22.0
10-19	79	18.9
40-49	65	15.6
30-39	62	14.8
20-29	60	14.4
50+	60	14.4

Operation and Management Characteristics

Operational and management characteristics of beef operations were considered as part of the individual characteristics aspect of the RISP model, which is addressed in research objective one. Individual characteristics included operation position, beef quality assurance certification, herd types, number of cattle managed, and other related factors.

The majority of respondents were owner (*n* = 289, 69.3%) or co-owner (*n* = 111, 26.6%) of the beef cattle operation. Other positions included employee with management decision responsibilities (*n* = 7, 1.7%), hired manager (*n* = 6, 1.4%), and employee without management decision responsibilities (*n* = 4, 1%). In terms of ownership, 78.9% of respondents (*n* = 330) individually owned their herds, while 19.9% (*n* = 83) of respondents were in a partnership and 1.2% (*n* = 5) managed a third party-owned herd, such as a prison farm or university herd. Type of ownership and management responsibilities influences the level of control an individual has over management practices in the operation.

Three-quarters (n = 317, 75.8%) of respondents reported currently being Beef Quality Assurance (BQA) certified. Of the 101 (24.2%) respondents who were not currently BQA certified, 11 (2.6%) reported being BQA certified in the past. The Beef Quality Assurance program is a national quality assurance program considered as the standard for beef cattle care. BQA training and certification is one indicator of a producer's commitment to raising a quality product in a safe and humane manner, as directed by the National Beef Checkoff Program. Beef quality certification also may be an indicator of the progressiveness of an operation; if a producer takes the time to become BQA certified, they are most likely more inclined to take the time to implement more progressive management techniques such as the use of artificial insemination and adhering to specifications for value-added programs.

More than three-quarters (n = 326, 78%) of respondents reported attending educational industry meetings, such as the annual Cattle Industry Convention, NCBA Trade Show, state cattlemen's conventions, and regional field days, at least once per year; 21.1% (n = 88) of respondents answered "no" and four participants did not respond. Respondents who spend time and money attending educational events are likely interested in increasing the depth of their management practices and cognitively learning about potential risks on their operation.

Respondents were asked to select all types of industry sectors that describe their herd, meaning respondents could select more than one answer. Cow-calf sectors, the survey's main focus, was a component of 98.1% (n = 410) of respondents' operations. Of the respondents, 12.2% (n = 51) included backgrounding, while 10.3% (n = 43) included stocker operations. Feedlots were a component of 2.9% (n = 12) of respondents' herds. "Other" was reported to be a component of 5.3% (n = 22) of respondents' herds. Seedstock, grass fed beef, and replacement female development were a few reported responses from participants who selected "Other."

Additionally, respondents recorded the type of herd they worked with. Three-quarters (*n* = 316, 75%) of producers operated a commercial herd; 23.9% (*n* = 100) of respondents recorded a purebred – nonregistered herd; and 36.1% (*n* = 267) of producers recorded operating a purebred – registered herd. Percentages totaled more than 100 because respondents could select more than one herd type.

Producers were asked to record the number of cattle cared for, counting cow-calf pairs as one unit (Table 4.7). Just over one-fifth (*n* = 91, 21.8%) of producers managed 26-50 head of beef cattle, followed by both herd sizes 11-25 and 101-299 each accounting for 17.9% (*n* = 75) of responses. There was not a specific increment size between categories; the researcher was interested in small-(<100) versus large-scale (100+) herds.

Table 4.7
Herd Size of Southeast Beef Operations (N = 418)

# of cattle	*n*	%
26-50	91	21.8
11-25	75	17.9
101-299	75	17.9
51-75	68	16.3
76-100	54	12.9
300+	31	7.4
1-10	23	5.5
Do not currently own any cattle	1	0.2

Respondents' production goals for their herds were largely both maternal and terminal (*n* = 252. 57.9%). Almost a third of respondents (*n* = 137, 32.8%) focused primarily on maternal goals while 9.1% (*n* = 38) focused on terminal goals in their herd.

A large majority of respondents (*n* = 394, 94.9%) reported having access to working cattle handling facilities and of these 394 respondents, 98.2% (*n* = 386) regularly use the handling facility to work cattle. Measuring access to a functional handling facility could provide insight as to why certain management practices are or are not implemented. For example, the use of artificial insemination (AI) would be influenced by access to a chute or head catch. In order to implement an AI program, proper restraint must be available to the technician.

Specific management practices were assessed that related to five general areas: breeding, calf management, general, calf marketing, and health management. In breeding practices, having a defined breeding season, which is indicative of a defined calving season, was much higher in this study (*n* = 34, 81.6%) when compared to the average of 45% of Southeast producers who had a defined calving season (McBride & Mathews, 2011). Only 4% of Southeast beef cow-calf farms reported using AI in a national survey (McBride & Mathews, 2011), which is substantially less than the 44.3% (*n* = 185) of producers in the present survey who utilize AI technology. A large portion of respondents (*n* = 292, 69.9%) practiced pregnancy checking and 40.4% (*n* = 169) utilized estrous synchronization technology.

In calf management, a large majority (*n* = 363,86.8%) of respondents recorded castrating male calves, though method and age at castration were not recorded; 50.2% (*n* = 210) creep fed calves; 50% (*n* = 209) vaccinated more than once at or prior to weaning; 47.4% (*n* = 198) vaccinated once prior to or at weaning; 31.1% (*n* = 130) used growth implants; 18.7% (*n* = 78) retained ownership through backgrounding and stocker phases; and 10.3% (*n* = 43) retained

ownership through the feedlot phase. Additionally, weaning practices were recorded as follows: a small percentage of respondents weaned calves onto a truck (12.9%, *n* = 54) or weaned for less than 45 days on the operation (14.6%, *n* = 61), while a majority (65.8%, *n* = 275) weaned calves on the operation for 45 or more days. This is in stark contrast to the 70% of producers in the South who were reported to sell calves at weaning by McBride and Mathews (2011). Weaning calves on a truck or for a minimal amount of days has been shown to increase stress, and therefore susceptibility to illness and decreased rate of gain in the animals (Boyles, Loerch, & Lowe, 2007; Hall, 1998). Weaning for at least 45 days is a common preconditioning practice on many operations (Roeber & Umberger, 2002).

Prevalent general management technologies included using individual animal identification, such as ear tags or individual brands, by 89% (*n* = 372) of respondents; some level of record keeping by a vast majority (88.8%, *n* = 371); and a rotational grazing program by 80.1% (*n* = 35). McBride and Mathews (2011) reported 60% of Southeast cow-calf producers utilized a rotational grazing program, which is much lower than the results of this survey. Unsurprisingly, only 31.1% (*n* = 130) of respondents had insurance on their herd.

Selling cattle on a cash basis was the most common marketing practice with 69.9% (*n* = 292) of producers reporting this method. However, 45% (*n* = 188) of respondents reported marketing their animals through a value-added program. Marketing animals on a value-added basis represents a producer's commitment to certain management standards, though levels vary depending on which program calves are marketed. Less than 8% (*n* = 30) reported selling calves on a contract.

In health management practices, 94.3% (*n* = 394) of producers reported using a parasite control program and 44.7% (*n* = 187) had their veterinarian perform regular health checks on the

herd. Regular health checks were used to be encompassing of specific veterinary practices or procedures, such as vaccinations, calf processing, breeding soundness, general herd health checks, or body condition scoring.

When asked if producers felt they could easily impose stricter management practices, 50.9% (*n* = 205) "somewhat agreed"; 20.1% (*n* = 81) "neither agreed nor disagreed"; and 19.6% (*n* = 79) "strongly agreed." "Somewhat disagree" was selected by 6.5% (*n* = 27) of respondents; 2.6% (*n* = 11) "strongly disagreed"; and 15 participants did not respond. When asked if they were more likely to implement new practices if a friend did, 45.5% (*n* = 184) of respondents "neither agreed nor disagreed"; 36.4% (*n* = 147) responded "somewhat agree"; 11.1% (*n* = 45) "somewhat disagreed"; 3.6% (*n* = 15) "strongly disagreed"; 3.1% (*n* = 13) "strongly agreed"; and 14 participants did not record a response. This perceived control of management is related to perceived behavioral control, a RISP factor.

Communications Characteristics

The researcher investigated influence of communication practices on management techniques in the research question. The research question of this study investigates the role of communication channels on risk knowledge. Communication data were collected to determine routine versus nonroutine channels in respondents as well as to gauge producer preference in communication practices. Several communication aspects were assessed to contribute to the conclusions drawn in the next chapter.

When asked if they received any industry publications or information subscriptions, 93.1% of respondents (*n* = 389) recorded "yes" while 6.9% (*n* = 29) said "no." Just over half (*n* = 219, 52.4%) of respondents reported paying a fee for at least one of these publications or subscriptions. A majority (*n* = 300, 71.8%) of respondents reported occasionally applying

methods/ideas from these communications to their operations in a year. “Very often” was reported by 26.3% (*n* = 110) of respondents and “never” was reported by 1.9% (*n* = 8). Having data on reception of communication pieces and willingness to pay for these pieces can be useful to industry communicators in future practices. Assessing behavioral change as a result of these practices is indicative of success of the messages and likely indicate more systematic processing of the messages.

Producers were asked to report their preference of primary source of information regarding beef cattle. A majority of respondents (*n* = 261, 63%) preferred information to come from a source that was regional. Local (*n* = 94, 22.5%) and national (*n* = 59, 14.1%) information sources also were selected, but with much less frequency. Four participants did not report a preference in sources. Preferred modes of receiving information were close between print media (*n* = 173, 41.4%) and digital media (*n* = 151, 36.1%), followed by verbal interaction being preferred by 22.2% of respondents (*n* = 93). One participant did not report a preference in mode. These data are helpful in determining producers’ preferred communication practices by industry communicators, part of the research question in this study.

The frequency at which producers actively sought management information also was measured. Many respondents (*n* = 177, 42.3%) reported “sometimes (4-8 times per year)” actively seeking out management information; 31.1% (*n* = 130) reported “rarely (1-3 times per year)”; 23% (*n* = 96) reported “very often (more than 8 times per year)”; and 3.3% (*n* = 14) reported never actively seeking management information. One participant did not respond to this question. Actively seeking was defined for the respondents as the act of searching for information purposefully and is an indicator of cognitive risk information seeking. Information seeking behavior is at the end of the RISP model, being influenced by the factors that come

before it such as information sufficiency, perceived information gathering capacity, and individual characteristics.

The most preferred information channel of participants was overwhelmingly print magazines (n = 335, 80.1%) (Table 4.8). Because of this significant preference, magazines are considered a routine channel. After print, extension publications and live demonstrations were the second and third most popular channels with 193 (46.2%) and 161 (38.5%) responses, respectively. Because respondents could select up to three channels, the total percentage is greater than 100. Channels with lower frequency are considered nonroutine, as they are less frequently used by respondents to gather risk information.

Table 4.8
Preferred Channels, by Frequency of Responses (N = 1,264)

Channel	*n*	%
Print magazines	335	80.1
Extension publications	193	46.2
Live demonstrations	161	38.5
Conferences	131	31.3
Newsletters	125	29.9
Online magazines	112	26.8
Social network channels	70	16.7
YouTube	67	16.0
Research journals	41	9.8
Podcasts	23	5.5
DTN machine/services	6	1.4

Preferred sources for information in communications items also were measured in the survey (Table 4.9). Local extension sources were most preferred (n = 240, 57.4%), followed by local cattlemen's association (n = 223, 53.3%) and universities (n = 220, 52.6%). Because respondents could select up to three sources, the total percentage is greater than 100. Source of a message indicates heuristic versus cognitive seeking and processing practices, though information processing was not measured in this study.

Table 4.9
Preferred Sources, by Frequency of Responses (N = 1,275)

Source	*n*	%
Local extension	240	57.4
Local cattlemen's association	223	53.3
University	220	52.6
Veterinarian	162	38.8
National breed association	82	19.6
Other producers	81	19.4
Industry	79	18.9
Feed dealer	43	10.3
Trade companies	41	9.8
National cattlemen's associations	39	9.3
Local breed association	34	8.1
Government bodies	31	7.4

Table 4.10 displays the questions that investigated respondents' level of cognitive engagement in information seeking. This table indicates that inclusion of a notable source or

reference and photographs or illustrations (heuristic factors) increases likelihood of reading a message by a great majority of respondents (86.5% and 85.5%, respectively). The least influential heuristic factor measured was message length, where a large majority (n = 372, 89.6%) of respondents disagreed that increased message length was equal to increased accuracy of the message.

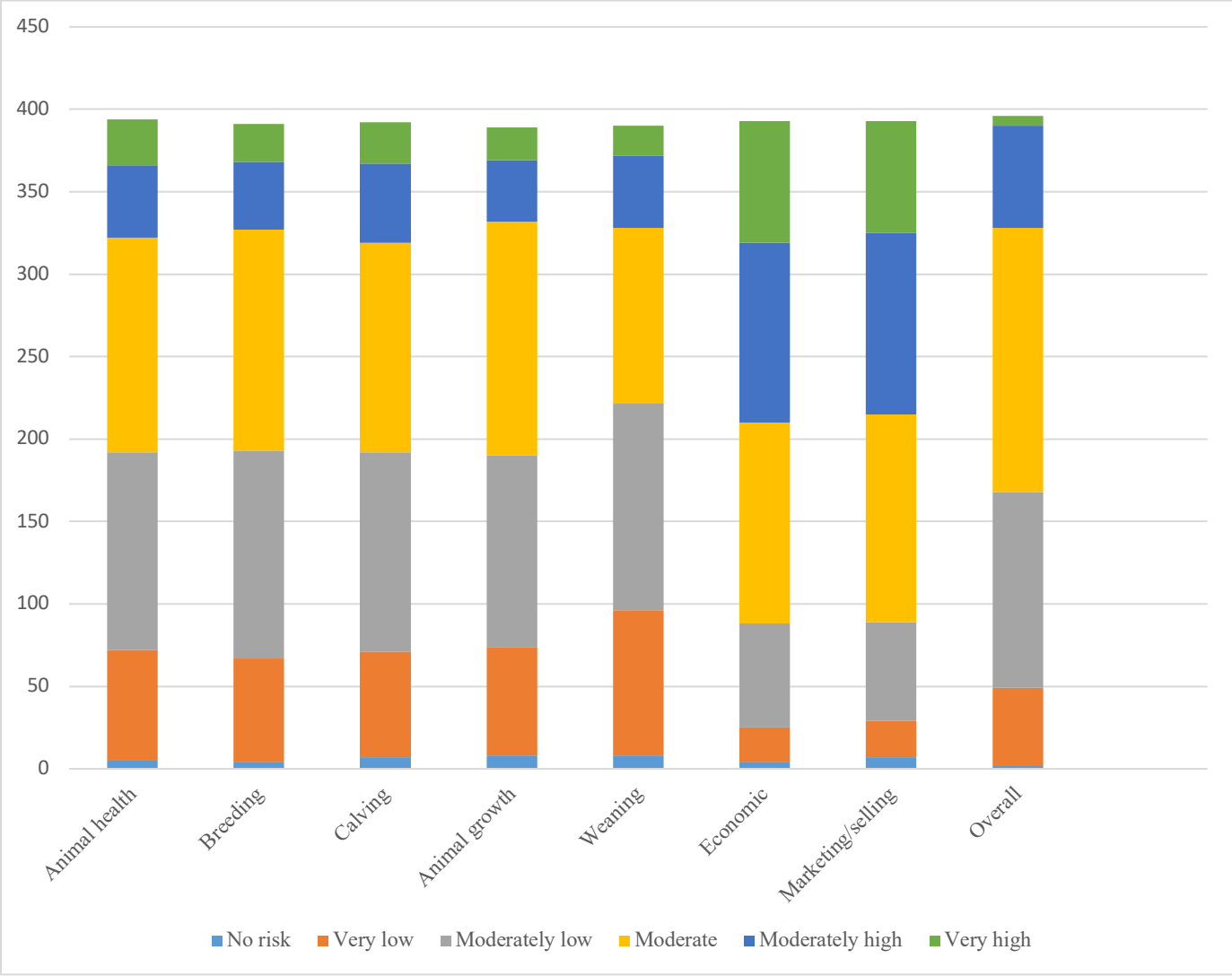
Table 4.10
Heuristics Statement Responses

Statement	Agree	%	Disagree	%
Notable sources/references increase likelihood of reading	359	86.5	56	13.5
Photos/illustrations increase likelihood of reading	355	85.5	60	14.5
Graphs/data increase likelihood of reading	324	78.2	91	21.8
No visual aids decrease likelihood of reading	254	61.5	160	38.5
Message length increases accuracy	43	10.4	372	89.6

Risk Perception and Sufficiency Threshold

Risk perception was measured through a series of questions answered using a Likert-type scale about eight risk areas in the beef industry in order to determine which areas respondents perceived to have the highest risk. Seven out of the eight areas were reported to have “moderate” risk with the perceived risk in weaning management primarily considered “moderately low.” Figure 4.2 illustrates the rankings of each individual risk area.

Figure 4.2
Perceived Risk, by Management Area



When asked if they believe they had enough knowledge to efficiently address risks faced by their beef cattle operation, 72% (n = 275) of producers answered yes. Just over half (n = 209, 54.7%) of respondents "somewhat agree" that they know how to find risk management information if needed; 26.7% (n = 102) "strongly agree"; 13.4% (n = 51) "neither agree nor disagree"; 4.5% (n = 17) "somewhat disagree"; and 0.8% (n = 3) "strongly disagree." This

perceived current knowledge is a factor in determining information sufficiency of the respondents.

Respondents were asked to rate both their current knowledge (Table 4.11) and the knowledge they felt they need (Table 4.12) to efficiently address risks faced by their beef operations. The knowledge level producers feel is necessary to address risks is known as the sufficiency threshold in the RISP model and will be referred to as such from here forward. Rates were provided on a scale of 0-100, with zero representing having no knowledge and 100 representing being an expert in the field.

Table 4.11
Current Knowledge, by Risk Area

Risk area	Min.-Max.	Mean	Median	Mode
Animal health	4-100	68.9	71.0	50
Breeding management	9-100	68.6	72.0	50
Calving management	11-100	71.0	76.0	90
Animal growth	9-100	66.0	70.0	80
Weaning	9-100	71.1	77.0	90
Economic	2-100	58.7	57.0	50
Marketing/selling	4-100	58.9	58.0	50

Note. Measured on scale from 0-100

Table 4.12
Sufficiency Threshold, by Risk Area

Risk area	Min.-Max.	Mean	Median	Mode
Animal health	0-100	77.8	81.0	100
Breeding management	8-100	75.6	80.0	100
Calving management	5-100	76.0	80.0	100
Animal growth	7-100	72.9	76.0	100
Weaning	2-100	72.3	76.0	100
Economic	6-100	77.6	81.0	100
Marketing/selling	8-100	79.0	83.5	100

Note. Measured on scale from 0-100

Using the information from Tables 4.11 and 4.12, the knowledge gap for each risk area was calculated by subtracting the average "sufficiency threshold" from the average "current knowledge" in each area (Table 4.13). If this gap figure was equal to zero, producers perceived they had the necessary amount of knowledge to assess risks facing their beef operations. If the gap figure was a positive number, producers had more knowledge about a risk than they perceived was necessary. Alternatively, a negative gap figure indicated a lower perceived current knowledge level than the perceived sufficiency threshold, or an insufficiency of knowledge to address the risk.

Table 4.13
Knowledge Gap, by Risk Area

Risk area	Avg. Current	Avg. Sufficiency Threshold	Gap
Marketing/selling	58.9	79.0	-20.1
Economic	58.7	77.6	-18.9
Animal health	68.9	77.8	-8.9
Breeding management	68.6	75.6	-7.0
Animal growth	66.0	72.9	-6.9
Calving management	71.0	76.0	-5.0
Weaning	71.1	72.3	-1.2

Communication Channels by Risk

The communication channels from Table 4.8 were measured against those same channels, but by preference in each risk area. Print and online magazines were combined into one channel, "magazines," and YouTube was combined with social network channels to form a "social network" channel when channels were assessed by risk area.

Preferences were measured against one another and were divided into four categories per channel: Agree Choice, Agree Nonchoice, Added, and Dropped (Tables 4.14 – 4.22). Channels that were preferred both generally and for a specific risk were categorized as Agree Choice. Agree Choice is indicative of a routine channel, or one that is consistently chosen to seek risk information. Channels that were not preferred either generally or for a specific risk were categorized as Agree Nonchoice. Channels that were not selected originally but were preferred in a specific risk area were categorized as Added and indicated a nonroutine channel. Nonroutine channels are those not habitually used but were preferred to seek specific risk information.

Finally, channels that were originally preferred but not preferred for a specific risk area were categorized as Dropped.

Table 4.14
Live Demonstration Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	115 (27.5%)	59 (14.1%)	198 (47.4%)	46 (11.0%)
Breeding Management	88 (21.1%)	93 (22.2%)	164 (39.2%)	73 (17.5%)
Animal Growth	90 (21.5%)	112 (26.8%)	145 (34.7%)	71 (17.0%)
Weaning	85 (20.3%)	124 (29.7%)	133 (31.8%)	76 (18.2%)
Calving Management	93 (22.2%)	100 (23.9%)	157 (37.6%)	68 (16.3%)
Economic	88 (21.1%)	101 (24.2%)	156 (37.3%)	73 (17.5%)
Marketing/Selling	71 (17.0%)	141 (33.7%)	116 (27.8%)	90 (21.5%)

Table 4.15
Magazine Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	293 (70.1%)	29 (6.9%)	20 (4.8%)	76 (18.2%)
Breeding Management	239 (57.2%)	36 (8.6%)	13 (3.1%)	130 (31.1%)
Animal Growth	222 (53.1%)	36 (8.6%)	13 (3.1%)	147 (35.2%)
Weaning	206 (49.3%)	37 (8.9%)	12 (2.9%)	163 (39.0%)
Calving Management	237 (56.7%)	36 (8.6%)	13 (3.1%)	132 (31.6%)
Economic	230 (55.0%)	35 (8.4%)	14 (3.3%)	139 (33.3%)
Marketing/Selling	182 (43.5%)	44 (10.5%)	5 (1.2%)	187 (44.7%)

Table 4.16
Newsletter Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	81 (19.4%)	175 (41.9%)	118 (28.2%)	44 (10.5%)
Breeding Management	61 (14.6%)	201 (48.1%)	92 (22.0%)	64 (15.3%)
Animal Growth	62 (14.8%)	206 (49.3%)	87 (20.8%)	63 (15.1%)
Weaning	53 (12.7%)	206 (49.3%)	87 (20.8%)	72 (17.2%)
Calving Management	68 (16.3%)	201 (48.1%)	92 (22.0%)	57 (13.6%)
Economic	74 (17.7%)	189 (45.2%)	104 (24.9%)	51 (12.2%)
Marketing/Selling	63 (15.1%)	199 (47.6%)	94 (22.5%)	62 (14.8%)

Table 4.17
Extension Publication Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	161 (38.5%)	100 (23.9%)	125 (29.9%)	32 (7.7%)
Breeding Management	125 (29.9%)	126 (30.1%)	99 (23.7%)	68 (16.3%)
Animal Growth	116 (27.8%)	131 (31.3%)	94 (22.5%)	77 (18.4%)
Weaning	126 (30.1%)	137 (32.8%)	88 (21.1%)	67 (16.0%)
Calving Management	140 (33.5%)	126 (30.1%)	99 (23.7%)	53 (12.7%)
Economic	118 (28.2%)	131 (31.3%)	94 (22.5%)	75 (17.9%)
Marketing/Selling	99 (23.7%)	142 (34.0%)	83 (19.9%)	94 (22.5%)

Table 4.18
Research Journal Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	25 (6.0%)	295 (70.6%)	82 (19.6%)	16 (3.8%)
Breeding Management	21 (5.0%)	305 (73.0%)	72 (17.2%)	20 (4.8%)
Animal Growth	25 (6.0%)	297 (71.1%)	80 (19.1%)	16 (3.8%)
Weaning	19 (4.5%)	302 (72.2%)	75 (17.9%)	22 (5.3%)
Calving Management	21 (5.0%)	306 (73.2%)	71 (17.0%)	20 (4.8%)
Economic	17 (4.1%)	317 (75.8%)	60 (14.4%)	24 (5.7%)
Marketing/Selling	11 (2.6%)	330 (78.9%)	47 (11.2%)	30 (7.2%)

Table 4.19
Conference Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	104 (24.9%)	206 (49.3%)	81 (19.4%)	27 (6.5%)
Breeding Management	81 (19.4%)	229 (54.8%)	58 (13.9%)	50 (12.0%)
Animal Growth	78 (18.7%)	230 (55.0%)	57 (13.6%)	53 (12.7%)
Weaning	75 (17.9%)	237 (56.7%)	50 (12.0%)	56 (13.4%)
Calving Management	80 (19.1%)	234 (56.0%)	53 (12.7%)	51 (12.2%)
Economic	79 (18.9%)	224 (53.6%)	63 (15.1%)	52 (12.4%)
Marketing/Selling	69 (16.5%)	230 (55.0%)	57 (13.6%)	62 (14.8%)

Table 4.20
Podcast Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	14 (3.3%)	379 (90.7%)	16 (3.8%)	9 (2.2%)
Breeding Management	9 (2.2%)	384 (91.9%)	11 (2.6%)	14 (3.3%)
Animal Growth	7 (1.7%)	381 (91.1%)	14 (3.3%)	16 (3.8%)
Weaning	8 (1.9%)	382 (91.4%)	13 (3.1%)	15 (3.6%)
Calving Management	7 (1.7%)	382 (91.4%)	13 (3.1%)	16 (3.8%)
Economic	11 (2.6%)	382 (91.4%)	13 (3.1%)	12 (2.9%)
Marketing/Selling	7 (1.7%)	378 (90.4%)	17 (4.1%)	16 (3.8%)

Table 4.21
Social Network Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	51 (12.2%)	260 (62.2%)	35 (8.4%)	72 (17.2%)
Breeding Management	37 (8.9%)	273 (65.3%)	22 (5.3%)	86 (20.6%)
Animal Growth	39 (9.3%)	277 (66.3%)	18 (4.3%)	84 (20.1%)
Weaning	37 (8.9%)	278 (66.5%)	17 (4.1%)	86 (20.6%)
Calving Management	42 (10.0%)	274 (65.6%)	21 (5.0%)	81 (19.4%)
Economic	43 (10.3%)	263 (62.9%)	32 (7.7%)	80 (19.1%)
Marketing/Selling	50 (12.0%)	249 (59.6%)	46 (11.0%)	73 (17.5%)

Table 4.22
DTN Preference, by Risk Area

Management Area	Agree Choice	Agree Nonchoice	Added	Dropped
Animal Health	2 (0.5%)	409 (97.8%)	3 (0.7%)	4 (1.0%)
Breeding Management	2 (0.5%)	411 (98.3%)	1 (0.2%)	4 (1.0%)
Animal Growth	2 (0.5%)	412 (98.6%)	0 (0%)	4 (1.0%)
Weaning	2 (0.5%)	412 (98.6%)	0 (0%)	4 (1.0%)
Calving Management	2 (0.5%)	411 (98.3%)	1 (0.2%)	4 (1.0%)
Economic	3 (0.7%)	404 (96.7%)	8 (1.9%)	3 (0.7%)
Marketing/Selling	3 (0.7%)	398 (95.2%)	14 (3.3%)	3 (0.7%)

Summary

Lots of valuable data were collected from respondents despite not being a representative sample. Some of the individual characteristics data, such as gender and average age, align with national averages, while some managerial practices showed differences between previous studies and the present research. These data will be further analyzed and explained in Chapter 5. Recommendations for the use of these data and limitations of the study also will be discussed in Chapter 5.

Chapter 5 - Discussion

Communication tactics and message delivery strategies vary based on audience and topic. Audiences are critical to understand when developing and distributing a message. In the beef industry, communicating with producers about risk management is vital to an operation's success. The purpose of this study was to investigate the risk perceptions and risk information-seeking practices of Southeast beef producers and how those habits affect their collection of beef cow-calf management information. This study intends to help communicators in the beef industry better target Southeast cow-calf producers through preferential information channels and sources, as well as adjusting communication practices to meet the risk management information needs of producers in this region. In this chapter, the results of the survey are discussed with relation to what the data mean to beef industry communicators and relative to previous research. This chapter also provides recommendations for future research regarding beef producer communications in the RISP model theory.

Research Objective One

The first research objective was to define demographic and sociocultural characteristics of beef cow-calf producers in the Southeast United States, relative to the "individual characteristics" section of the RISP model (Figure 2.1). In general, the respondents were comparable to the more general agricultural and beef producer populations, with the exception of gender. The average age of respondents in this study was 52.5, which is just five years below the national average of 57.5 (USDA NASS, 2019). Women only accounted for 17.6% (n = 67) of respondents, substantially lower than the number of female beef producers in the 2017 U.S. Agricultural Census (USDA NASS, 2019), who represent 37.1% of producers. Respondents who

identified as Caucasian accounted for 6% less of the sample than the national average for "white only" producers.

There was not a large difference in the number of years of experience, measured in ten-year increments, among respondents. The most reported increment was 0-9 years of experience in beef cattle production, followed by respondents with 10-19 years of experience, suggesting that many of the respondents were somewhat new in the beef industry, which is consistent with the age demographic previously discussed.

Around one-third of respondents reported a bachelor's degree as being their highest level of completed formal education. Following a bachelor's degree, but at a much lower rate, was completion of a master's degree. This indicates the audience is generally well-educated and have experience in post-secondary education. It is likely that, as a result of survey distribution through state extension services and the American Association of Bovine Practitioners, there was a higher pool of veterinarians with DVM degrees, academics with doctorate degrees, and extension agents, many of whom are required to obtain a master's degree. Higher levels of education and spending more time at a university also were potential contributors to their increased familiarity with extension services.

Herd size of 26-50 animals (cow-calf pairs counted as one unit) was the most common among survey respondents. Though not measured in the same way, the average beef cow herd size in the U.S. is 43.5 (USDA ERS, 2019), which falls within this survey category. In an April 2011 report, the USDA defined small-scale operations as those with less than 100 beef cows. These small farms account for about 90% of all beef operations (USDA, 2011). Operations with 100 or less cows accounted for around three-quarters of respondents in the present study. This information is helpful to communicators developing messages for beef producers as they can

account for the scale of operation most likely to be operated by their audience. Additionally, consistent with national themes, the large majority of surveyed producers earn more than half of their household income off-farm. This means that the beef operation is not their sole source of income and is likely more of a hobby-style operation. Just over half of respondents had an average yearly household income greater than $100,000. There was a sharp decline to the second most common average range of $60,000-$79,999 per year.

Most respondents were owner of their operation, but co-owners represented more than one-quarter of respondents. Similarly, a vast majority individually owned their herds, with partnerships making up around one-fifth of herd ownerships. Overwhelmingly, cow-calf herds were the most accounted for in this study, but backgrounders, stockers, and feedlots also had substantial representation. Commercial herds made up the majority of herd type, followed by purebred-registered and purebred-nonregistered herds. In both operation and herd type, respondents were able to select more than one component to represent their herd(s). These data mean that, although the Southeast is known for cow-calf operations (McBride & Mathews, 2011), there is a great variety of operation types to be considered by communicators. Additionally, many operations were owned and managed by an individual, meaning those individuals make all of the management decisions. Messages are often processed by individuals rather than partners or groups, among survey respondents.

A little more than half of respondents reported focusing on both maternal and terminal traits in their herds, rather than primarily focusing on one or the other. Communicators should provide messages geared toward maternal and terminal herds equally. The surveyed Southeast producers are likely interested in adding pounds to steer calves and producing feminine heifer calves and seek a “best of both worlds” scenario from their information consumption. All risk

areas are targeted by producers who have both maternal and terminal goals with their herds, whereas, for example, operators with primarily terminal goals would be more concerned with animal growth, weaning, economic, marketing and selling risks.

Research Objective Two

The second research objective was to determine the perceived knowledge gap of beef cow-calf producers in the Southeast United States as it relates to risk management knowledge. Sufficiency thresholds were found to be fairly consistent (Table 4.12.2) while there was some variation in perceived current knowledge (Table 4.12.1). Respondents indicated that the risk areas with the highest current knowledge were weaning at 71.1 out of 100 and calving management at 71.0 out of 100. Marketing/selling was the risk area with the highest sufficiency threshold, at 79.0 out of 100. Overall, the largest negative knowledge gap, or biggest deficit between producers' current knowledge and their perceived sufficiency threshold, was in the marketing/selling risk area at a -20.1 difference. Following closely behind the marketing and selling gap was a -18.9 gap between current knowledge and perceived sufficiency threshold of the economic risk area. The gap shortened greatly following the economic risk area, with the animal health knowledge gap falling to -8.9. Breeding management had a knowledge gap of -7.0; animal growth -6.9; calving management -5.0; and weaning had the narrowest knowledge gap at -1.2. These numbers indicate that respondents feel most prepared to attend to risks related to weaning management and least prepared to face financial risks in the economic and marketing/selling management areas of the beef industry. It is important to remember that respondents were not asked to measure their *physical* ability to address these risks, but their *cognitive* ability to do so. Following theory surrounding the RISP model, an increased negative knowledge gap (larger negative numbers) should motivate the respondents to seek risk

management information regarding those specific management areas. Thus, respondents should be seeking more information about the economic risks and marketing of calves rather than weaning management.

The results of this study reinforce the idea of a knowledge gap between a perceived sufficiency threshold and current knowledge. In each measured risk area, respondents indicated having less current knowledge than what they perceived as sufficient, creating a gap the researcher labeled as negative. In this instance, the researcher took the assigned value of current knowledge and subtracted from it the assigned value on the same scale of perceived sufficiency threshold, resulting in a negative number for each risk area. If any number had been positive, this would indicate that the producer's current knowledge surpassed what they deemed necessary to have sufficient knowledge.

Research Question One

How do beef cow-calf producers in the Southeast United States use different communication channels to influence their level of knowledge regarding risks facing their operations? This question was assessed by measuring communication preferences of respondents.

Overwhelmingly, respondents preferred print magazines to any other information channel. In this study, a channel was defined as the medium of a message. For example, in a scenario where a magazine published an article written by a well-known bovine veterinarian, the magazine is the channel. Print magazines were selected as one of the top three preferred channels by more than three-quarters of respondents. The next closest channel was extension publications, followed by live demonstrations. Respondents were asked to report up to three

preferred channels. The least preferred channels of the surveyed producers were research journals, podcasts, and DTN machines or similar services.

Preferred sources of risk information also were assessed in this research. Again, respondents were asked to report up to three preferred sources for risk information regarding beef cattle. In this study, a source was defined as the creator of a message. For example, in a scenario where a magazine published an article written by a well-known bovine veterinarian, the veterinarian is the source. The top three most preferred sources included local extension, local cattlemen's association, and university. The least preferred sources of information include national cattlemen's associations, local breed associations, and government bodies. In this case, if a communicator is sharing a message about the utility of some management practice, it would be more effective to cite a source from a state extension specialist or agent than citing a national cattlemen's association, based on the results of this study.

Well over 90% of respondents reported receiving publications or subscriptions to beef industry communication pieces of some sort, whether they paid a fee or not. Respondents reported a variety of magazines, publications, newsletters, farm journals, and other communication pieces they regularly receive or are subscribed to. Among the most popular were breed magazines such as *Angus Journal, SimTalk*, and *The Register*; state and regional cattlemen's association newsletters such as *Cow Country News, The Virginia Cattleman*, and *The Florida Cattleman and Livestock Journal*; and industry publications, especially *Drovers, The Progressive Cattleman, BEEF Magazine, The Progressive Farmer*, and *Farm Journal Magazine*. Many of these pieces are print magazines or newspapers, which were by far the most preferred channel to receive risk information. It is important to keep in mind that respondents were asked to share those publications or subscriptions they receive, without the stipulation that they must

also attend to them. Receiving a communication piece and attending to the information they provide are vastly separate factors to risk information seeking and processing. Knowing that such a large majority of producers, more than nine in ten, receive some type of communication is valuable to industry communicators.

Less than 2% of respondents reported "never" applying ideas and methods learned from received communication pieces into their operation in a year. Just more than 70% reported "occasionally" applying these ideas and a little over one-quarter said they implement new methods "very often." This indicates that messages received from industry communication efforts do influence producer decisions and encourage behavioral change in a very large majority of surveyed Southeast producers. The researcher suspects inputs such as time, labor, and capital are highly restrictive in many desired behavioral changes.

Similar to method application, respondents were asked to report their risk management information seeking frequency. The most reported responses were sometimes (4-8 times per year) and rarely (1-3 times per year). Actively seeking was defined in this study as purposefully searching for information. Producers who actively seek risk information are more likely to cognitively process messages, therefore theoretically leading to longer-lasting behavioral change.

Hypothesis One

The researcher hypothesized that, as the level of perceived risk increases, beef cow-calf producers in the Southeast United States would seek risk information through nonroutine channels at an elevated level. As illustrated in Table 4.11, moderate risk was the most indicated level for seven of the eight risk areas. Weaning risk was the exception, with moderately low the most indicated perceived risk level by respondents.

When risk areas and preferred channels were measured against one another, magazines remained the clear choice of channel by survey respondents. In each risk area, with the exception of marketing and selling, magazines were the most selected channel, mirroring the general preference results (Table 4.8). In marketing and selling, magazines were closely split between remaining a choice channel and being dropped from the preference list. Thus, magazines are considered a routine channel due to their consistent use and preference by surveyed producers. To a lesser degree, extension publications were also found to be a routine channel. In the risk areas of animal health and calving, extension publications were kept as a preferred channel for information. Interestingly, extension publications were largely reported as both a non-choice general communication channel and breeding risk management channel and almost equally a choice channel in the same two areas.

Alternatively, demonstrations were found to be a nonroutine channel added by respondents in animal health, breeding, animal growth, calving, weaning, and economic risk areas. This means that though live demonstrations may not have been a producer's most preferred channel generally, it became a preferred channel depending on the specific risk area.

Preferred communication channels remained largely constant regardless of level of perceived risk. However, due to the neutrality of perceived risk in all assessed risk areas, these results are inconclusiveness and should be investigated further. Therefore, the null hypothesis that there is no relationship between perceived risk level and use of routine versus nonroutine communication channels is accepted and the researcher's hypothesis is rejected.

Although the hypothesis was not able to be properly investigated, the data found surrounding the hypothesis is still valuable. Noting the increased knowledge gap in marketing/selling risk, live demonstrations were identified as a nonroutine channel for these

areas. Despite the lack of variation in risk level among risk areas, information sufficiency and insufficiency, as well as routine and nonroutine channel use was present and consistent with RISP model theory.

Barely more than one-quarter of respondents "strongly agreed" that they knew where they could find risk information if needed. Just over half "somewhat agreed" they could successfully seek out this information. Beef industry communicators should be aware that these producers may not feel comfortable seeking out risk information and take steps to let their audience know where risk information can be found or make that information more readily available to those who seek it.

Conclusions

Based on these results, and not to be generalized to the wider population, surveyed beef producers in the Southeast are primarily Caucasian males in their early fifties with small-scale beef operations. Beef producers who participated in this study, as a whole, perceived moderate risk associated with beef production and were largely in agreeance on preferred communication channels, especially magazines, and sources, including local cattlemen's associations, local extension, and universities. In general, primary sources and channels of information were consistent between risk areas, with the exception of marketing and selling risks which had a preferred nonroutine channel of live demonstrations. Respondents tended to be more educated and affluent and had larger herd sizes than prior research indicated. Due to higher education levels, many producers should have the ability to apply higher-level thinking to a concept or method present in risk communication pieces.

Recommendations

More research in this field should be conducted using the RISP model theory, as it has previously been used heavily in the medical field but much less frequently in agriculture and especially within animal agriculture.

For Future Research

The next step after determining preferred channels is to learn how to increase one's share of the audience's attention to a message and influence their behavior in risk management. Further investigation is warranted to understand what makes a producer more likely to implement new methods and ideas and what causes them to attend to such information in communication pieces.

The researcher did not find evidence to support that there is a negative correlation between perceived risk level and information seeking through routine channels. However, the researcher suspects that more targeted questions about specific risks, even within broader risk areas, may have provided more support for this aspect of the theory and suggests further research into this theorized correlation. Each risk area was rated to have a moderate level of perceived risk and had very similar results to one another. Thus, a change in information channel preference could not be observed with confidence.

Future studies should investigate active seeking more in-depth, by risk area and channel, and comparing results with perceived risk level for those areas. Understanding exactly where producers look for specific risk information, and *how* they look for it, can lead to better-targeted messages and aid in producer adoption of new ideas and technologies. Moreover, understanding how beef producers perceive content in communication pieces can enable communicators to develop more user-friendly material, also promoting behavioral change.

For Practice

Information collected regarding risk perception can be used by industry communicators to determine which risk areas to highlight information about in their messaging. Producers are theoretically more likely to attend to information regarding those risk areas they are least familiar with and have a wider perceived knowledge gap, such as economic and marketing/selling risks. Communicators should be aware that, though this data cannot be generalized to the population, it is still important to note that a majority of respondents were commercial cow-calf producers or had a commercial and/or cow-calf component to their operation, but purebred and grower operations were also represented in the Southeast. Communicators should not place a lot of emphasis on years of experience when developing a message as experience was largely evenly dispersed among respondents.

The prevalence of social media accounts indicates producers' access to the internet to some degree and cognitive function to utilize it. Social network channels were one of the lesser-preferred channels for receiving risk information with less than 20% of respondents placing it in their top three. However, a large majority of respondents had at least one social media account. The social networking site Facebook was the most popular platform where respondents had an account. While more research in this specific area should be conducted, the researcher believes social media has untapped potential for sharing risk management information. Social media provides a platform on which communicators can link and share their messages both on-site and externally. Facebook and Instagram, which is owned by Facebook, were the two most popular networking sites for producers to have an account and should be taken into consideration by industry communicators. Perhaps connecting messages with these platforms would increase message consumption and, ideally, encourage systematic processing and a behavioral change as

a result of reading the message. Communities have formed on many of these networking sites of agricultural producers and like-minded individuals, where information is freely shared and discussed between groups and individuals. This could be a prime setting for sharing risk information with a large share of producers and warrants further investigation.

It is the researcher's recommendation, when sharing a message pertaining to risk management of beef cattle to respondents of this survey, that communicators position their message through one of three channels: magazines (ideally print as it was more frequently selected than online in general preferences), extension publications, or live demonstrations. Communicators also should risk information through other channels before utilizing any of the three least preferred: research journals, podcasts, or DTN machines or similar services.

Message sources for surveyed producers should be one of three: local extension, local cattlemen's associations, or university, as indicated by source preferences for risk information. It is recommended to use other sources before national cattlemen's associations, local breed associations, or government bodies when communicating a message to surveyed beef producers.

Limitations

The researcher has outlined limitations for future researchers who wish to replicate this study or conduct similar research using the RISP model. The researcher was unable to find other studies in animal agriculture communications that used RISP theory and therefore encountered and identified several limitations throughout the duration of the study.

Overall, the greatest limitation was identification of and access to the intended target population of beef cow-calf producers in the Southeast United States. Researchers should arrange sources of respondents and assisting organizations well in advance of opening the survey to ensure adequate time for sources to review and approve the instrument before sharing with

their contacts. Initial contact with sources may also present a temporal challenge and should be started well in advance of anticipated survey launch. The ability to meet face-to-face with several organizations at the 2020 Cattle Industry Convention was extremely beneficial both to the researcher and to the supporting organizations and is suggested for future researchers to meet in-person or over the phone with supporting individuals or organizations.

Consider using other approaches and sources, in addition to cattlemen's associations, veterinarians, and extension, to recruit respondents as well. Some parts of the target population in the Southeast will be extremely hard to reach, such as those who are backyard, hobby producers who do not feel they belong in a cattlemen's association, do not regularly work with their veterinarian, and perhaps in areas with inadequate extension service. Overlap in coverage also is suspected, contributing to the inability to obtain an accurate count of distributed surveys, and an inability to calculate response rates. Producers may be on email lists of more than one organization – for example, a producer may have received the survey link from both their veterinarian as well as through an email blast from their state cattlemen's association.

Consider collecting data on one specific area of the model, such as relevant channel beliefs, rather than a broad range of the model in order to collect more specific results. Narrowing down the research area will allow for more targeted and specific data, providing more significant insight to each section of the model without creating respondent fatigue from an over-lengthy instrument. Though perhaps less contributive to the overall RISP theory, a better understanding of the selected area can be achieved. Several studies on each aspect of the model conducted over an extended period of time and combined to represent the entire model would be intriguing and likely more helpful to overall understanding of risk information seeking and processing in animal agriculture. Previous research and development of the RISP model used

smaller, more in-depth studies on different aspects of the proposed model (Griffin et al., 2004; Kahlor, Dunwoody, Griffin, Neuwirth, & Giese, 2003).

Use agriculture census data or other consistent source to formulate increments for the survey or instrument. In this study, the researcher built the questionnaire response options using both USDA data and personal insight. Analyzing results would have been more straightforward if response options were aligned with a national standard. Because the field of study shifted from prior research, a pilot study is recommended. Future researchers should conduct a pilot study to determine instrument validity and reliability. This study modeled the questionnaire after D'Angelo (2017) and had limited time and finances to perform a pilot study.

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Appendix A - IRB Approval

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Dr. Jason Ellis
Communications and Agricultural Education
301 Umberger Hall

Proposal Number: 10036

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 02/03/2020

RE: Proposal Entitled, "Risk information seeking and processing of beef cow-calf producers in the Southeast United States"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

203 Fairchild Hall, Lower Mezzanine, 1601 Vattier St., Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278
comply@k-state.edu | k-state.edu/comply

Appendix B - Research Instrument

Beef Cattle Management Practices

Start of Block: Consent

Q1 Please read this consent document carefully before you decide to participate in this study.

You are receiving this survey because you have been identified as a potential **cow-calf operator in the southeastern United States.** This survey will take approximately 10-15 minutes to complete. Your participation is completely voluntary. There is no penalty for not participating. You can withdraw from the survey at any time without penalty. All answers are confidential to the extent provided by law. There are no known risks associated with this study.

If you would like to learn more about this study, please contact Rachel Waggie at rwags@ksu.edu. If you have questions about your rights as a research participant, please contact the Kansas State University Research Compliance Office - 203 Fairchild Hall, 1601 Vattier St, Manhattan, KS 66502; 785-532-3224; or comply@ksu.edu. By clicking agree below, you agree that you have read this statement and are aware of your rights.

- ○ I agree (1)
- ○ I do not agree (2)

Skip To: End of Survey If Please read this consent document carefully before you decide to participate in this study. You a... = I do not agree

Page Break

End of Block: Consent

Start of Block: Individual Characteristics

Q2 The following questions will assess your individual characteristics as a beef producer. Please answer as honestly as possible.

Page Break

Q3 How many years of experience do you have in beef cattle production?

- ○ 0-9 (1)
- ○ 10-19 (2)
- ○ 20-29 (3)
- ○ 30-39 (4)
- ○ 40-49 (5)
- ○ 50+ (6)

Q4 What is your position with the cow-calf operation?

- ○ Owner (1)
- ○ Co-owner (2)
- ○ Hired manager (3)
- ○ Employee with management decision responsibilities (4)
- ○ Employee without management decision responsibilities (5)

Page Break

Q5 Are you currently Beef Quality Assurance (BQA) certified?

- ○ Yes (1)
- ○ No (2)

Skip To: Q7 If Are you currently Beef Quality Assurance (BQA) certified? = Yes

Display This Question:

If Are you currently Beef Quality Assurance (BQA) certified? = No

Q6 Have you ever been BQA certified in the past?

- ○ Yes (1)
- ○ No (2)

Q7 In which state is your operation located? If your operation spans more than one state, select the state where you consider your operation to be "headquartered."

- ○ Alabama (1)
- ○ Florida (2)
- ○ Georgia (3)
- ○ Kentucky (4)
- ○ Louisiana (5)
- ○ Mississippi (6)
- ○ North Carolina (7)
- ○ South Carolina (8)
- ○ Tennessee (9)
- ○ Virginia (10)
- ○ West Virginia (11)

Q8 Do you attend educational industry meetings, such as the annual Cattle Industry Convention & NCBA Trade Show, state cattlemen’s gatherings, or regional field days, at least once per year?

- ○ Yes (1)
- ○ No (2)

Page Break

Q9 We will now be moving on to the next section, *Operational Practices.*

Page Break

End of Block: Individual Characteristics

Start of Block: Operational Characteristics

Q10 The following questions will assess the characteristics of the beef operation with which you are associated. Please answer as honestly as possible.

Page Break

Q11 Is your herd individually owned, a partnership, or third-party owned (i.e. a prison farm, university operation)?

- ○ Individual (1)
- ○ Partnership (2)
- ○ Third party (3)

Q12 What type of beef operation(s) do you work with? Select all that apply.

- ☐ Cow-calf (1)
- ☐ Backgrounder (2)
- ☐ Stocker (3)
- ☐ Feedlot (4)
- ☐ Other (please explain) (5) _____

Q13 What type of beef herd(s) do you work with? Select all that apply.

- ☐ Commercial (1)
- ☐ Purebred - nonregistered (2)
- ☐ Purebred - registered (3)

Q14 How many head of cattle do you manage or care for? Cow-calf pairs should be counted as one unit.

- ○ 1-10 (1)
- ○ 11-25 (2)
- ○ 26-50 (3)
- ○ 51-75 (4)
- ○ 76-100 (5)
- ○ 101-299 (6)
- ○ 300+ (7)
- ○ I do not currently own any cattle. (8)

Q15 Do you focus production primarily on maternal or terminal goals in your herd?

- ○ Maternal (1)
- ○ Terminal (2)
- ○ Both (3)

Page Break

Q16 We will now be moving on to the next section, *Communication Practices.*

Page Break

End of Block: Operational Characteristics

Start of Block: Communication Practices

Q17 The following questions will assess your communication practices as they are related to beef cattle production. Please answer as honestly as possible.

Page Break

Q18 Do you currently receive any industry publication(s) or information subscriptions?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Do you currently receive any industry publication(s) or information subscriptions? = Yes

Q19 What publications do you regularly receive, or what information services are you subscribed to?

_____

Display This Question:

If Do you currently receive any industry publication(s) or information subscriptions? = Yes

Q20 Do you pay a fee for any of these subscriptions or services?

- ○ Yes (1)
- ○ No (2)

Q21 How often do you apply ideas/methods you read/hear about from communication you do receive into your operation in a year?

- ○ Never (1)
- ○ Occasionally (2)
- ○ Very often (3)

Page Break

Q22 Do you prefer your *primary* source of information regarding beef cattle to be from a source that is:

- ○ National (1)
- ○ Regional (2)
- ○ Local (3)

Q23 What is your preferred mode to receive information regarding beef cattle? In this case, mode refers to a way of receiving communication.

- ○ Digital media (e-mail newsletters, websites, social media, etc.) (1)
- ○ Print media (2)
- ○ Verbal interaction (extension outreach, industry meetings, etc.) (3)

Q24 How often do you actively seek out management information in a year? Actively seeking is not the same as browsing through communication pieces; to actively seek, you must be searching for information purposefully.

- ○ Never (1)
- ○ Rarely (1-3 times per year) (2)
- ○ Sometimes (4-8 times per year) (3)
- ○ Very often (more than 8 times per year) (4)

Page Break

Q25 Choose up to 3 *channels* through which you prefer to receive information regarding beef cattle. A channel refers to the medium of a message.

- ☐ Print magazine (1)
- ☐ Online magazine (2)
- ☐ Live demonstrations (3)
- ☐ Newsletters (4)
- ☐ Extension publications (5)
- ☐ Research journals (6)
- ☐ Conferences (7)
- ☐ Podcasts (8)
- ☐ Social network channels (Facebook, Twitter, LinkedIn, etc.) (9)
- ☐ YouTube (10)
- ☐ DTN machine or similar service (11)

Q26 Choose up to 3 *sources* from which you prefer to receive information regarding beef cattle. A source refers to the creator of the message.

- [ ] Local extension (1)
- [ ] Trade companies (pharmaceuticals, etc.) (2)
- [ ] Feed dealer (3)
- [ ] Breed association - local (4)
- [ ] Breed association - national (5)
- [ ] University (research/state extension) (6)
- [ ] Other producers (7)
- [ ] Cattlemen's association - local (8)
- [ ] Cattlemen's association - national (9)
- [ ] Veterinarian (10)
- [ ] Industry (LMA, Drovers, BEEF, etc.) (11)
- [ ] Government institution (USDA, FDA, etc.) (12)

Page Break

Q27 As a general rule, the longer a message is, the more accurate it must be.

- ○ Agree (1)
- ○ Disagree (2)

Q28 As a general rule, I am **more** likely to read an article if it includes photographs or illustrations of the topic being discussed.

- ○ Agree (1)
- ○ Disagree (2)

Q29 As a general rule, I am **more** likely to read an article if it includes notable sources or references.

- ○ Agree (1)
- ○ Disagree (2)

Q30 As a general rule, I am **more** likely to read an article if it includes graphs and/or data.

- ○ Agree (1)
- ○ Disagree (2)

Q31 As a general rule, I am **less** likely to read an article if it does not include any visual aids.

- ○ Agree (1)
- ○ Disagree (2)

Page Break

Q32 We will now be moving on to the next section, *Management Practices.*

Page Break

End of Block: Communication Practices

Start of Block: Management Practices

Q33 The following questions will assess the management practices employed on your beef cattle operation. Please answer as honestly as possible.

Page Break

Q34 Do you have access to a working cattle handling facility?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Do you have access to a working cattle handling facility? = Yes

Q35 Do you regularly use the handling facility to work your cattle?

- ○ Yes (1)
- ○ No (2)

Page Break

Q36 Which of the following breeding practices do you implement on your operation? Select all that apply.

- [ ] Artificial insemination (1)
- [ ] Defined breeding season (2)
- [ ] Estrous synchronization (3)
- [ ] Pregnancy checking (4)

Page Break

Q37 Which of the following calf management practices do you implement on your operation? Select all that apply.

- [ ] Castration (1)
- [ ] Creep feeding (2)
- [ ] Dehorning (3)
- [ ] Growth implants (4)
- [ ] Vaccinating once prior to or at weaning (5)
- [ ] Vaccinating more than once prior to or at weaning (6)
- [ ] Weaning on the truck (7)
- [ ] Weaning on the operation less than 45 days (8)
- [ ] 45+ day weaning on your operation (9)
- [ ] Retaining ownership on calves through backgrounding/stocker phase (10)
- [ ] Retaining ownership on calves through feedlot phase (11)

Page Break

Q38 Which of the following general management practices do you implement on your operation? Select all that apply.

- [ ] Individual animal identification (ear tag, tattoo, individual brand) (1)
- [ ] Record keeping (2)
- [ ] Rotational grazing (3)
- [ ] Insurance on herd (4)

Page Break

Q39 Which of the following calf marketing practices do you implement on your operation? Select all that apply.

- [ ] Marketing calves through a value-added program (1)
- [ ] Selling on a cash basis (2)
- [ ] Selling on a contract (futures or forward) (3)

Page Break

Q40 Which of the following health management practices do you implement on your operation? Select all that apply.

- [ ] Parasite control program (1)
- [ ] Regular health checks by a veterinarian (2)

Page Break

Q41 On the table below, indicate which channels you currently use to collect information regarding the management areas indicated to the left. More than one channel can be selected for each area.

	Magazines (1)	Live demonstrations (2)	Newsletters (3)	Extension publications (4)	Research journals (5)	Conferences (6)	Podcasts (7)	Social network channels (8)	DTN machine or similar service (9)	I do not use any channel for this information (10)
Animal health (1)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Breeding management (2)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Calving management (3)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Animal growth (4)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Weaning (5)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Economic (6)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Marketing/selling animals (7)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Page Break

Q42 I could easily impose stricter management practices on my operation.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Q43 If my friend implements a new practice, I am more likely to implement the same practice as well.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Page Break

Q44 We will now be moving on to the next section, *Perceived Risk.*

Page Break

End of Block: Management Practices

Start of Block: Perceived Risk

Q45 The following questions will assess the risk you associate with your beef cattle operation. Please answer as honestly as possible.

In this study, *risk* is defined as the probability of negative effects occurring as a result of herd management practices. For the remainder of this questionnaire, "risk" and "management area/practice" are used interchangeably.

Page Break

Q46 How would you define the overall risk associated with ***your*** beef cattle operation?

- ○ Very high (1)
- ○ Moderately high (2)
- ○ Moderate (3)
- ○ Moderately low (4)
- ○ Very low (5)
- ○ No risk (6)

Q47 On the scale provided, indicate your level of perceived risk for each management area in the beef industry.

	Very high (1)	Moderately high (2)	Moderate (3)	Moderately low (4)	Very low (5)	No risk (6)
Animal health (1)	○	○	○	○	○	○
Breeding management (2)	○	○	○	○	○	○
Calving management (3)	○	○	○	○	○	○
Animal growth (4)	○	○	○	○	○	○
Weaning (5)	○	○	○	○	○	○
Economic (6)	○	○	○	○	○	○
Marketing/selling animals (7)	○	○	○	○	○	○

Page Break

Q48 We will now be moving on to the next section, *Information Sufficiency.*

Page Break

End of Block: Perceived Risk

Start of Block: Information Sufficiency

Q49 The following questions will assess the information sufficiency you associate with beef cattle production risks. Please answer as honestly as possible.

Page Break

Q50 On a scale of 0-100, adjust the slider to indicate the knowledge you ***currently have*** about the risks related to each management area, where 0 means you know nothing, and 100 means you know everything there is to know.

	0 10 20 30 40 50 60 70 80 90 100
Animal health ()	
Breeding management ()	
Calving management ()	
Animal growth ()	
Weaning ()	
Economic ()	
Marketing/selling animals ()	

Page Break

Q51 On a scale of 0-100, adjust the slider to indicate the level of knowledge you ***feel you need*** to effectively deal with the following management risks, where 0 means no knowledge is necessary, and 100 means you need to be an expert in the field.

	0 10 20 30 40 50 60 70 80 90 100
Animal health ()	
Breeding management ()	
Calving management ()	
Animal growth ()	
Weaning ()	
Economic ()	
Marketing/selling animals ()	

Page Break

Q52 Do you believe you *currently* have enough knowledge to efficiently address risks faced by your beef cattle operation?

- Yes (1)
- No (2)

Q53 I know how to find risk management information if I want to.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Page Break

Q54 We will now be moving on to the next and final section, *Demographic/Sociocultural Characteristics.*

Page Break

End of Block: Information Sufficiency

Start of Block: Demographic/Sociocultural Characteristics

Q55 The following questions are standard demographic assessment questions. All responses are anonymous and will remain confidential. Please answer as honestly as possible.

Page Break

Q56 What is your age, in years?

_____

Q57 What is your gender?

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

Q58 With what race(s) do you most identify?

- Caucasian (1)
- African American (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Hispanic/Latino(a) (5)
- Native Hawaiian or Pacific Islander (6)
- Other (7) _____

Q59 What is the highest level of formal education you have completed?

- ○ Some high school (1)
- ○ High school/GED (2)
- ○ Associate's degree (3)
- ○ Trade/technical school (4)
- ○ Bachelor's degree (5)
- ○ Master's degree (6)
- ○ Doctorate degree (7)

Page Break

Q60 Do you have any social media accounts?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Do you have any social media accounts? = Yes

Q61 On which social media platforms do you have an account? Select all that apply.

- ☐ Facebook (1)
- ☐ Twitter (2)
- ☐ Instagram (3)
- ☐ Snapchat (4)
- ☐ Pinterest (5)
- ☐ LinkedIn (6)
- ☐ YouTube (7)
- ☐ Other platform(s) not listed (8)

Page Break

Q62 What is your household's average annual income?

- ○ < $20,000 (1)
- ○ $20,000 - $39,999 (2)
- ○ $40,000 - $59,999 (3)
- ○ $60,000 - $79,999 (4)
- ○ $80,00 - $99,999 (5)
- ○ $100,000+ (6)

Q63 Where does the majority (51+%) of your household income come from?

- ○ Off farm (1)
- ○ On farm - beef cattle (2)
- ○ On farm - other (3)

Page Break