THEMATIC ANALYSIS OF FOOD SAFETY LITERATURE:

THE FDA FOOD CODE AND STATE LEGISLATION

by

Sabrina N. Backlund

Liberty University

A Dissertation Proposal Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

School of Communication and the Arts

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ABSTRACT

One of the most important purposes of communication is to warn people of environmental dangers. More specifically, communication can identify risks associated with food safety. The government and food safety experts are to provide information on these dangers. This study aims to determine whether these entities use consistent language to communicate these dangers. The reader will first take a journey through relevant communication concepts and an introduction to food safety. This qualitative applied communication analysis uses MAXQDA software to ascertain similarities in word choice between the Food and Drug Administration (FDA) food code and state legislative material. This comparison uses terms deemed valuable to food safety in National Restaurant Association (NRA) ServSafe Manager and *Food Safety Culture: Creating a Behavior-Based Food Safety Management System*. The results identify similarities and differences between these documents through the research questions associated with the study and the principles of the two-step flow theory and cybernetics. After the results, the thematic analysis provides a representation of matters identified through the new lens that the results provide. This dissertation concludes by introducing the cascading communication model and its benefits regarding food safety communication.

Key terms: food safety, food safety communication, strategic communication, cascading communication, two-step flow theory, applied communication

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List of Abbreviations

Food and Drug Administration (FDA)

United States Department Of Agriculture (USDA)

Center for Disease and Control (CDC)

Public Health System (PHS)

National Restaurant Association (NRA)

CHAPTER ONE: INTRODUCTION

Overview

The first chapter of this dissertation introduces the topic of communication in food safety. The chapter begins with a story of food safety and the impact food safety protocols can have on the public good. While a fictional account, the story represents how one small error can lead to severe consequences for individuals who may be immunocompromised. The introduction continues with relevant information on the problem and purpose of this research pursuit. The introduction finishes with an overview of the research question of this study and key terms associated with applied communication in food safety.

"When Worlds Collide" - A Food Safety Story

"Sharon, did you pack the volleyball net?" Logan Smith stated, "I cannot wait to let loose and relax; it has been three years since we have been able to go to the beach house. Sharon added, "The last time we went was the first year I went undefeated in the volleyball tournament. Are you sure you want me to pack the net?" Logan scoffed at the idea, "Of course, I've got to reclaim my crown!"

Sharon and Logan heard a loud grumbling in the car a few hours down the road. Logan and Sharon made eye contact. Logan affirmed, "I don't know whose stomach is sending out cues that we need lunch, but the gas tank agrees." Sharon asked, "Are we close?" Logan explained, "We are about 15 minutes away; do you want to stop now or wait to go to our favorite spot?" Sharon answered, "Of course, I want to go to our favorite spot! You know we will wait longer at any other place. We are in and out quickly at our favorite spot, plus the food is so good!"

Inside the restaurant, one of the restaurant workers, Tony, was communicating with one of his co-workers. "I can help you with that!" The co-worker exclaimed, "It's raw!" Tony said,

“It’s ok. I’ll change my gloves.” The coworker answered, “Thanks for your help!” Tony explained to another co-worker, “Don’t worry, I will wrap those sandwiches in just a second! I won’t let you down.”

Sharon asked one of the individuals in the drive-thru, “What makes you all so good? You have tasty food, and we always get through so quickly!” The manager explained, “We are very specific in our hiring processes. That makes the biggest difference!” “You guys are great! See!” Sharon exclaimed, “That only took five minutes!” “Listen,” Logan explained. “I never doubted you. I love that place, too. The chicken sandwich is way better than any other place. Now take a nap. We’ve only got a couple of hours to go!

As Logan and Sharon arrived at the beach house, Logan couldn’t help but wake up his bride, “Babe, look at this view. It’s been so long since we’ve been here. I forgot how beautiful it is here.” Sharon responded, “You’re right, and I can’t wait to see everyone. Mom and Dad will be here in the morning. I think everyone else will be here tomorrow night.” Logan asked, “So we get the night all to ourselves?” Sharon responded, “That’s right. Just you and me.”

“Mom!” Sharon shrieked with excitement. “I’ve missed your hugs, and you look great!” Sharon’s Dad remarked, “What am I, chopped liver?” Sharon laughed, “Of course, I love you too, Dad! Everyone else should be here this afternoon, and volleyball is calling my name.” Logan remarked, “Come in, and I’ll get you all a drink and a snack.” Sharon’s dad responded, “I knew you picked a good one, Sharon.”

As the afternoon crept in, Sharon explained, “I’m not feeling great. I’m going to lie down while we wait for everyone else to arrive.” A few hours later, Logan checked on Sharon, “Hey babe, I just wanted to make sure I couldn’t get you anything. Your sister should be here in the

next 15 minutes." Sharon responded, "Logan, my stomach is bothering me. I want to lay down and rest." Logan agreed, "Yeah, I will lie with you. I'm not feeling great either."

Sharon's mother, Betty, came to check on the two a few hours later, asking, "Are you two feeling any better? We are about to eat dinner." Logan responded, "I've got an upset stomach, but I'm concerned about Sharon. I think we might need to take her to the Emergency Room (ER) for fluids. She's not doing well." Sharon stated, "I'll be ok. I need to rest." Betty remarked, "I'll get the keys. Let's try to stay ahead of this."

Only 15 minutes into the ER trip, the nurse remarked, "It's good that you all brought her in. She lost a lot of fluids, and she's immunocompromised. You did the right thing. We will get her hooked to an IV and have a doctor assess her as soon as possible." Logan looked at Sharon. "See, babe. They are going to take care of you. Everything is going to be fine." Sharon replied, "I'm so scared, Logan. What did I do wrong?" Sharon fell asleep. Logan asked the nurse, "What can I do to help?" The nurse replied, "We need to monitor her at this point. The doctor is on his way now.

The ER Doctor assessed Sharon's condition, "Unfortunately, we will have to admit her to the hospital immediately. She is not responding to the fluids, and her kidneys are taking the brunt of this sickness. It's early, but it could be a foodborne illness. Logan, can you prepare a list of the places she's eaten over the past week? We need to be able to track how this is affecting other people, as well. We will keep her as comfortable as possible, but you all must prepare for the worst with her underlying illness. I am so sorry; I wish we could do more."

Logan and Betty held Sharon's hands on the journey to the Intensive Care Unit (ICU) hospital room. Logan remarked, "I hope she knows we are here." Betty remarked, "Me, too. I let everyone at the house know what we are dealing with." Logan responded, "Thank you, I thought

we were being careful, I did." Betty answered, "I know, Logan. I know you were taking care of my baby." As Sharon's family surrounded her in the hospital room, Logan cried, "God, please don't take Sharon from me!" Unfortunately, Sharon succumbed to the illness.

Vacation is a time that many use to let loose and relax. It is an opportunity to create precious memories with family. One family, the Smiths, were excited to go on vacation after the pandemic had hampered their plans for several of the preceding years. Finally, the Smith family could travel to the coast for their annual beach trip. The three-hour drive to the beach always included one stop, and as lunchtime was approaching, the Smiths decided to stop and fill their gas tank and grab lunch. For many families, agreeing on one restaurant that everyone will enjoy can be difficult, but luckily, everyone decided to go through the drive-thru of their favorite restaurant. This restaurant was known for the quick production of food and popular menu items.

Another aspect, this restaurant was well known for its specific hiring practices. The entire company was known for selectively hiring people with a passion for serving the community in which they live and engaging individuals interested in more than just earning a paycheck. The hiring process selected Tony as one of these individuals. Tony found satisfaction in going the extra mile to help guests and serve his team. This satisfaction was also rooted in his ability to provide for his family through demanding work and determination. Tony's achievements earned him two years of experience at the restaurant, and his performance propelled him to be one of the fastest workers in the kitchen. Tony's passion for providing for his family helped him strive for his best every shift.

One of Tony's shifts was during the time of the Smith's visit for lunch. Specifically, on this day, Tony was using his skills to produce food quickly for customers while also assisting his team. To help one of his coworkers, Tony moved a container of raw chicken and placed the

container on the appropriate shelf. Afterward, Tony removed his gloves and changed into a clean pair before returning to the assigned station. Tony assumed these behaviors would prevent the contamination of any ready-to-eat food he was preparing. Unfortunately, Tony continued producing fast and quality food, but sadly it was missing the safe component. During Tony's shift, he prepared food for the Smith family and hundreds of other customers.

The Smith family and Tony were unaware of their exposure to a foodborne pathogen. Unfortunately, foodborne pathogens can infect food without changing its appearance, taste, or smell. Eventually, the exposure to foodborne pathogens became evident through symptoms of a foodborne illness. The most common symptoms present themselves, like a stomach bug with vomiting and diarrhea. However, individuals that are considered immunocompromised often exhibit more severe symptoms.

Unfortunately, Sharon Smith was immunocompromised, making her more susceptible to becoming sick from illnesses that may not significantly affect others. Around 24 hours after eating at the restaurant, Sharon became violently ill. The other members of the family experienced mild symptoms but eventually recovered. However, Sharon was not as lucky. She was hospitalized but never recovered. Sharon died surrounded by her family in a hospital bed. The Smiths, crushed by the death of Sharon, seek answers. What happened? How could such a wonderful trip turn into their worst nightmare? Tony's lack of proper hygiene exposed the Smith family to a foodborne pathogen. He unknowingly contaminated their food.

Tony meant no ill will towards anyone; he was merely trying to prepare food quickly for the customers. He prepared food for this family, utterly unaware that Sharon was immunocompromised. However, in his desire to produce food efficiently, he gained responsibility for the death of an individual. The demand for efficiency in the quick-service

industry leaves little room for tactics such as handwashing. For example, handwashing seems simple, but it can seem like an irrational, time-consuming step in the quick-service industry. How can this mindset be changed? How could communication have better prevented this instance? How can the language used in food safety education become more sustainable and embedded in the culture of the quick-service industry? After all, eating is necessary for survival.

Food and Our Need for Survival

While food intake and how it necessitates survival developed from a basic concept, communication has similarly developed from a basic idea. Ong (2002) states that experts can trace all communication to a simple oral basis. However, written communication is a recent development considering the entire length of human history. He states that historians can only trace literacy back 6,000 years. At the same time, this is a massive amount of time compared to one's lifetime.

Interestingly, this lengthy development in communication through technology happens through sociological phenomenon (Ellul, 1964). Likewise, many are unaware of the discourse caused by developments in communication through technology as it is merely a component of their being. Ong (2002) identifies that the lengthy evolution of written communication and literacy has made the developed world dependent on this type of communication as a component of one's being.

The dependency created by this type of communication is not all negative. One development of technology that benefits communication is the permanency that written communication provides (McLuhan, 1999). The permanency of written communication is particularly important when discussing food safety, as it is essential to track, monitor, and build from knowledge as the supply chain is quickly changing. Written communication holds the key

to ensuring clarity within these processes. There needs to be more than oral tradition, as with many aspects of life, to sustain the rapidly developing concept of food safety.

Development in technology and the global supply chain do not change the fact that food is necessary. As simple as it may sound, humans, require nourishment to survive. Many Americans have access to food at home but seeking food sources outside the home is becoming a popular option for many. Food sources outside the home encompass avenues like restaurants, including the developing delivery option. Unknowingly many foodborne pathogens can be present no matter how one is sourcing their next meal. While fully prepped food is becoming increasingly popular, it goes through an extensive process to arrive safely on a plate before them. Communication helps prevent consumers from encountering foodborne illnesses regardless of how individuals receive food. Food systems are a massive component of successfully ensuring food's safe arrival, no matter the method.

The purpose of a food system is to transfer products from a raw state to a platform where the public can access them. This process has grown to be highly complicated, and one component that complicates the process is the need for food safety. The obligation to communicate food safety within food system components becomes increasingly complex. As a food system becomes increasingly complicated, foodborne diseases become more prevalent (Yiannas, 2009). He found that regulatory inspections and training are resources used to combat foodborne illnesses and are also advancing. These tools have helped make those involved in the food system more knowledgeable about the dangers they encounter. However, the communication factor often lacks clarity in explaining the dangers. One of the problems communicating about food safety is finding ways in which people with diverse backgrounds can

all understand the same information. Mass communication often makes it difficult to reach people with different language skills and diverse backgrounds.

The Issue of Food Safety

This study seeks to fill the gaps in understanding the value of applied communication in preventing foodborne illness in the food service industry. Often confronted with food safety, laypeople automatically think of the regulatory agencies responsible for monitoring establishments. However, food safety reaches much further into the industry.

Regulatory agencies and food safety legislation play a massive part in defining safe food practices. Unfortunately, their tactics often miss the opportunity to capitalize on improving the culture of food service and production establishments. Regulatory agencies gather a snapshot of an entity at any given time but cannot determine the food safety culture. One explanation for this phenomenon is that many inspections communicate qualitative measurements instead of quantitative measurements. The inspector is often required to make a judgment call based on the mass communication created by regulatory agencies. This uncertainty leads to inconsistencies in how one inspector executes a visit compared to others. Inconsistencies in food safety regulations offer little encouragement to the public regarding the safety of the food they consume. The next level of defense is the education provided by each establishment to educate employees about safe food handling practices. This study seeks to identify applied communication methods to assist industry professionals in reducing the risk of foodborne illness outbreaks.

The tools that establishments currently utilize have yet to provide the perfect solution. Yiannas (2009) states that the success of food safety in retail establishments relies heavily on going beyond traditional training, testing, and inspectional approaches to managing risks. Governing agency’s structure testing and inspection, but food safety education is often specific

to an industry or company. Dissonance exists with the mass communication used by inspectors and industry professionals. This dissonance complicates the need for consistent communication about food safety. However, to better understand the complicated nature, it is essential to understand the importance of communication in food safety education. With changes in communication about food safety, we can share knowledge and make it more transferable.

One of the critical concepts for communication in food safety is the necessity for a diverse set of tools. A diverse group of communication skills benefits organizations as they encounter complicated issues (Coffelt et al., 2019). For example, rhetorical questioning helps leaders understand where employees stand regarding identifying food safety concepts (Fiol, 2002). Communication creates room for growth in the ever-changing world of food safety and is a device for change management (Harkness, 2000). Diversity and versatility in communication will help organizations make a food system less likely to produce unsafe food.

However, the quick-service industry magnifies the importance of diversity, versatility, and pressure to produce food as quickly and efficiently as possible exacerbates these components. Making food at a pace acceptable for the public fosters techniques that drive production speed and aims to discredit processes that act as a barrier. The desire for rapid production creates additional challenges for training food safety, specifically regarding maintaining habits aimed at battling foodborne illnesses. Often steps in the food safety process generate the need for what many view as irrational, especially in comparison to the demand for speed and efficiency. Researchers need help naming a sustainable training method that is transferable across all industries. For restaurants specifically, research on hospitality employee attitudes and attributes of their dispositions would be fruitful (Mathe, 2012). Likewise, Barret and Feng (2019) could not create full sustainability in any training programs they studied.

The ever-changing component of food safety challenges the quick-service industry in many ways. For example, the publicity surrounding recent foodborne illness outbreaks has increased the focus on food safety among food handlers (Johnson et al., 2003). Rationality is a common theme for business owners, as financial rationality is critical (Mathe, 2012). For employees, rationality is essential in producing food. However, the public's demand for fast production from quick-service restaurants can cause some food service employees to place minimal emphasis on food safety (Roseman et al., 2017). However, a food establishment's culture can influence food safety's importance by increasing motivational components (de Andrade et al., 2019).

Long-term and short-term training significantly increases the likelihood of habit formation, but unfortunately, gaps are still apparent (Sanlier et al., 2020). Participants tend to revert to bad behaviors even with a curriculum that teaches and examines correct behaviors. (Diplock et al., 2018). The likelihood of reverting to bad behaviors suggests that researchers must establish techniques to help organizations maintain a food safety culture. Elobeid et al. (2019) state that the food service industry needs food training programs that all entities have the resources to support. Researchers desire to make food safety a vocation of routine and habit (Diplock et al., 2018). To accomplish this, managers must combine the food service community's values and culture with communication techniques that aim to produce safe food (Elobeid et al., 2019). Ongoing training and reinforcement of communication are necessary to ensure food safety remains a vital component of culture, especially in the battle to maintain food safety as a priority compared to other dynamics such as speed.

Literature regarding food safety and foodborne pathogens begs for collaboration and consistency in legal development. Managers need to collaborate with food service workers.

Regulatory agencies must collaborate with those in the food production and service industries. Those in education need to collaborate with experts in food safety. Lastly, communication professionals must partner with these entities to develop more consistent messaging for the mass communication that reaches these audiences. Dissonance in food safety increases the likelihood that more individuals will encounter unsafe food and that food safety professionals will better understand the value of applied communication in preventing foodborne illness.

The Problem This Study Will Investigate

The dissonance created by food safety is not a discovery. Food safety communication was a problem in the past and still haunts us today. Continuous changes in components such as the supply chain will continue to create new challenges in communicating about food-safe preparation and production (Detwiler, 2020). He points out that while we continue to learn from past outbreaks, such as the 1993 E. Coli outbreak at "Jack in the Box," the food service industry provides evidence that ensuring food safety is still unknown. One common issue is the diversity that exists within food safety language. For example, globalization creates complexity that has not always existed with food or its communication aspects (Ghonkrokta, 2017). He argues that the complex nature of food safety is begging all facets of the industry to come together to create a sense of continuity, especially in communication. Ghonkrokta states that with increased awareness of producing food effectively and efficiently, the trajectory for safe production is only sometimes a consideration. For example, if Tony had been more focused, knowledgeable, and concerned with food safety, he could have prevented a tragedy. The author maintains that professionals need opportunities to increase safe practices through communication and culture. More standardized applied communication in food safety can help increase safer practices and decrease the likelihood of foodborne illness.

One area that can help in this standardization of processes is breaking down barriers. King et al. (2017) state that practices that enable safe food production must provide minimal barriers to the rate of production. Besides the moral implications of making food that is not safe are the economic implications. They mention that there is often a gap in understanding food safety concepts. For example, they explain the difference between the concepts of hazard and risk. Food safety is a significant concern in the food service industry because it is only sometimes a priority for entities operating in the food service industry. Better applied communication regarding the dangers of food safety can ensure it becomes a central concept in production and reduce the likeliness of illness or injury associated with unsafe food.

The Purpose of This Study

This qualitative applied communication thematic analysis aims to understand the uniformity of language associated with food safety used by food regulatory agencies and educational entities in the United States. The language used by regulatory agencies identifies the potential dangers through specific food safety terminology. The researcher will use guidance from Katz and Lazarsfeld's two-step flow theory to study the language and terminology. The two-step flow theory provides a means of analysis by emphasizing how the public is informed through mass communication. The two-step flow theory includes insight into the communication used to identify and describe dangers in food safety. Focusing on the language used to project importance in communication by food regulatory agencies and educational entities, food safety professionals can better understand the appropriate language to prevent severe threats from unsafe food.

Food safety is a poorly defined concept, even in the food service industry. Furthermore, although necessary, the terms foodborne illness and foodborne pathogen are not easily

interpreted. However, foodborne illness is not something anyone ever wants to experience. Nevertheless, most people will encounter unsafe food throughout their lifetime. It is essential to establish better ways to communicate about dangers, hazards, and instances of the potential for foodborne illness. A better understanding of food safety gives everyone better tools to protect themselves and those around them.

One of the tools is language. Language has a way of connecting or distancing people. We form a connection when we understand a word or concept similarly. When our experience is different, it creates detachment and misunderstanding. However, professionals and researchers aim to make this detachment and misunderstanding less common. Botan (2021) describes the concept of strategic communication, which intends not just to make organizations effective, but society. To be successful in the use of communication Holtzhausen (2021) implies that it be purposeful and planned for the audience interaction through different forms of media while also including other applied communication techniques (Holtzhausen, 2021). Within the consideration of communication techniques, meaning is essential.

Nickerson and Goby (2018) mention that the creation of effective meaning originates when individuals aim to achieve a goal. Whether through definition or perception, the meaning behind words shapes our reality of any situation. For example, safe food differs depending on a person's current condition. In the developed world, we are highly selective in the food we eat and consider safe. However, accessibility is the most crucial concept regarding food in undeveloped areas. Safety is an individual's last concept when considering food accessibility scenarios. When people are starving, they are more likely to exhibit risky behaviors and encounter compromised food. Language is used more as a reference for accessibility than as a tool for recognizing unsafe food.

In many unsafe aspects of life, individuals can avoid the circumstances deemed unsafe, but the nourishment required from food makes interaction with it unavoidable. Dangerous food continues to affect individuals across the globe. Communication is a valuable tool to help individuals identify hazardous foods, but an established, easily recognizable communication tool must be established to identify food safety hazards. Communication needs to involve a semiotic community between sender and receiver (Rogala & Białowąs, 2016). The authors describe that this relationship involves the interaction of the same symbols and signs. Adding meaningful communication in a food service environment will help employees identify critical control points (CCPs), and the research conducted through a qualitative perspective provides the ability to interpret and gain meaning from data collection. Adding the two-step flow theory with the data collection provides further dissection of communication involved in food safety.

Conceptual and Theoretical Framework

The two-step flow theory is the conventional means of the theoretical framework for this study on communication in food safety. The two-step flow theory is a product of Elihu Katz and Paul F. Lazarsfeld. These scholars created the theory by studying the effectiveness of mass media campaigns (Katz & Lazarsfeld, 2006). More specifically, the authors researched how and under what conditions mass media influences opinions and attitudes. The two-step flow theory introduces the concept that meaning transferred from mass communication often occurs through the means of an opinion leader (Uzunoğlu & Misci Kip, 2014). Therefore, this theory in this study requires knowledge of mass communication outlets and audiences. The authors indicate that opinion leaders are the intercessors of messaging indicated by mass communication. In other words, the opinion leader links the communication and the person influenced (Howitt, 1982). This process implies that the mass media influence the opinion leader, who then influences

others (Howitt, 1982). Katz and Lazarsfeld add that interpersonal relationships are essential in how mass communication messaging reaches an audience. Howitt expresses that some individuals are more likely to become early adopters who can influence others to make similar decisions.

The idea that some individuals are more likely to become early adopters changes how professionals develop applied communication. This is because it is essential to look at message perception differently to descend into the variability of how a message is perceived. For example, Daly and Davy (2016) studied entrepreneurial pitches and pointed out that tonal pitch provides influence through verbal content and substance. Tonal pitch is translatable to food safety through readers' investment and willingness to create safe food. The authors state that it is essential to trust reliability and validity and to transform one's technical knowledge into a relevant language regardless of the receiver's knowledge base. Therefore, it is vital for someone reading literature on food safety to trust that the source is knowledgeable about food safety but can understand the content regardless of their knowledge or experience. Someone creating a message can effectively present their food safety knowledge by paying close attention to their desired audience.

The two-step flow theory helps those creating literature establish boundaries for more straightforward and consistent yet trustworthy explanations of associated dangers in food safety. Creswell and Poth (2018) describe the importance of boundaries by expressing that they provide deeper insight for researchers and more distinct conclusions. The authors further describe that these conclusions developed from well-established boundaries create a more significant opportunity to find relationship patterns in data. These factors helped establish a foundation for the method and design of this study. More specifically, how thematic analysis of food safety

literature through cybernetics, focusing on two-step flow theory, is a great fit. This thematic analysis provided a thorough dissection of food safety literature to understand commonalities, differences, and emerging themes.

This study provides information on the overall complexity of relevant applied communication based on food. Coding such as word count, average word length, similarities and differences in word usage, and visual aesthetics provides insight into themes in each document—similarities and differences between documents provide information on whether themes are present in this food safety literature. Katz and Lazarsfeld (2006) discuss how exposure, medium, content, and predispositions are intervening variables in how a message is perceived. The authors add that when these factors come together successfully, they create a message that is positively reinforced and effective.

The coding of similarities considered any words used between different utterances and documents of food safety literature. Similarities in communication are more likely to elicit a different response from the receiver of the message. The study of communication begins with the sender-message-receiver (SMR) communication model, which explains communication as a transmission captured into a code that passes through a channel to a receiver (Daylight, 2017). The author describes that the next step involves the receiver unpacking the information. This process aims for the receiver to unpack the same information first captured into code. Just with any means of communication, these principles are valid in the food safety language. This model further explains how an opinion leader forms meaning from communication.

Guiding Research Questions

The following research questions guided this qualitative applied thematic analysis with this introduction in mind.

RQ1. How do communication strategies differ between the FDA food code and state legislative material?

Similar communication strategies improve the likelihood of obtaining similar meanings through messaging, especially when considering the influence of an opinion leader. Different communication strategies can create dissonance in understanding the principles represented in a passage. Communication strategy does not alone determine whether meaning transfers through the presentation of information. Another factor is introduced by technological advancements and how they change how information influences messaging (Katz, 1987). Knowing whether different strategies create better outcomes when addressing different audiences is essential.

While a complete understanding of how each communication strategy benefits each audience is desirable, learning the techniques used by different agencies to address overall similarities and differences is helpful. Overall, similarities can provide evidence of whether one strategy can benefit an audience over a different one. One can identify dissonance between the agency and the FDA food code by studying communication strategies and their differences. It is also essential to determine how communication strategies differ between state legislative material from one state to another to learn about the benefits and disadvantages.

RQ2. Why is communication different between the FDA food code and state legislative material?

This question explains why this study is taking place. Looking at these different documents, one can notice differences in communication. However, further analysis is required

to understand why. Understanding why communication differs between the FDA food code and state legislative material is essential to determine what each entity is trying to accomplish through releasing information. Identifying why communication is different between the FDA food code and state legislative material is crucial because it could help explain why differences exist between the different entities and why their understandings of what is vital regarding food safety differ.

Understanding why communication differs from understanding how the anticipated audience perceives a message is essential. Answering this question could help researchers understand why different components of food safety education pass through various levels of communication. These factors are crucial in communication and in this study of communication about food safety. The researcher hopes to understand what components are missing by answering this question.

RQ3. What does consistency or inconsistency in communication themes mean for industries held to these standards?

Identifying consistency or inconsistency in communication themes for industries held to these standards is crucial because this provides insight into whether one benefits from strategies used while another does not. Answering this question will help identify themes of whether agencies hold one industry to higher standards versus another. Consistency or inconsistency within the communication themes can help identify whether specific industries have a more remarkable ability to meet standards set by the FDA food code and state legislative agencies while others do not. As consistencies or inconsistencies become apparent, it provides a lens for professionals to see where improvements can occur within their industry.

When these areas of opportunity appear, one will likely learn ways food safety procedures and education can improve. Another thing to learn from answering this question is how to hold different industries to the same standards regardless of what part of the food process they take part in or how much money they can budget toward safety education. Regarding food safety, companies within the same industry should receive incentives for sharing tactics they have found valuable to safeguard the public. It would be much more beneficial for the public to incentivize sharing knowledge than it would be to lose another life to something entirely preventable.

RQ4. What communication strategies can regulatory and inspection agencies use to identify food safety dangers?

Recognizing communication strategies used by regulatory and inspection agencies to identify food safety dangers is essential. After identifying beneficial strategies to identify food safety dangers, it is important to determine whether regulatory and inspection agencies use similar measures. Identifying beneficial strategies is essential because it helps collect information on the most effective tactics. While the most effective benefits may not appear, they can provide insight into what has yet to prove effective.

Whether the measures are similar or not, the ineffective ones must be discovered and made transparent so that improvements are possible. We are still learning about food safety, and the identification of measures that are not effective is recognizable in most cases. These improvements are possible. By studying the communication strategies of regulatory and inspection agencies, one can gain insight into what standards industries observe and how this information can help identify food safety dangers.

Definitions and Key Terms

Cascading communication - the breakdown of language to increase understanding across. various levels.

Center for Disease Control (CDC) – one government agency that has considerable influence regarding the prevention and response to foodborne illness.

Computer Assisted Qualitative Data Analysis Software (CAQDAS) – software program that collects and analyzes qualitative data (Punch, 2014).

Crisis communication – provides an avenue for response and perception after or in preparation for an emergency (Lastres et al., 2019).

Critical control points (CCPs) – the potentially dangerous portions in the food processing and production process (Oyarzabal and Rowe, 2017).

Cybernetics – Craig's tradition of communication theory describes the interaction of multifaceted systems and the interactions (Littlejohn et al., 2017).

Environment Assessment Training Series (EATS) - an in-depth training opportunity composed of foundational skills, skill-building, and benefits that enables inspectors to develop skills to provide valuable feedback to retail food establishments (Coleman & Brown, 2018).

E. Coli (STEC) – The foodborne pathogen known as Shiga toxin-producing Escherichia coli, which is associated with beef and produce (Detwiler, 2020).

FDA food code - a document created by many individuals, groups, and organizations to guide the production of safe and genuinely prepared food (Yiannas, 2009).

Food safety is the behavior associated with a food system that ensures safe management and minimizes foodborne illness (Yiannas, 2009).

Food safety culture - a behavior-based food safety program (Yiannas, 2009).

Food safety literature – FDA food code and state legislation

Food Safety Modernization Act of 2012 **-** a product of focused attention on preventing foodborne illness, especially from fresh fruits and vegetables, that provided more authority to the FDA, such as mandatory recall, detention of food, controls over food facilities, and increased domestic and foreign food facilities. It also encourages the FDA to introduce new and enhanced food safety controls for food facilities and fresh produce farms (Humphrey, 2012).

Foodborne illness is a disease caused by food (Yiannas, 2009).

foodborne illness outbreak **-** when multiple people have consumed contaminated food **(**Hedberg et al., 2013).

Foodborne pathogen – a disease-causing organism present in food (Blackburn & McClure, 2009).

Global Food Safety Initiative (GFSI) – provides guidance on how to manage food safety systems (Shinbaum et al., 2016).

Hazard Analysis Critical Control Point – the identification and solution to turn potentially dangerous portions of the food preparation process into unhazardous steps (Oyarzabal and Rowe, 2017).

High-risk food practices **-** hand hygiene, temperature controls, personal hygiene, cleaning and sanitizing, and cross-contamination- likely to result in food safety issues (Reynolds and Dolasinski, 2019).

Immunocompromised – an individual with an impaired immune system.

MAXQDA software – a software package that allows researchers to import and organize keywords while automatically coding them (VERBI GmbH, 2022).

Organizational Communication – communication such as messages created, delivered, and received by individuals involved in a multifaceted network of connections that utilizes context to get information to employees and consumers communication within an organization (Wang et al., 2019).

pathogen-annotated tracking resource network (PATRN) **-** a connected system investigating foodborne diseases globally (Gopinath et al., 2013).

Polysemy **-** when one term has multiple meanings (Symonds et al., 2014).

postmanagement – allowing the government to identify the cause of an outbreak and hold responsible parties accountable (Park et al., 2020).

Pure Food and Drug Act of 1906 – what most consider initial legislation regarding food safety in the United States after unsanitary conditions were made clear by the author Upton Sinclair. (Manion, 2012) implementing strategies to ban the manufacture, sale, or transportation of adulterated, misbranded, poisonous, or deleterious foods, drugs, medicines, and liquors (Detwiler, 2020).

quick-service industry – the portion of the food service industry that focuses on speed of operation often over other factors

ready-to-eat food – food that will not undergo any further cooking process before it is served (Levine et al., 2017).

Regulatory agency – state entities responsible for administering the adopted version of the food code.

Semiotic Tradition – the tradition of communication that embodies the idea of communication as a process that must have shared meaning through signs and that the meaning comes from an individual instead of words or symbols (Rogala and Białowąs, 2016).

Sender-message-receiver (SMR) communication **-** a transmission captured into a code that passes through a channel to a receiver (Daylight, 2017).

SERVSAFE – an educational curriculum produced by the National Restaurant Association for educating food service workers.

Strategic communication – "Strategic communication is a form of focused communication created with the desire to reach a specific audience to attain a particular goal (Holtzhausen, 2021).

State legislative material – legal documentation of state regulation and expectations regarding the safe handling of food.

synonymy – when two or more terms with the same meaning (Symonds et al., 2014).

Syntagmatic **-** when words co-exist outside of chance (Symonds et al., 2014).

Two-step flow theory – this includes the opinion leader as a link between the communication and the person influenced. This process implies that the mass media influence the opinion leader, who then influences others (Howitt, 1982).

U.S. Department of Agricultures Food Safety and Inspection Service (FSIS) the regulatory agency responsible for investigating foodborne illness outbreaks with federal, state, and local public health officials (Robertson et al., 2016).

United States Food and Drug Administration (FDA) – initially established by the Pure Food and Drug Act of 1906for implementing strategies to ban the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors (Detwiler, 2020).

Summary

This chapter introduced the developing concept of communication in food safety. The chapter includes the story of a death that was preventable. The first chapter briefly describes food safety, the problem, the purpose of the study, and the conceptual and theoretical framework. The following chapter will provide a lens through literature pertinent to identifying where these fields currently stand. The remaining chapters will include a discussion of the method, a presentation of the findings, and a discussion.

CHAPTER TWO: LITERATURE REVIEW

Overview

Chapter two of this dissertation includes a review of relevant literature. This thematic analysis aims to provide an opportunity to better understand the communication used by food safety regulatory agencies in the United States. The literature review will begin with a discussion of foundational principles of communication, including dimensions, and purpose of theory, traditions of communication, cybernetic tradition, semiotic tradition, organizational communication, strategic communication, crisis communication, and risk communication. Next, the literature review will include a discussion of the theoretical framework: the two-step flow theory. Lastly, Chapter two will discuss food accessibility, foodborne illness, defining food safety, beneficial concepts in food safety, and government involvement.

Foundational Principles of Communication

In the traditional sense, many define communication as a face-to-face conversation, a text, or even a phone call. However, communication transitioned from how it was initially transmitted (Ong, 2002). He states that communication between humans began as an oral tradition and describes that as some languages developed, the need for different forms of transmission became evident. Many aspects of life today would only be possible with various transmission conditions. For example, the author states that printed language creates a means by which space acts as a vessel for spoken word.

Regardless of the change in transmission communication, they are all affected by philosophy through technological developments (Ellul, 1964). Most of these changes one can relate to through historical events, but it is difficult within the middle to notice the changes. McLuhan (1999) describes that the changes in technology coincide so closely with changes in

society that sometimes it is difficult to recognize any differences. The different forms of transmission in the present can entice one to understand the essential communication components. As Rogala and Białowąs (2016) describe, communication is necessary for societies' existence and human activity. They define communication as of fundamental importance regarding the efficiency of a working world. This is the definition that defines communication within this study.

Now, what does communication entail? Sebeok (1991) breaks communication down to its fundamental purpose and defines communication as one of the most basic forms of transmitting influence from one part of a living system to another aspect, thus producing change. However, even in this intentionally basic form, communication is overly complex. Littlejohn et al. (2017) add that communication is essential to life but that humans have historically used communication differently from other species.

For example, modeling is a distinct ability innate to the human species, and it can be described as the structures created to represent objects (Sebeok & Danesi, 2000). Communication utilizing human modeling can be described through semiotics. Semiotics research defines these structures as signs, texts, codes, and figural assemblages (Sebeok & Danesi, 2000). In other words, humans represent the world through these structures and confirm that one of the purposes of models is to define patterns in human life. The current study aims to establish how themes help individuals understand descriptions of the dangers related to food safety. Sebeok and Danesi found that the conceptualization of these models relies heavily on psychological and social factors regardless of the context.

Models are also used to describe and visually represent ideas in communication. Bergman et al. (2020) explain that models play an essential role in enabling researchers to study

communication. The authors add that models provide a visual representation of developments in the study of communication. Bergman et al. (2020) add that models provide a practical way for researchers to represent information and findings. Models provide an excellent resource for comparing communication research. For example, models allow researchers to show why more complex forms of communication are better represented through different systems. Historically, models of communication have provided an arena for communication theorists to stretch, and they will continue to provide new dimensions for future studies.

Dimensions and Purpose of Theory

While communication is a complicated concept, a theory is also difficult to define. Some describe theory simply as a way of capturing reality (Littlejohn et al., 2017). The authors add that others may use theory to categorize one's observations. Littlejohn et al. identity theory through a set of dimensions to assist with understanding theory. The authors identify these dimensions as philosophical assumptions, concepts, explanations, and principles. In fact, they state that most theories of value include each of these dimensions. Littlejohn et al. (2017) prescribe that a theory representing an aspect of communication should be assessed on its usefulness instead of its truthfulness. Theory in qualitative research helps shape research questions by allowing the examination of data through a theoretical lens (Creswell & Creswell, 2020). During analysis, the researcher uses the theoretical lens to identify emerging themes.

Traditions of Communication

While the foundation concepts of communication cover an enormous spectrum, Robert Craig organized concepts by categorizing them into different traditions (Craig, 1999). Craig's seven traditions are semiotic, phenomenological, cybernetic, sociopsychological, sociocultural, the critical, and rhetorical. Craig remark that these traditions allow a different perspective on

communication theory. He remarks that while these traditions offer different perspectives, they naturally overlap and allow for the greater ability to define the complicated concept of communication theory.

Cybernetic Tradition

One of the traditions Littlejohn et al. (2017) mentions is the cybernetic tradition. The authors explain that the cybernetic tradition aims to describe physical, biological, social, and behavioral systems that work and influence one another. Craig (1999) explains that cybernetics aims to explain and allow exploration of the complexity communication represents. They include the concept that systems are the central factor of this tradition. Systems are essential to creating safe interactions with food. It is essential to understand how a system functions and how two or more systems interact (Littlejohn et al., 2017). Many different systems interact in the realm of food service and production. The authors describe that cybernetic tradition seeks to address the complexity of making systems more effective and efficient. The authors suggest that the cybernetic tradition aims to explain how policy statements and regulations work together in a network to motivate action.

Cybernetics is a product of the technological advancements that followed the Second World War (Swann, 2020). The author explains that the rapid introduction of different technology, specifically regarding communication, created an immediate need to understand each system and how other systems interact. He states that one of the most important factors is understanding how systems act as one and together as a whole. Swann (2020) brings one's attention to how cybernetics has roots in ancient Athens and the comparison of governance and a ship's steering. Swann (2020) adds that the word itself finds reference to the kybernetes, which describes the act of piloting or steering. He also references how the cybernetics tradition aims

content towards a common goal. However, technology complicates matters from how the term originated.

The introduction of internet communication into the tradition of cybernetics creates the opportunity to study many interacting networks. Internet communication is one example of a system that cybernetics provides insight into. Studying a system as complex as the internet is only magnified when considering all the other systems it influences. The cybernetics tradition brings insight into the ability to understand technology's effects on communication. It also provides insight into networks attempting to communicate with and through each other. Swann (2020) communicates that the tradition of cybernetics explains the benefits that occur through effective organization.

Semiotic Tradition

Punch (2014) defines semiotics as the science of signs and describes semiotics as a system in which one thing stands for another and is based purely on language. For communication to occur, shared meaning with symbols must be present, and characters that produce a shared purpose act as tools for different contexts (Littlejohn et al., 2017). Semiotics depends on several factors, including the source, destination, and context (Sebock, 1991). Central to these factors, Punch (2014) agrees that semiotics is the idea that words and their associated meaning depend significantly on their context. One context that is important to this study is danger. Danesi (2021) describes semiotics in the context of danger and identifies that we inherently search for signs of danger in our surroundings. However, the author states that many mistakenly assume that the meaning surrounding a word or concept is the same for everyone. He believes semiotics holds the key to communication being more beneficial as a warning system. He insists that the semiotic tradition provides evidence that simply labeling a danger does not

signify the risk involved. The author also remarks that the study of semiotics regarding danger is more complicated by the varied descriptions.

Organizational Communication

Perception plays a massive role in organizational communication. However, organizational communication relies heavily on context. Organizational communication utilizes context to get information to employees and consumers (Wang et al., 2019). They identify that some of the most notorious catastrophes across the globe result from ineffective communication and describe communication within an organization as messages created, delivered, and received by individuals involved in a multifaceted network of connections. The authors identify those ineffective methods of communication include missing, unnecessary, inaccurate, inferior quality, and ambiguous information. They identify the concepts that need to change to improve safety communication: explicitness, timing, assertiveness, and active listening. Identifying these strategies is essential to improving communication about food safety (Wang et al., 2019).

Communication strategies from different encounters with danger benefit those concerned with food safety (Liu et al., 2020). The authors mention that the national weather service uses communication strategies to inform the public during crises to bring one's attention to the weather. The source must discuss the threat of imminent and immediate danger; therefore, communication promotes action. They mention that the national weather service uses word choice to communicate hazards and that word choice is imperative to appropriately recognizing a hazard or danger. The authors emphasize the need for entities to build a bridge between what they want to communicate and the best communication method with the audience they seek to inform.

The challenges that affect weather and food safety experts are the need to communicate pertinent information while balancing ambiguity and the vast communication needs of the public. They mention that communication from specific entities such as organizations is the product of ensuring the interests of that organization regardless of whether it matches the interests of the public good and that the same message can be different depending on the purpose behind the communication (Liu et al., 2020).

In this regard, the various aspects of communication often become siloed (Willoughby & Smith, 2016). They acknowledge that this factor leads to the underutilization of tactics that could benefit multiple communication aspects. One tactic they describe, gamification, was initially used in one communication form but benefited others. They include that mobile technology is another tactic that benefits multiple avenues of communication. They identify that the parallel factors in the benefits of communication strategies across different silos of communication provide hope that concepts studied in one setting may be beneficial in another. One of the strategies that can benefit is identifying danger and risk, especially in food safety. The study of organizational communication is one way the perception of different individuals and how they interpret information benefited this study.

Strategic Communication

Strategic communication is interpreting information communicated with a specific goal (Nickerson & Goby, 2018). While this is a simplified definition, Holtzhausen (2021) explains that factors within and outside a given communication scenario affect the ability to communicate. The author states that while it is a new field of communication, it provides insight into how entities communicate with their selected audience. She informs readers that strategic

communication is an applied science; therefore, much of the information comes through the observation and experience of the practice.

Strategic communication closely identifies with the concept of persuasion (Hallahan et al., 2007). The authors state that one manifestation of strategic communication is how organizations present themselves to an audience. However, Nickerson and Goby (2018) mention that to make strategic communication successful, it is essential for the audience to be specific in identifying its audience. The authors infer that this gives the entity the ability to select specific strategies to ensure the message is understood and well received. They state this is due to the different language skills and cultural backgrounds represented in any given audience.

The scholars representing strategic communication concepts provide confidence that food safety communication can better reach audiences that benefit from specified information. One notion essential to point out is that if manifestations of strategic communication are found through observation and experience, then professionals in food safety must be willing to learn how to use communication more effectively through these concepts. Although the concept is new, it can provide important information to strategic communication researchers and in the battle against unsafe food production.

Crisis Communication

Another concept of communication that provides insight into food safety communication is crisis communication. Crisis communication establishes the need for appropriate perception and response. Cruise lines define a crisis as an outbreak that is not handled appropriately (Liu-Lastrest et al., 2019). The authors state that a crisis can result in customer dissatisfaction, loss of revenue, potential litigation, and bad publicity. They mention that a cruise ship's risk or crisis communication consists of proactive information and messaging following an outbreak. The

authors explain that risk and crisis communication protect public health and safety and reduce public harm. They establish perceived risk and efficacy beliefs as the most critical communication influences and state that elevated health risk influences perception and behavior surrounding crisis communication.

In a crisis, the most concerning factor is the unknown outcome (Asselt et al., 2017). The authors describe that communication is key to controlling a crisis. They add that good communication invites the best outcomes, especially the communication that takes place between stakeholders and the public. The communication these authors label as good is well organized and planned before any food safety crisis takes place. One crucial aspect Asselt et al., 2017 added is the necessity to monitor the situation to be able to respond appropriately. Lastly, the authors add that while well-organized and planned communication may work well for certain entities, it can prove unsuccessful in other circumstances. This acknowledgment provides evidence for the need for different communication between parties depending on the audience.

Risk Communication

One purpose of communication is to identify risks to prevent interaction with dangers, and communication professionals refer to this as risk communication (Kjellgren, 2013). The authors state that risk communication develops a population's knowledge about risk, which should, in turn, make them more capable of responding appropriately. Separately, Han and Liu (2018) define risk as the set of all destructive consequences that an individual believes possible and identify credibility as an essential component in risk communication. Therefore, it makes sense that Koutsoumanis and Aspridou (2016) consider risk communication a significant component of risk-based food safety management. The authors mention that risk-based food safety management provides a more transparent view of food safety. To add to this perspective,

Jenkins et al. (2021) establish that effective communication and management are necessary for identifying risk and that specific characteristics lead to different perceptions of the identified risk. Other factors affect the likelihood that a risk is perceived appropriately.

Food safety and crisis create a complicated intersection for communication. McEntire and Boateng (2012) remark on the delicate balance between restoring consumer confidence and protecting them from further damage. The authors state that another matter that adds to the complicated nature of crisis communication regarding food safety is the likelihood that agencies will communicate with each other promptly. They also mention gaps in "best practices' used by the different agencies depending on their purpose. McEntire and Boateng (2012) identified formal systems and networks as one of the best ways to make crisis communication successful.

Identifying Danger and Risk. Fundamental human nature encourages individuals to avoid danger and risky behaviors. However, not all hazards and risks are avoidable. In foodborne illnesses, consumers often cannot guard themselves by identifying danger. The lack of the ability to identify dangers is because pathogens that cause foodborne illness are not recognizable through scent, taste, or the untrained eye.

Food service professionals are more likely to spot dangers that provide foodborne pathogens with the opportunity to develop compared to untrained individuals. Food service professionals are more likely to spot these dangers due to the fact they are more likely to be educated about them. They are also more likely to encounter instances that could provide the opportunity for foodborne pathogens to develop. This gap creates the need to communicate differently with new and more seasoned professionals.

It is essential to include the discussion of other domains to understand how humans identify risk. Hazard awareness is valuable for food safety. It is also insightful to recognize one's

level of understanding regarding hazard messaging (Millman et al., 2015). The authors describe that appropriate hazard awareness enables individuals to identify an appropriate behavior to safeguard themselves from danger.

As a primary means of survival, humans need to recognize danger. Depending on the situation, the danger portrays itself differently. For example, color can illuminate danger from our surroundings. Pravossoudovitch et al. (2014) studied the association between people worldwide about *red and danger messaging*. Humans have developed many ways to aid in the concept of identifying danger. The authors discuss the connection between the developed world and nature and a natural predisposition to be cautious of the *red* and state that these findings provide evidence of current communication associated with dangers.

However, members of the supply chain interpret current messaging differently. A comparative study on how experts, producers, and consumers provide insight into how they prioritize a hazard (Hartmann et al., 2018). The authors established vast differences in how these individuals' perceived messages regarding food safety dangers. They found evidence of a gap in knowledge associated with food hazards between experts and laypeople, leading to the difference in perception. One tactic used by industries to identify dangers is to add specific messaging to foods, but this tactic has a complicated nature. Sax and Doran (2016) discuss the confusion with food labeling messaging, stating that there is no standard definition of 'natural' to describe foods. Meijer et al. (2021) argue that labeling food is an underutilized and oversimplified way of communicating. There is also the perspective that labeling food does not determine whether the recipient accurately perceives a message. The accurate depiction of a concept is of the utmost importance when communicating danger and risk.

Risk Perception. One has no way of understanding risk unless one perceives a situation as such. Perception is critical to framing risk communication (Freudenstein et al., 2020). They point out that one key component in risk communication is understanding the difference between risks and hazards. The authors identify hazard identification as the first step in a four-step risk assessment to encourage further understanding. Brown (2014) establishes that personal experience determines risk perception and that subconscious factors like emotions affect risk perception. She explains that the brain finds ways to make meaning from partial information. She states that effective risk communication considers emotions and the importance of partial information. She also describes that it is essential to consider how individuals understand a concept when they may not comprehend all information represented through communication. She mentions the idea of innumeracy or the struggle to understand the meaning of numbers. Innumeracy brings to the forefront that the same information can be represented in the same way but perceived differently merely because someone does not understand the means of representation. Concepts such as innumeracy encourage representing food safety in several ways. While perception is vital in risk communication, it is also crucial to identify how individuals interpret all communication (Liu-Lastrest et al., 2019).

Consumers. Perceived risk is a determinant for consumers regarding food safety (Vainio et al., 2020). However, Frewer et al. (2016) could not identify all consumers' most successful tactics regarding food risk communication. They studied the effectiveness of risk communication in informing consumers about potential hazards associated with consuming specific foods. They found it necessary to target specific audiences when a risk (benefit) message is an appropriate tool. They argue that consumers should receive more information regarding dangers to make

informed decisions about the risk and mention several factors that play into the effectiveness of communication for the benefit of consumers.

The authors first mention the action of consumers processing the risk communication they may encounter. Second, the authors note the behavioral determinants associated with risk communication regarding food. The third approach they focus on is risk communication through culture. Perceived risk affects consumer behavior and emotions (Vainio et al., 2020) and found that individuals' cultural differences in perceived risk also be a factor.

Credibility. Credibility is one deciding factor related to a message's perception. Kjellgren 2013 confirms that the lack of credibility can prevent a message from being received. The author provides the example that government regulation can affect risk communication credibility and finds that when risk is considered unavoidable, governments often move from trying to control the risk to managing the risk. This information could sway one's belief in whether a risk is manageable. She identified that these perspectives often get in the way of the purpose of risk communication, making it challenging to raise awareness around an issue as people need help finding reliable information. She states that while there should be a strong emphasis on creating risk communication, there needs to be equal emphasis on those disseminating the information. The medical field is, unfortunately, familiar with issues arising through risk communication.

Medical Interactions. Many aspects of communication within the medical field have been problematic (Zipkin et al., 2014). They studied risk communication between patients and medical professionals and found that barriers in communication between patients and doctors often exist when explaining statistics involved with medical risk and benefit. The authors identified that disseminating statistics for patients can be more complex than many understand.

Some forms of communication turned out to be more helpful than others. For example, they also found visual representations beneficial for clinicians when communicating to patients about probabilities regarding risk. To transfer information to the food industry, Yiannas (2009) informs readers that presenting statistics is a standard method for educating individuals on the effects of foodborne illness.

Similarly, he found that the method was not particularly beneficial. Risk communication begs for further development regarding disseminating information through education. Specifically, when attempting to transfer knowledge from individuals of different educational backgrounds.

Other information from the medical field was interesting regarding risk communication. Another challenging dynamic regarding communication is the representation of side effects from consuming medicines (Tong et al., 2015). They identify that the communication regarding a treatment's side effects influences patients' safety and their interpretation of other messaging regarding a particular medicine. To break the factors that create these problems, one must understand issues regarding the transmission of messages. The authors identify one key issue regarding the transmission of side effects is the consumer’s lack of understanding of the specific language used to describe the risks and that regardless of how minimal the likelihood of a side effect is, the individual's perception significantly influences whether the medicine was worth the risk. Though the context of the risk differs, communication remains a constant concern, whether through risks associated with the side effect of a medication or the risks associated with producing safe food. Another concern surrounding communication is the idea of perception. This literature review will now produce information based on risk perception to understand the concept of perception.

Theoretical Framework

The theoretical framework for this study was Katz and Lazarsfeld's (2006) two-step flow theory. The two-step flow theory focuses on the idea that opinion leaders translate the information they receive from a mass communication outlet to the remaining members of an audience (Uzunoğlu & Misci Kip, 2014). The authors bring attention to the influential nature of opinion leaders due to their ability to transmit information denounced from mass communication. Yao et al. (2022) add that due to technological advancements and civilizations' reliance on the internet, opinion leaders are no longer constrained by geographical and social barriers.

Katz and Lazarsfeld (2006) Two-step Flow Theory

When Katz and Lazarsfeld (2006) produced the two-step flow theory, they believed individuals desired communication that was an intimate, first-hand account. The authors viewed communication as a direct and consequential means to motivate action through immediate response. At the time, communication and action were very closely related. They state that mass communication added new dimensions to how the concept reached each person. Mass communication influenced the creation of the two-step flow theory (Katz & Lazarsfeld, 2006). They noticed how interpersonal relationships greatly affected how an individual perceived mass communication. The authors also identified how primary groups were responsible for disseminating the communication. Katz and Lazarsfeld's (2006) discovery apply to much of the communication we use today.

The two-step flow theory elicits attention from scholars responsible for creating food safety literature produced for mass consumption. It is important to remark that the disconnection between communication and food safety begs for techniques that could be beneficial in making

danger abundantly clear, especially to those identified as opinion leaders. An individual's ability to interpret the world through the distinction of messages can prevent foodborne illness outbreaks. An important factor from the two-step flow theory for food safety professionals is the power interpersonal relationships hold in relaying important information (Corner et al., 1998). Another concern for food safety professionals is food accessibility, specifically regarding relevant and meaningful messaging.

At the inception of the two-step flow theory, the authority of the internet was not considered. Therefore, the theory greatly emphasizes social and geographical boundaries (Uzunoğlu & Misci, 2014). The authors suggest from the initial perspective that face-to-face interaction was an opinion leader's greatest tool. However, they add that the power of personal interaction transferred to the digital environment we are familiar with today. Online resources continue to become more popular (Howitt, 1982). These online resources include popular platforms that provide social interaction available through social media.

While Katz (1987) mentions that technological advancements are shifting research focus from influence on information and individual to social organization, most scholars agree that technology did not diminish the concepts represented through the two-step flow theory. Howitt (1982) discusses the specialization of diffusion from entities creating mass communication to reach opinion leaders. These entities hope the targeted opinion leaders carry pertinent information to applicable social groups. The idea of reach is increased by the author's inclusion of a discussion of concepts involving the flow of information from more than the initial two steps.

Regardless of the number of steps involved in the process, the idea of influence is important to the entities aiming to reach specific social groups; it does not always necessitate

action or the adoption of information (Howitt, 1982). The author touches on mass media's ability to provide an outlet for learning. However, Howitt (1982) embraces that for the two-step flow to include an educational component, the opinion leader must be able to provide information on the concept. The educational component of the two-step flow brings excitement to food safety communication. Lan et al. (2019) expresses the importance of reaching those influencing people in their environment. The authors found the two-step flow important in disseminating information during the avian influenza outbreak. They found that these individuals significantly affect the intensity of the public's response.

Food Accessibility

Food accessibility is a concept with a rich history. Food is an essential part of our culture and livelihood. Yiannas (2009) establishes that human existence has always relied on food. However, the author states that access to food has developed in diverse ways. For example, food is more readily available from a positive perspective. Alternatively, the production and processing methods of making food more readily available have led to many foodborne illnesses.

History

The historical developments of the food chain establish one of the reasons for the current state of variability in communication about food safety. Developments in the food chain enable more people to access food and many entities to diversify the available food (Keusch, 2013). However, the author states that the opportunities for foodborne illness increase when societies shift from hunter-gathering to one based on agriculture and domesticated animals. Yiannas (2009) discusses that we initially accessed food through hunting and gathering. These instinctual behaviors can make humans' animalistic attributes for survival visible.

For example, humans' animalistic attributes for survival can explain the desire to drive production and development in the accessibility of food. Many of the methods included are directly involved in farming and agriculture (Yiannas, 2009). He explains that while developments in the accessibility of food have provided readily available products to many, the processes involved have become increasingly complicated. The author states that strategies that have not always been a component of accessing food threaten safe food production. These processes include production, processing, transportation for the food movement, supply chain logistics, and inventory. Each process welcomes different chances for food to become unsafe and additional opportunities for introducing foodborne illness (Yiannas, 2009).

Foodborne Illness

Foodborne illness is a complicated concept. Foodborne illnesses can make our food supply dangerous for consumption (Yiannas, 2015). Foodborne pathogens create foodborne illnesses. (White et al., 2021). They state that food is often contaminated by a person or through contact with animals or contaminated water and define the food through which the disease travels as a food vehicle. Foodborne illnesses can occur from many diverse types of food. For example, Yu et al. (2018) points out that foodborne illness can result from fresh and fresh-cut produce. Fresh and fresh-cut produce is one of the more common ways for individuals to encounter foodborne pathogens. The authors found that many need to familiarize themselves with the concept that altering food by peeling, chopping, or slicing increases microbial growth. Misconceptions, mishaps, and miscommunication significantly affect whether food remains safe.

The study of foodborne illness outbreaks offers valuable information. White et al. (2021) analyzed how foodborne illness outbreaks are studied. The authors discuss known pathogen sources causing illness, person, place, and time characteristics of cases associated with the

outbreak (descriptive data), and case exposure assessment. However, there is minimal discussion of why the pathogen came about. Many experts become consumed with what are known as reported instances of foodborne illness (Arendt et al., 2013). The authors explain that while reported illnesses help track illnesses, they only sometimes help establish how to prevent occurrences. Tracking illnesses brings up the importance of statistics in food safety.

Statistics

Statistics often represent the consequences of foodborne illness (Yiannas, 2009). Developed or undeveloped, no country is immune to the effects of foodborne illness. Jemaneh et al. (2018) mention that while foodborne illness is preventable, over 48 million people (about twice the population of Texas) become sick annually. The authors found it surprising that foodborne illness is responsible for the death of 3,000 people annually just in the United States. Even more surprisingly, they established that this does not represent unreported instances (Jemaneh et al., 2018). Harris et al. (2018) remark that while much development is underway to improve food safety, there is still much to discover. One concept that provides much more beneficial intervention regarding foodborne illness is relating concepts to personal experience (Yiannas, 2009).

Personal Experience

Foodborne illness creates many challenges for society. First, it has a direct impact on one's health. Food poisoning is a common term used to identify a foodborne illness. Batz et al. (2013) state that while common initial symptoms come to mind when one thinks of foodborne illness, the long-term effects can be the most damaging. Another impact of foodborne illness is the negative association one has with food, but not necessarily the relevant hazard (Ha et al., 2020). Vomiting and diarrhea are two common symptoms that come to mind when pondering the

ramifications of foodborne illness. However, Batz et al. (2013) mention that foodborne illness's long-term effects can affect any individual. The author states that these effects range from deficits in cognitive development in young children to sepsis and meningitis in adults. Foodborne illness can affect any individual, but Eley et al. (2021) remark that foodborne illness places a significant burden on vulnerable populations with weakened immune systems. Foodborne illness can have a more substantial effect than the physical experiences commonly attributed to it.

Economic Impact

A lesser-known factor of foodborne illness is the economic impact. Foodborne illness has a massive economic effect (Young & Waddell, 2016). An individual who encounters foodborne illness will incur healthcare costs, including doctor's visits and hospital stays. Mild foodborne illness may cause a short-term financial burden, complications, and severe disease effects. Another economic factor of foodborne illness is its effect on businesses. Rodríguez-Herrera et al. (2022) state that the costliness of a foodborne illness outbreak could be a way to help align the industry out of the desire to prevent further expenses. Food safety education intervention can reduce risk and decrease the chance of potential economic effects (Zan et al., 2017). Some of the catastrophic instances of outbreaks come to mind regarding foodborne illnesses' impact economically.

For example, Harris et al. (2018) points out the economic devastation of a foodborne illness outbreak during Chipotle's establishment in 2015 and add that the company is still operating but has yet to recover from the events' backlash. The state food safety and industry experts continue to study the Chipotle mishap to prevent other outbreaks and encourage safe food production behaviors. This event established the need to redefine food safety from a much broader perspective.

Defining Food Safety

Unfortunately, communication about foodborne illness is not as simple. However, food safety is a widely accepted way to spread awareness about foodborne illnesses. Advances in the food chain have created the need for the concept known as food safety. Hassauer and Roosen (2020) establish that food safety has no generalized definition. Some define food safety as the barrier between the public and foodborne illness (Agyei-Baffour et al., 2013). Hassauer and Roosen (2020) mention that the different meanings represented by food safety create inconsistencies in understanding the concepts. However, food safety is one of the widely accepted ways to increase awareness about foodborne illnesses.

The authors ascertain that defining food safety through criteria and values helps create versatility among the industry and consumers. Machado Nardi et al. (2020) describe food safety risks from unexpected or unidentified physical, biological, or chemical contaminants. One way to establish an understanding of food safety is through training.

Food Safety Training

Food safety is the most common means for industries and individuals to learn about preventing foodborne illnesses. Zan et al. (2017) explain that education can improve food safety behaviors, but they add that few food safety specialists can identify one effective means for educating all individuals. Education is a loose term regarding food safety training (Sanlier et al., 2020). The variability in each state's policies and requirements is one reason differences occur in training, while it also plays into why the term education is used loosely (Rowell et al., 2013). Feng et al. (2016) identify activity through reading as a common type of educating individuals on food safety. However, Yiannas (2009) comments that reading is not the most beneficial means of educating on food safety.

Conversely, combining reading with personal recollection has benefits. Feng et al. (2016) establish storytelling as an incredibly beneficial means for educating about food safety, especially among individuals within the high-risk category. The oral communication traditions strongly associated with many languages make storytelling a universally valuable tool for preventing foodborne illness by increasing knowledge about food safety (Ong, 2002). Combining storytelling, information on food safety hazards, and practical training provides value to any food safety education program. Another beneficial component of food safety training is learning the concepts of Hazard Analysis Critical Control Point (HACCP).

Hazard Analysis Critical Control Point

Wengle (2016) identifies HACCP as a system for food safety regulation in the United States. Rowell et al. (2013) identify food safety training as a technique for educating staff or preventing foodborne illnesses, applying HACCP to instances specific to the industry, and familiarizing staff with FDA Food Code and state local food safety policies. Wengle (2016) mentions that HACCP is vital in food service and production but can be difficult for some industries to manage. The author describes that the problem with food safety heavily relies on entities' ability to self-regulate.

Self-regulation is common because few regulatory agencies can accurately measure food service establishments' culture or behavior patterns. They explain that entities are encouraged to follow HACCP-based regulations closely but can be flexible about the specifics of their industry.

Some might argue that this flexibility creates dissonance in communication about food safety. Agyei-Baffour et al. (2013) characterize the success of a hazard analysis critical control plan as dependent on the type of organization that embodies it and that training, in general,

differs tremendously depending on the entity and industry. However, variability does not just exist with HACCP.

Training Style, Content, and Techniques

The variability of food safety training programs is evident in the content of each program. Ripley et al. (2021) describe food safety training programs focusing on high-risk food practices and that this program aims to help retail food establishments that perform poorly on inspections. Programs such as this focus on specific practices. Hand hygiene, temperature controls, personal hygiene, cleaning and sanitizing, and cross-contamination were the most common topics in food safety training programs (Reynolds & Dolasinski, 2019). The authors found that communication style with supplemental visual representations is a common implementation technique to teach these practices. The combination of training style, content, and techniques can create variability regarding the priority of an entity or industry.

However, staff education is an establishment's most exceptional defense against foodborne illnesses. Abdullah Sani and Siow (2014) state that practical food safety training and resources are essential in the battle against foodborne illness, but that ongoing support and development are necessary for maintaining safe food preparation behaviors. Likewise, Sanlier et al. (2020) exclaim that the most significant gains in the knowledge base are achieved through continual development and focus on safe food practices. Furthermore, McFarland et al., 2019 explain that one of the most challenging aspects of training skills is the need for ongoing practice and reinforcement. This support includes motivation from managers, and feasible facilities and equipment help create a routine (Elobeid et al., 2019).

Sanlier et al. (2020) describe different forms of education, such as long-term, short-term, practical, theoretical, and continuous education. Young and Waddell (2016) add to this concept

by exclaiming that establishing the correct technique in routine is another essential factor in developing safe behaviors in food preparation. While describing food safety education, variability and routine are common themes that can still conflict. Combining variability and routine with relevant information provides a firm foundation for training.

Food safety education relies heavily on the source of communication, delivery, and the relatability of content (Zan et al., 2017). The authors explain that training in food safety differs from many other forms of education because it requires transferring communication, knowledge, and safe behaviors. Industry-inclusive communication through food safety training support is essential (Elobeid et al., 2019). The authors ascertain that an audience learning about food safety must be able to see the information as actionable. The audience must understand the language on a level where they can transfer learning into behaviors. Zan et al. (2017) describe training longevity as necessary in food safety education.

The authors confirm that short-term food safety education is less valuable than an ongoing and relevant communication program. However, many states provide conflicting information by making it common to require managers to acquire a certification training program (Yu et al., 2020). The authors identify one of the popular standard certification training programs the National Restaurant Association (NRA) offers. While this requirement helps ensure that training is taking place, it has yet to make a recognizable difference in the number of foodborne illness outbreaks.

While relevancy provides a foundation for food safety education, McFarland et al. (2019) identify efficacy as essential in food safety training. They state that while there is a significant effort to educate individuals about the many aspects of food safety, efforts have not decreased the instances of foodborne illness. Hedberg et al. (2013) state that restaurants that follow a

systems-based approach have the best chance of encouraging behaviors to reduce the risk of foodborne illness.

The behaviors of a systems-based approach are more likely to become consistent. Eley et al. (2021) state that consistency is one of the most important concepts to remember when preparing food safety education for young people. Through a systems-based approach, Yiannas (2009) discusses that creating clear and specific communication is one of the most significant issues in building a successful food safety management system. Similarly, Nik Husain et al. (2016) discuss the importance of communicating specific messages about food safety. Unfortunately, barriers to producing safe food continue after clear and specific messaging are produced.

Additional Barriers to Food Safety

Abdullah Sani and Siow (2014) describe human error as a common cause of unsafe food production. Sometimes the safest plans lead to instances where foodborne illness affects individuals. Even with all the understanding in the world, many things that are out of our control can create instances in which foodborne pathogens affect the food supply. Another barrier to food safety is the concept that semiotics exacerbates barriers to food safety since not all entities define safety similarly (Hassaure & Roosen, 2020). The authors encourage the establishment of a framework that aids in determining safe food. Then, human errors can be reduced and eliminated through more applicable communication. Communication is critical in identifying dangers, but knowledge about the dangers is also essential. Gaps in food safety knowledge are missing knowledge about dangers associated with food.

Gaps in Food Safety Knowledge

Many factors create gaps within the knowledge base. Oyarzabal and Rowe (2017) identify a knowledge gap about critical concepts in food safety as key to the relationship between regulatory agencies and food service workers. Personal experience drives a wedge between proper and safe food preparation techniques. Another area is the ability to translate theory into practice. A difference in the educational level of workers can make learning food safety material difficult. While the knowledge of food service workers was encouraging, the present gaps provide an opportunity for improvement. These gaps can decrease by focusing on communicating food safety dangers (Elobeid et al., 2019).

On another front, Keusch (2013) identifies the significant gaps between standards set for regulation and the norm for people at home. Food safety practices at home are lacking for many Americans (Parra et al., 2014). The authors found that hand washing is a widely accepted means to curb the likelihood of foodborne illness. They also found that the risk perception of those preparing food at home gives food service and production entities an idea of where workers stand when beginning training.

A common misconception about food safety is that individuals prepare food safely at home (Young & Waddell, 2016). Levine et al. (2017) found that the public lacks the knowledge to protect themselves from dangers associated with food safety. The authors found that many perceive a situation as safe when it may not be and that it is crucial to bridge the gap between what people perceive as safe. Again, studying semiotics complicates how people understand the concept of safety. The perception of many individuals is to be more concerned with how other individuals are preparing food (Young & Waddell, 2016). The authors stated that most possess extreme confidence in their ability to prepare safe food but not in the external preparation of

food. They describe that even when certain practices are known to help prevent foodborne illness, consumers will avoid the exercises if they are considered impractical. The cost is one concept that few consider a practical change.

Costly Changes

Unfortunately, hazard reduction is often a costly change to make by investing time, resources, and cost. Jensen et al. (2015) ascertain that finding cost-effective food hazard reduction systems will be the way for the industry to change. The authors found that when intervention costs the industry more, it must raise prices or produce a change in production expenditures. Inflation and other factors put too much pressure on food service for food safety to constitute further costs. However, the authors state that the cost-effectiveness of a strategy is only sometimes something food safety experts consider.

Similarly, Racicot et al. (2020) mention efficiency as an enemy of food safety. Food safety measures often slow food production and provide illogical steps. The authors desire to create modern quantitative ways to monitor food safety. However, food service and production workers sometimes need help finding feasible ways to measure food safety. From another perspective, some are unaware of the damage they are creating.

Optimistic Bias

Optimistic bias is a concept that inhibits an individual from monitoring food appropriately (Rossi et al., 2017). They identify optimistic bias as one of the most significant barriers between food handler knowledge and the implementation of safe techniques. The authors define optimistic bias as a psychologically backed belief that we are less likely to experience adverse events than others. They describe time constraints, lack of communication, inadequate resources, and ineffective leadership as other factors affecting the decision-making of

food service workers. With the concept of danger comes the related idea of risk. Souza et al. (2018) mention optimistic bias as having a significant influence on the behaviors of food service workers. Although differences exist in problems associated with foodborne illness regardless of what aspect it is covering, awareness is a common issue concerning all aspects of foodborne illness (Arendt et al., 2013). After learners develop awareness, learners need the motivation to implement changes.

Training Translating to Practice

Elobeid et al. (2019) establish that food-related illness often occurs from food consumed in a restaurant and that this institutes the need for food service and production workers to be motivated to change their routines for decreases in foodborne illness. Reynolds and Dolasinski (2019) admit that food service workers are crucial to preventing foodborne illness. However, research gaps exist addressing education, training, and continual development as crucial components. Rowell et al. (2013) state that knowledge does not always transfer to an individual's behavior and studied the influence of activity on the institution's performance. The authors witnessed a deficiency in overall performance with entities that enact a training program and assessment but pointed out that minimal improvements were recognized. Wen and Kwon (2017) also confirm that food safety knowledge alone cannot consistently help food service workers produce safe food but acknowledge that proper communication training improves risk reduction. Establishing a culture predominant in risk reduction encourages trust, and one component of effective communication is the concept of trust between the transmitter and receiver.

Consumer Confidence

One theme throughout this literature review is that trust is instrumental in communicating information. To dive deeper into the concept, consumers must be confident in the system producing their food. Communication on various levels is among the most influential components in building consumer confidence in food production processes. For example, using a fully functioning theory illustrates that risk communication is most successful when information benefits the public (Liu et al., 2020). The strategy used to communicate benefits to the public is crucial, as no one is bulletproof (Kjellgren, 2013). The author describes that no communication strategy is a one-size-fits-all concept and that matching a message's design to a specific audience is valuable.

For example, communication during an outbreak may differ from during prevention measures, but both rely on consumer confidence to work properly. Liao et al. (2020) establish the importance of food safety communication, specifically during an outbreak. Maia et al. (2019) establish trust as a critical factor in disseminating this information during an outbreak. Another initial barrier to enacting food safety guidance and regulation is the lack of confidence many developed in government, some conceding it was no more trustworthy than the industry information provided to consumers (Booker, 2018). The ongoing distrust in industry and regulation entities creates the need for cooperation. Ha et al. (2020) recognize that while food risk information decreases trust, it increases one’s knowledge of risk perception. While risk seems like something that would frighten people, it can be a beneficial concept for consumers and industry professionals alike.

Beneficial Concepts in Food Safety

As communicating risk is a beneficial concept with life in general, other concepts prove helpful. Nik Husain et al. (2016) state that food safety is a priority for institutions worldwide. However, foodborne illnesses continue to cause illness and death due to improper food handling, storage, and hygienic practices. The authors identify several factors that curb the effects of foodborne illness and describe that these factors include surveillance and monitoring, training, and adopting food safety management systems and risk models. More recently, food safety information has become readily available to the public.

For example, information on foodborne illnesses such as listeriosis is widely available (Maia et al., 2019). The authors believe that risk communication could help prevent foodborne illnesses early on. Understanding populations' risk perceptions, concerns, and communication needs will help produce more valuable education regarding foodborne illnesses. They found that targeted communication favors populations that benefit from specific information. The desire to provide regularly available information encourages the public to take advantage of it. Another crucial factor in making this information beneficial is the ability to interpret the communication provided.

Communication plays a huge part in preventing foodborne illness; however, many disciplines must combine to embody it fully. Mancino (2020) describes the intersection of philosophy and communication. The author states that interpretation is a component of all types of communication. However, that technology adds additional layers to the depth of interpretation, and these concepts require diverse ways of studying them. She provides evidence of the variety that embodies communication through the diversity in the definitions used to explain it.

From a philosophical perspective, the concepts of communication benefit conversations regarding food safety. She introduces the idea that philosophy broadens the concept of meaning through language. For example, the author identifies that some philosophers believe communication begins with an individual, while others credit it to separate realities. The author states that the idea of different realities stems from the concept that language and its meaning depend on individuals' experiences. The philosophy of communication brings interest to the contexts of communication in messaging.

Communication is critical to solving many issues with food safety and preventing foodborne illnesses. Communication will provide value through its development in the arena of food safety. Furthermore, the collaboration of different entities can create consistent communication between consumers and producers of the food chain. Yiannas (2009) establishes that words are powerful tools for establishments in their battle to keep food safe. Government entities empower food establishments by confirming much of the vocabulary associated with food safety.

Government Involvement

Government involvement appears different depending on the context. Wengle (2016) explains the idea of experimentalist governance and that it involves flexible, responsive regulation and stakeholders. Smith et al. (2016) explain that new hazards develop as industry tactics change, but regulations are only sometimes as quick to update. The combination of new dangers and flexible regulation discourages developments in food safety. However, they suggest that focusing on preventative measures could benefit organizations when focusing on food safety. The authors confirm that it is not enough to have a system to track foodborne illness after

it occurs. However, organizations that provide different perspectives about food safety provide more value.

Organizations and Agencies

Organizations need to provide information about food safety and foodborne illness. Wahidin and Purnhagen (2017) provide evidence of the abundance of organizations that funnel information to the food industry. One of these organizations is the *World Health Organization* (WHO). They mention that the WHO considers food safety a priority for public health. The authors state that when selecting the subject matter of food safety education, organizations often determine whether something can significantly impact public health. However, these statistical methods often create dissonance between risk and applicability. The story behind these numbers is begging to take the stage, and legislation is one way these numbers provide information for governments to make a difference.

One government agency with considerable influence regarding food safety is the *Center for Disease Control* (CDC). The CDC is likely to become involved in foodborne illness that is considered an outbreak. Hedberg et al. (2013) define a foodborne illness outbreak where multiple people have consumed contaminated food. However, as with many other food safety professionals, not much consideration is placed when only one individual is affected. This factor proves that regulations are more focused on eliminating outbreaks than reducing or eliminating foodborne illnesses.

The CDC has several responsibilities. The CDC seeks to make advances in response to foodborne illnesses discoveries. Jemaneh et al. (2018) share what the CDC has established as the five contributing factors of foodborne disease from restaurants. The authors name these contributing factors as food items from unsafe sources, poor personal hygiene, inadequate

cooking temperatures, improper cold or hot holding temperature of foods, and contaminated equipment or utensils. Yiannas (2009) similarly points out improper holding temperatures, inadequate cooking, contaminated equipment, food from unsafe sources, and personal hygiene as some of the most prominent issues. Combined with the CDC, Keusch (2013) describes multidisciplinary teams searching for ways to provide practical, science-based tools for combating foodborne illness. Yiannas (2009) identifies collaboration as essential in food service and production becoming safer and that the collaboration involved after a foodborne illness outbreak would be beneficial in prevention, too.

Unfortunately, the type of prevention measures one would expect most commonly begins with indicators that a foodborne illness is presently affecting individuals. Historically, agencies regulating foodborne illness outbreaks have not prioritized prevention. Braden and Tauxe (2013) report that the foundation of public health exists through diagnosis and reporting. However, the authors credit the account of foodborne illness, hospitalizations, and deaths with creating momentum for change from current standards. Therefore, while the aftermath often leaves a devastating mark, it also encourages transformation within food safety. Other government agencies also have a more active role in preventing foodborne illness outbreaks.

The *United States Food and Drug Administration* (FDA) developed the food code to)assist local and state jurisdictions in adopting safe food production and preparation practices (Grossman, 2014). Yiannas (2009) describes the FDA food code as a document created by many individuals, groups, and organizations to guide the production of safe and genuinely prepared food. Grossman (2014) states that the FDA food code is revised every four years. They state that while the FDA food code assists government agencies, its overall purpose is to prevent

foodborne illness. The authors confirm that states must voluntarily adopt the FDA food code because it is not a law or a method of guidance.

Idjagboro et al. (2020) further explain that not all states adopt the food code. The authors establish that some states have adopted the FDA food code but have yet to adopt the most recent version. They describe the process of this information trickling down to state retail food regulatory policy as vertical policy diffusion. With vertical policy diffusion, states can accept or reject policy (Idjagboro et al., 2020). They state that the difference in conditions leads to differing approaches depending on the system. The authors identify the idea that industry, academia, consumers, and federal government stakeholders at the biennial *Conference for Food Protection* (CFP) amend Food Code.

This collaborative nature provides evidence of how vital literature is. All 50 states and the District of Columbia have accepted at least one version of the food code (Idjagboro et al., 2020). The food code is one-way investigators can create consistency but identify that the diversity within the food industry continues to create problems (Liu & Lee, 2017). This range continues to make new issues as several types of food become popular. Legislation regarding food safety provides professionals with the ability to address diversity.

Legislation

Much of the discussion with legislation begins with the *Pure Food and Drug Act of 1906* (Manion, 2012). The author states that the United States (U.S.) government passed the *Pure Food and Drug Act of 1906*. She states that journalists such as Upton Sinclair helped bring the unsanitary conditions to the attention of the U. S. government and, with the publication of *The Jungle* shared his account of the Chicago meatpacking industry. The author states that this publication helped implement goals established by the *Pure Food and Drug Act of 1906*, and the

Department of Agriculture formed the *Food and Drug Administration* (Manion, 2012). Different motivators often propel legislation.

The economic impact is one of the most popular reasons for considering food safety risk perception in legislation (Ha et al., 2020). Manion (2012) describes the *Food Safety Modernization Act 2012* as the most significant component of legislation regarding food safety since the *Federal Food, Drug, and Cosmetics Act of 1938*. The author states that the *Food Safety Modernization Act 2012* aims to build a foundation of "science-based" regulations for food safety and remarks that food safety regulation began through pressure from the public regarding unsanitary meat products. Pressure from the public continues to play a significant role in the development of legislation.

For example, new developments in food safety pressured legislators to develop the *Food Safety Modernization Act of 2012* (Humphrey, 2012). He describes the *Food Safety Modernization Act of 2012* (FSMA) as a product of focused attention on preventing foodborne illness, especially from fresh fruits and vegetables. The author describes that The FSMA provided more authority to the FDA, such as mandatory recall, detention of food, controls over food facilities, and increased domestic and foreign food facilities. Another provision the author mentions of the FSMA is that it encourages the FDA to introduce new and enhanced food safety controls for food facilities and fresh produce farms.

Before the development of FSMA, many food processors across the globe aimed to follow the *Global Food Safety Initiative* (GFSI) closely. GFSI guides how to manage food safety systems (Shinbaum et al., 2016). The authors state that FSMA moved the FDA from the path of guidance onto a path of regulation and requirements. They note that supporters of FSMA are seeking ways to make food safety training more uniform. Grossman (2016) states that FSMA

brought requirements to the concept of food safety best practices. The author points out the importance of collaboration to meet the regulations and requirements of FSMA.

Regulation

Regulation is one form of combating foodborne illness (Tai, 2015). The author describes the federal food regulatory system as fragmented, with fifteen organizations responsible for regulating food, and reports that coordinated regulation allows for more consistent regulation and increases the capacity of food safety regulation. She found that coordination is essential for food safety personnel to embrace their purpose. Barlow et al. (2015) state that most systems aiming to ensure food safety are either hazard-or risk-based. The authors categorize food safety as a concept that is not absolute. It is unreasonable to consider reaching a point where zero instances of foodborne illness occur. They mention that food safety regulation that considers the probability of an adverse effect or risk-based is an increasingly popular approach. This concept can either help or hinder the relationship between producer and consumer.

The public's view of food safety sets the stage for food safety culture. Booker (2018) identifies that a cultural shift occurred when food safety was captivated by the producer-and-consumer relationship. The author states that when the public became more dependent on others to produce food, the need for food safety regulation became apparent and remarks that fear has historically been the driving force in food safety regulation.

One might find it interesting that a lack of fear is the issue for food service workers and their application of safe food production and processing. However, he found that the industry's desire to promote production and efficiency compared to safety and regulation led to the minimization of the importance of food safety. The author also identifies that the cultural understandings of what is "safe" also create barriers to food safety guidance and regulation. The

semiotic study of the word “safe” would yield different meanings to unfamiliar cultures. Adding to this complication is the idea that quality is subjective, and the concepts of quality and safety become easily intertwined. Defining the baseline of expectations regarding food safety can be difficult.

The development of expectations sets the standard for further developments with regulation. Smith et al. (2016) points out that while regulatory agencies seek new ways to reduce the occurrence of foodborne illness, improvements, and implementation of new techniques are not producing desired results. Not achieving the desired result indicates that the idea of successful food safety regulation does not match the tools and resources of local government agencies. Robertson et al. (2016) identify the *U.S. Department of Agriculture's Food Safety* and *Inspection Service* (FSIS) as the regulatory agency responsible for investigating foodborne illness outbreaks with federal, state, and local public health officials and establish that the purpose of the FSIS is to help find the source of an outbreak but is not strongly associated with the prevention of foodborne illness instances.

Prevention of an outbreak is made more accessible through the clarity of a system. Chen et al. (2013) discuss the importance of having a food safety system with clear communication, evidence-based content, and rigorous standards. The authors found that many scholars would agree that a ranking system for food safety provides regulations that enable the industry to tackle and prioritize areas where the probability of an incident is more likely. They believe the FDA's desire to develop and provide risk assessment tools applicable to each industry could encourage the development of such a system. Systems regarding risk and ranking may benefit industry professionals but discuss tracking foodborne illness on a national level, but there is also opportunity on a global scale.

Gopinath et al. (2013) describe the pathogen-annotated tracking resource network (PATRN) as a connected system investigating global foodborne diseases. Another technique-based process to track food safety on a large scale is the pathogen-annotated tracking resource network (PATRN). The authors materialized that the sophisticated PATRN creates an opportunity for in-depth analysis and reporting but discuss the difficulties of collecting data about foodborne illnesses. Some challenges include unreported illness and the inability of underdeveloped areas of the world, often the greatest affected, to report any information. While data helps professionals identify areas of opportunity, it is not a perfect tell-all.

Data creates barriers, but Valleé and Charlebois (2015) credit data segmentation and limitations for the global inability to select, build up, monitor, and evaluate food safety performance. The authors establish a need to standardize protocols. If regulation is indeed science-based, entities should more easily meet standards. However, the authors applaud a collective approach to foodborne outbreaks, which begs one to wonder why professionals wait for an outbreak to occur to encourage a coordinated approach.

Another problem is how the focus of regulatory agencies often their attention once the source of an outbreak is located (White et al., 2021). This problem does not bring much traction to the prevention of additional outbreaks. The authors found that hypothesis generation during a foodborne illness outbreak investigation is essential. However, to create further traction in preventing future outbreaks, the dissection of an event needs to continue deeper. One way there is traction through an outbreak is when there is the mention of hospitalizations. Painter et al. (2013) examine hospitalizations and deaths related to foodborne illnesses. They provide evidence that many only consider foodborne illness an issue when it causes hospitalizations and death. Next, the authors discuss how state and local health officials follow procedures like contact

tracing to determine the root cause of an outbreak. These investigations provide valuable information on extinguishing an outbreak but do not necessarily focus on preventing further occurrences.

Other research does provide information on preventing foodborne illness. In areas with fewer resources, there is much to learn about prevention. Rodrigues et al. (2019) establish that developing areas need help selecting resources that produce safe food. In addition, the authors state that it is essential to recognize what is required to make agencies for developing countries more effective. The authors bring attention to the variability within even one industry and how that makes it difficult for food safety regulatory agencies to communicate consistently on how to produce safe food. They explain that workers often feel *productivity pressures* more than *pressures from regulatory agencies* aiming to keep food safe. This disconnect creates issues with accountability and how it can be more appropriate.

Coordination in accountability benefits government agencies and entities. Park et al. (2020) credit large food companies for developing food safety management plans based on national and global regulations. They draw attention to the South Korean system that identifies postmanagement as a critical component of food safety management. The authors state that postmanagement allows the government to identify the cause of an outbreak and hold responsible parties accountable. Nonetheless, others claim that a close partnership model would be more beneficial.

The idea of regulatory agencies acting as a support system has interested many. Lavua and Bingham (2017) introduce the concept of regulatory agencies working as a support system to help improve instances of unsafe practices. The authors state that regulatory agencies can help entities recognize consequences and create a new reality for the industry. They propose that

inspectors aim to grasp a composite picture of each entity by combining the investigations of the establishment and point out that underestimating the complexity of food safety inspections is common. Nevertheless, inspections are a considerable component of food safety in the United States.

Inspection

Regulatory agencies are responsible for enforcing the established standards regarding food safety (Jemaneh et al., 2018). The authors explain that regulatory agencies place the most weight on a priority, priority foundation, or core violation during an inspection and express the need to improve the food code through scholarly documentation and research. These authors also mention the need for collaboration between all participating parties regarding safer food processing and production—for example, the involvement of entities such as the *European Union* (EU).

Borraz et al. (2020) identify the EU's desire to establish more consistency in regulation and standards regarding food safety inspections. The authors explain that inconsistencies exist between inspectors across the EU and write that the reason for these inconsistencies is the inspector's difference in ability, and some are considered ill-equipped. They mention that the existing violations may result in a different level of risk depending on the location. To get more specific, the authors show that a considerable risk in one industry might not need to be considered high in another. They also describe that the consistency of food safety communication is an issue in Europe and globally. The United States has found ways to make communication regarding food safety beneficial.

Inspection in the U.S. has found ways to make disclosing food inspection information beneficial. Kaskela et al. (2019) explain that disclosing food safety inspection information

increases compliance with established standards but identify that even with the disclosure of findings, recurrence of non-compliance is common. The authors establish risk perception through inspection as a valuable tool to reduce the likelihood of unsafe behaviors, but some food service entities view requirements as insignificant. However, they maintain the perspective that this creates a barrier to compliance. Proper communication through compliance measures establishes a means to break down barriers.

Communication is vital to making food safety inspections more beneficial for producers and consumers. Buckely (2016) describes communication as one of the many essential factors in food safety inspections. The author establishes that inspectors must connect with food service workers to help them develop solutions to violations. Effective communication during food safety visits provides a foundation for this solution. The author describes that food service workers need a more profound understanding to make long-term changes in recurring violations. Likewise, inspectors must be trained with specific skills to encourage the development of knowledge that food service workers must incorporate into action.

Barnes et al. (2022) state that while governments heavily rely on food safety inspections, many criticize and consider them inadequate. The authors inherit some criticism of food safety inspections because there are inconsistencies in how they are defined. They found that another factor in compliance is the variability between jurisdictions. The authors want to establish what food safety inspections mean to society and what society expects to gain from inspections and determine the differences between meanings. They state that inspectors explain difficulties in the calibration of expectations due to measuring many aspects of a food safety visit from a qualitative perspective. This disconnect removes an inspector's potential to be a valuable

resource. Qualitative measurements exacerbate this disconnect when inspectors must compare diverse entities.

For example, Liu and Lee (2017) found specific diversity in ethnic and nonethnic restaurants. The authors identify that the most common duration for food code violation inspections to occur is annually. Nevertheless, annual visits must occur more often to benefit the entity or consumers. They found that ethnic restaurants often have more findings than nonethnic restaurants and are usually small-scale operations with limited capital for maintenance and limited educational resources. The authors describe that these business owners and workers are more likely to experience a language barrier in communication about food safety. They explain that their scores have a minimal role in motivation to improve because there are often misunderstandings and differences in perception due to communication barriers.

However, Patel et al. (2021) establish that a low-scoring food inspection does not necessarily motivate improvement. They found that food establishments often aim for minimum requirements instead of focusing on the risk associated with unsafe procedures. The authors state that a low-scoring establishment may have little incentive to improve and rarely relate improving to benefiting the public's health. They propose incentivizing restaurants that score incredibly high on food safety inspections as motivation to exceed minimal requirements and help bridge the gaps between regulation and industry.

One organized way of assisting inspectors in becoming more beneficial to the entities they serve is the *Environment Assessment Training Series* (EATS). Coleman and Brown (2018) describe EATS as in-depth and composed of foundational skills, skill-building, and benefits. EATS enables inspectors to develop skills to provide valuable feedback to retail food establishments (Coleman & Brown, 2018). This intervention provides many more benefits to

regulatory agencies and the industry. The value begins with a relationship built around consistent communication of food safety inspection and regulation.

Summary

Foodborne illness is a disease transferred through food to an individual. It dramatically affects individuals' health across the globe regardless of their circumstances. When foodborne illness occurs, it economically affects the consumers and producers involved. Consistent communication is the key to decreasing instances of foodborne illness. Education and training on foodborne illness most commonly occur through literature intake; however, it is not always the most beneficial. Methods are challenging to maintain as they often slow production and become obsolete through developments in the food chain. Food safety is most valuable through actionable activities considered efficient and can effectively transfer through staff development.

CHAPTER THREE: METHODOLOGY

Overview

One responsibility of food regulatory agencies is to ensure public safety. However, the tactics used by these agencies often need to be revised. One tactic that could help food regulatory agencies in their ability to protect the public is using strategic communication. First, it is essential to identify in what capacity food safety communication is a concern. Studying the language used by regulatory agencies to identify potential dangers in food service environments can help determine how communication hinders these tactics. The two-step flow theory provides the foundation of analysis for communication about food safety in this study. The two-step flow theory studies an opinion leader's importance and influence in relaying messaging from mass communication. This theory helped establish themes, differences, and similarities in the language regulatory agencies use to identify aspects of food safety.

One theme essential to remember throughout this study is that most people will interact with foodborne illnesses in their lifetime. This theme should encourage the public and scholars to find common ground in communicating about food safety. Communication about the prevention of foodborne illness begins with food safety as an imperative line of defense. Communication is a valuable tool to warn humans about potential dangers. Communication to identify danger must be easily recognizable and understood. Food safety regulatory agencies are an example of an entity that must communicate about dangers on a large scale. The two-step flow theory provides a means of analysis to understand better the language regulatory agencies use to communicate to the masses about food safety. This analysis provided a basis from which all communication about food safety should stem or identify that it may be a root cause of some of the struggles in communication about food safety.

This chapter provides clear and concise procedures, research design, and analysis of this research study. The methodology chapter for this dissertation explains the use of thematic analysis to study language describing food safety dangers. First, the chapter reviews the nature and purpose of the study and analyzes the study. Next, the chapter describes the data collection process. Lastly, the chapter reviews assumptions, scope, delimitations, and limitations pertaining to the study.

Method and Design

The food service and food production industry must clearly understand the current language used by regulatory agencies to understand the expectations of how to communicate about food safety properly. The thematic analysis provides essential information on what meaning opinion leaders gather from a text. A thematic analysis of the FDA food code and accepted state food safety legislation provided insight into the current language used by regulators. Furthermore, this thematic analysis provides evidence of a lack of similar messaging in food safety literature.

Creswell and Poth (2018) state that purposeful sampling provides results by identifying different perspectives on the problem and process. The qualitative applied thematic analysis provided a foundation for establishing similarities, differences, and themes between the FDA food code and state legislation. Coding content from the FDA food code and state legislation provided information to explore through the theoretical framework. An appropriate theoretical framework is necessary for the researcher to gain information for a study. The qualitative applied thematic analysis in studying the FDA food code and state legislation aimed to establish similarities, differences, and themes and then apply the two-step flow theory to examine the data for further meaning. Another way to describe thematic analysis is to draw inferences from the

text. Drawing inferences from the FDA food code and state legislation will help establish the meaning associated with the text. The procedures for this thematic analysis employed strategies to ensure consistent, reliable data.

A qualitative applied thematic analysis of the FDA food code and state legislative material paired with the theoretical framework of the two-step flow theory provided a foundation for establishing valid inferences for the study. The FDA food code and state legislative material text went through rule-guided classification and organization in the context of accepted terms and vocabulary in food safety. The documents underwent a coding process to pull language related to food safety. While this qualitative study had some malleability, but consistency remained important. The study of abstract meaning identifiable through qualitative study allowed this researcher to understand better concepts based on the thematic interpretation of the FDA food code and state legislation.

Artifacts for Analysis

The essence of food safety regulation began with the discovery of industries and their adulteration of foods during production (Detwiler, 2020). The author points out that food regulation in the U.S. began with a research perspective with the U.S. Department of Agriculture (USDA) establishment in 1862. To further explain this point, he identifies that The *Pure Food and Drug Act of 1906* started the actual food regulation by implementing strategies to ban the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors. The author states that this act also established what is now recognized as the FDA. He identifies that much of the present-day legislation and regulation developed after the 1993 *Jack in the Box* E. coli outbreak. He credits the 1993 *Jack in the Box* outbreak with making “E. coli” and “foodborne illness outbreak” common in vocabulary and

impactful in new legislation. However, the author depicts that in 2002 the FSMA further developed information regarding food safety and names one of the changes most relevant to this communication study is the change of specific text used to explain aspects of the industry. The author states that FSMA attempted to create balance within the regulatory system.

Currently, the U. S. government splits the responsibilities of regulating food (Detwiler, 2020). The author expresses that The FSIS regulates meat, poultry, and egg products. He affirms that The FDA regulates all other food products not regulated by the USDA, including dietary supplements, bottled water, food additives, and infant formulas. The FDA is responsible for most or 85% of food products (Detwiler, 2020). With this variability, the author declares, developing a truly integrated system will be tough because states also vary in their ability to provide enough resources, technical staff, lab capacity, and institutional infrastructure.

To reduce the effects caused by foodborne illness, the U.S. government first established the FDA food code in 1993 (Dewiler, 2020). He shares that there were subsequent editions in 1995, 1997, 1999, 2001, 2005, 2009, 2013, and 2017. The FDA food code guides state legislation and regulation standards regarding food. Food service and production professionals use this information to build educational and procedural knowledge. However, the messaging of the FDA food code suggests that the tactics do not end up as persistent components of food service and food product establishments. It is crucial to determine whether the FDA food code is the source of disconnected communication in this system.

The sample for this study initially included a convenience sample of 51 artifacts. The first document was the most recent version of the FDA food code. The other 50 artifacts included each state's guiding legislative documents on food safety. These documents are publicly available through links on the FDA website. The accepted legislation for each state and the most

recent version of the FDA food code underwent analysis. This study collected information on specific words to describe dangers and hazards in food service environments, including the number of times each word is present. The frequency of words was also a vital component of this study. After this data was collected, the study compared information between documents. The study identified disconnected language structure by identifying similarities, differences, and identifiable themes.

The FDA food code communicates expectations for safe food production. The two-step flow theory encourages us to ask questions about the meaning of the FDA's language used to describe these circumstances. The researcher started analyzing the content of the FDA food code and the legislation used by state regulatory agencies for enforcement. A thematic analysis through the two-step flow provided the ability to collect similarities, differences, and themes in the structure of these communicative documents.

The *National Restaurant Association* (NRA) creates a curriculum for educating food service workers, and the program is known as *Servesafe*. As a component of this program, the NRA produces a book to aid students in learning about food safety. Many workers, especially managers, seek certification with the NRA. This designation comforts many that knowledge about food safety will help keep the public safe. The *Servesafe* book offers extensive information on food safety within the food service industry. The information *Servesafe* produces one of the most well-known and widely accepted food safety curricula in the U. S..

Food Safety Culture: Creating a Behavior-Based Food Safety Management System is introductory material for forming a behavior-based food safety program (Yiannas, 2009). The author produced a textbook for food safety professionals to guide critical concepts in food safety management. The concepts in his book reference the idea that food safety is behavior-based. The

book compares provided skills and knowledge to building culture as the foundational necessity of food safety. The author desires to advance food safety worldwide by sharing the material encompassed through experience and research.

Coding Processes

Punch (2014) describes coding as the foundation of qualitative analysis. The author identifies the coding process as labeling data for collection and analysis, and this study utilized *Computer Assisted Qualitative Data Analysis Software* (CAQDAS) to aid coding. The FDA food code and state legislation went through the coding process using the MAXQDA software package. This type of examination provided a greater understanding of communication in food safety.

VERBI GmbH (2022) states that the MAXQDA software package allows researchers to import and organize with maximum flexibility. A specific function of the MAXQDA software package that was valuable for this study was the ability to search keywords while automatically coding them (VERBI GmbH, 2022). Another critical function of MAXQDA was finding connections in the data (VERBI GmbH, 2022). VERBI GmbH (2022) offers specific tools like analyzing word frequencies and combinations. The ability to collect information on word frequencies and combinations provided value in identifying gaps regarding communication about food safety in the FDA food code and state legislation (VERBI GmbH, 2022). MAXQDA can offer greater intercoder reliability as a function of a CAQDAS however, the analysis of themes after the coding process can differ depending on the researcher's perception. The qualitative applied thematic analysis included a coding scheme comprised of code names, code definitions, text examples, and coding rules. The software package collected the words most used in the

selected literature. Themes indicated whether the documentation identified a similar language or not.

Coding Rules

Establishing a good data set is essential to set parameters for the information the study aims to analyze (Creswell & Creswell, 2020). The amount of literature on food safety available for this coding process would not be feasible for exploration to establish themes. The coding rules for this study aim to target specific entities that aim to produce strategic communication on food safety. Clarke and Braun (2017) describe codes as the smallest units of analysis that provide a means to capture potentially relevant data to the research questions. The boundaries set by the following coding rules set the stage for identifying similarities and differences in the text through themes. Words must be associated with food safety and be included in at least two of the following comparison components of literature.

1. NRA *SERVESAFE Manager* terms
2. FDA terms
3. Selected vocabulary from *Food Safety Culture: Creating a behavior-based food safety management system.*

I used MAXQDA software to analyze the literature. Text analysis allowed this scholar to study the structural linguistic aspects of the artifacts and results through a coding process to provide any context of patterns recognizable through categorizing words based on their meaning and frequency.

Process and Procedures

The following process and procedures enable the investigation of public documents through CAQDAS (Creswell & Creswell, 2020). The authors state that processing documents

allows the researcher the ability to learn about the language used by an entity. They add that documents provide written evidence that does not require transcribing. The CAQDAS provided a means to aid with the coding of these artifacts.

1. Each literature component, including each state's FDA food code and legislation, was downloaded and converted to PDF format.
2. Each PDF component was uploaded to the MAXQDA software package.
3. The researcher compared documents by frequency to discern which language was most used.
4. The most frequently used words were abstracted from each text.
5. The results produced some data unrelated to food safety.
6. The scholar uploaded NRA terms, FDA food code terms, and *Food Safety Culture* to MAXQDA.
7. The scholar submitted NRA terms, FDA food code terms, and *Food Safety Culture* through a word frequency analysis.
8. If words produced a frequency in at least two of these data sets, they moved to a comparison with the FDA food code and state legislation word frequencies.
9. Words were compared between all frequency sets.
10. The scholar prepared a report summarizing the results and findings collected from the frequency data set.

The carefully thought-out processes and procedures of this study enable the summarizing of data by means of the MAXQDA software package. The next step was investigating the data to identify emerging themes, such as similarities and differences in content. Next, the thematic analysis provided a foundation for this synopsis.

Thematic Analysis

Thematic Analysis provides theoretical autonomy through flexibility (Nowell et al. (2017). However, the authors add that thematic analysis provides rich, detailed outcomes. They identify thematic analysis as beneficial in examining similarities and differences and generating unforeseen themes. Clarke and Braun (2017) add the benefit of thematic analysis being able to be applied across a large group of theoretical frameworks. Thematic analysis became a prime candidate for this study after discovering the description by Ozuem et al. (2022), which identified the importance of identifying and describing represented ideas instead of quantifying words and phrases. Another factor Ozuem et al. (2022) mentions that adds to the value of thematic analysis in this study is how the researcher's perspective guides it. Thematic analysis is a tool that allows researchers to provide a perspective that is produced solely from an individual's life experiences. Food safety professionals can benefit from the perspective that many of the audiences they aim to reach have diverse language skills and cultural backgrounds.

The components of literature for analysis were composed of the FDA food code, legislation accepted by each state, the NRA Servesafe book, and Frank Yiannas's book *Food Safety Culture: Creating a Behavior-Based Food Safety Management System*. In reference to the FDA food code, most states adopt it and establish regulations relevant to the industry in their state. However, some have not adopted the most recent version of the FDA food code, but they have established legislation to guide regulatory agencies. The FDA recently revised the food code in 2017 (Detwiler, 2020). The author describes that the FDA, CDC, USDA, and *Association of Food and Drug Officials* (AFDO) created the FDA food code. State regulation occurs through one or multiple agencies (Detwiler, 2020). The author says the FDA has established inconsistencies with the idea of state-mandated regulations. They may seek different

mandates depending on the department's priorities. Differences in prioritization can cause conflict and inconsistency.

After the data collection, it was essential to identify similarities, differences, and themes between these documents. This examination provided a greater understanding of the tactics used for communication in food safety. For example, does the FDA food code vary in communication tactics to identify danger versus what each state uses? Identifying consistencies or inconsistencies helped determine how communication is disseminated from the legislation to regulatory agency and eventually to industry. The information established around the dissemination of messaging provided the researcher with other opportunities to advance the development of education and warnings about food safety. Identifying dissonance through these processes can help professionals establish better ways to change the perception of food service and production workers to one appropriate for the setting in which they work.

Assumptions

Assumptions help researchers establish constructs and anticipate problems from framed solutions (Wolgemuth et al., 2017). One assumption is that the FDA food code benefits the development of safe food establishments. The author argues that the inclusion of the quantitative concept of frequency increase’s reliability of research results.

Scope and Delimitations

This study interpreted a limited amount of food safety literature. Food safety literature continues to develop on an international and national level. However, on a national level, most organizations use the FDA food code and state legislation to guide food safety-related principles. This thematic analysis studies the FDA food code and states legislative material to understand the guidance. The FDA food code receives input from several agencies but is subject to input from only some parties it affects. It was not intended by the researcher to portray the themes discovered or not discovered to mirror the consensus of the entire food safety literature and education base. However, the themes identified benefit professionals in developing appropriate communication in identifying food safety dangers. The coding selection provided a limited amount of vocabulary to compare. Therefore, it is essential to remark that a different source for coding selection may lead to different results.

Limitations

The researcher involved in this thematic analysis is knowledgeable about food safety. A novice interpreter could provide outcomes that differ due to a lack of knowledge of food safety concepts. The arrangements were vetted through the dissertation chair to detect bias. Since its inception, the two-step flow theory has encountered further developments. This study provides an in-depth description of the established theoretical framework.

Ethical Considerations

This study did not necessitate informed consent, protection of vulnerable populations, or data security. The data in the thematic analysis is readily available to the public.

Summary

The communication of dangers surrounding food safety underwent exploration through qualitative applied thematic analysis with the theoretical framework of the two-step flow theory. This methodology chapter provides insight into the procedures, design, coding, data collection, and analysis used in the study. The contents of this chapter provide insight into the procedural aspects of this study. The inclusion of these components highlights the validity and reliability of this study. This in-depth description offers specificities for the reproduction of this study. The remaining chapters will include a discussion of a presentation of the findings and a discussion of the findings.

CHAPTER FOUR: FINDINGS

Overview

One function of communication is to identify danger in one's environment. In food service and production environments, communicating about risk is essential in protecting the public from foodborne illnesses. To create consistency in communication about food safety, government agencies and experts in food safety have produced literature to communicate hazards that are likely to occur in the food service industry. It is crucial to identify upon comparing this literature if the language used is consistent or if there are discrepancies. Consistent language about dangers helps create a clear representation of what strategies food safety professionals could encourage to ensure safe food production.

This qualitative applied thematic analysis included an exploration of 51 artifacts. These artifacts include the FDA food code and state legislative documents from each state. The researcher compared language from NRA *ServSafe Manager and Food Safety Culture: Creating a Behavior-Based Food Safety Management System* and FDA terms to compare the artifacts. The researcher processed language from these artifacts through the software program MAXQDA to determine consistent word frequencies between the documents. The coding process allowed for comparing language using words associated with at least two of the following: NRA terms, FDA terms, and selected vocabulary from *Food Safety Culture: Creating a Behavior-Based Food Safety Management System*. The language included in the findings of this study are words associated with food safety. Chapter four presents the findings of this qualitative applied thematic analysis of food safety literature using the two-step flow theory. The qualitative applied thematic analysis aims to produce information on whether food regulatory agencies and educational entities can use better language to describe safe food production.

The artifacts of this study were downloaded and converted into PDF format. Most documents included links directly from the FDA website; others were available on the state's corresponding legislative website. Next, these PDF documents were uploaded to the MAXQDA software package. The researcher first used MAXQDA to compare documents by word frequency. This analysis abstracted the most frequently used words from each text. After analyzing word frequency, terms from the NRA, FDA food code, and Food Safety Culture were uploaded to MAXQDA. These terms were also compared through word frequency analysis. When words appeared in at least two of these data sets, they were included compared to the FDA food code and state legislation word frequencies. Lastly, the scholar prepared a report summarizing the results collected from this frequency data set while removing words that were not relatable to food safety.

The dissection of these artifacts produced findings in chapter four. Chapter Four provides evidence of themes closely related to the research questions produced by the researcher. The themes correlate with the purpose of the documents and the audience they intend to address. Detwiler (2020) explains that the documents' differences are closely related to the agency and its priorities. The authors of each component of literature intended to reach an audience that plays an important role in food safety. One can perceive that a document's purpose will direct language and communication. However, language can dictate how an audience perceives the purpose of a statement, especially in the presence of opinion leaders.

Chapter Four of this dissertation discusses the findings of this thematic analysis. These findings include an overview of a qualitative dissection of the language used in food safety literature. The scholar compared the FDA food code and state regulatory and legislative material against the language used in food safety educational material. Vocabulary terms used to compare

in the thematic analysis are from the *National Restaurant Association*'s educational material, FDA food code key terms, and the food safety expert Frank Yiannas's book *Food Safety Culture: Creating a Behavior-Based Food Safety Management System*. These components of literature provided the foundation for this scholar to explore the consistency of food safety language in the United States.

Chapter Four will transition into discussing the findings of this study. The findings will cover the research questions addressed by this study. Next, the chapter will cover emerging themes represented in the research. These themes include progression, context, audience, and consistency. The chapter will end with a conclusion and transition into Chapter five.

Presentation of the Findings

A presentation of findings will follow, including all findings associated with this study, after an in-depth discussion of findings and their relation to the research questions and overarching themes through identification as headings. This section represents results based on the frequency of words. Further details of the frequencies of words are in the appendix.

RQ1. How do communication strategies differ between the FDA food code and state legislative material?

One way communication strategies differ between the FDA food code and state legislative material is centered around the purpose of the documents. Purpose is an appropriate component for the authors during the production of these documents. The FDA food code includes information and language meant to inform different entities of the food service industry on the production of safe food. The FDA's communication strategies to generate the food code aligns with the idea that the public will benefit from guidance on safe food production. For example, the FDA food code provides definitions and explanations of concepts. This strategy

benefits an audience attempting to learn about food safety concepts. The FDA's strategy aims to help readers form new meanings regarding food safety. State legislation varied from the FDA food code because the communication strategy sets standards for legal matters regarding food safety in comparison to aiding one in forming new meanings. This communication strategy provides information on requirements of what is legally acceptable in each state. This language included information such as the required equipment for an establishment to operate legally.

Differences in communication strategies exist between the legislative documentation depending on the state. Although the purpose remains the same from state-to-state, states produce communication using different tactics. For example, the strategy used to represent information varied visually between states. Some states used font size and colors to help information become easier to read. Another way state legislative material differed is through formatting. Some existed in word documents, others as PDF documents, and a few states had the information directly available on a webpage.

Formatting is a minor inconsistency between documents. However, formatting differences can distort a message's meaning if the reader is unfamiliar with it . Another matter affecting the perceived meaning of these documents is the use of space. When words are cramped, it can be difficult to gain meaning. But, when an author uses space well, it can make it easier for one to gain meaning.

Color is also a factor that can negatively or positively affect meaning. Many colors have meaning, such as red and its association with stop signs. Many of the legislative documents do not include color. Upon reading these documents, much of the text tends to run together, and concepts are difficult to separate. The use of different font is another factor that can inhibit one from understanding the text.

RQ2. Why is communication different between the FDA food code and state legislative material?

For several reasons, communication is different between the FDA food code and state legislative documents. One reason is that the formatting varies depending on the material represented. While the FDA food code exists in PDF format, formatting preferences for state legislative material include word documents, PDF documents, and information directly available on web pages. The fact that there are different formats creates the opportunity for a message to be perceived differently by the same audience. Another factor is whether all individuals will have the ability to gain access to the documentation because of the different formats. Formatting discrepancies raise the question of whether consistency in language can be easily identifiable between documents. Another factor that creates a difference in the communication initiated through these artifacts is text forms, color, and texture.

As mentioned as a component of RQ1, communication also differs depending on these documents' purpose. The FDA food code document takes on the role of producing communication that guides the reader. While the communication is informational, it does not set a legal precedent for food safety matters. The communication in the FDA food code is meant to guide states when creating their legislative material. The language has an educational undertone, and the organization of the text is more easily digestible than the legislative material. The organization of FDA food code happens through chapters, which allows the audience to reference material more efficiently.

The communication outlined in legislative material identifies legal standards regarding food safety. Much of the legislative material requires that the reader has a prior understanding of food safety and legislative material. In addition, the organization of state legislative material

differs by state. There is no standard format across all 50 states. Each state's food safety legislative material is organized similarly to all other legislative material from that state. The organization from each state happens in a way in which regulatory agencies and industry professionals can reference what each state identifies as legal. A novice reader with no connection to legislative material would have initially become familiar with how the legislative material is arranged to be able to gain perspective meaning from the messaging.

Each artifact's purpose relates to the presumed audience. For example, legislative material exists for an audience with presumed food safety knowledge and experience with communication of legal matters. This assumption outlines the idea that the audience would need both to benefit from the material. The FDA food code aims to help the audience learn about food safety. Therefore, this audience would have a limited understanding of its principles. These examples provide evidence of intentionality and differences in communication.

Culture is deeply rooted in both food production and communication. Therefore, establishing a new norm takes a combination of food production and communication. Understanding new food safety principles must align with cultural beliefs and communication abilities. Cultural differences create a large amount of dissonance regarding the safe production and storage of food. For someone to change their cultural perspective, they must interact with information they understand and determine to be essential. Individuals are more likely to determine that information is essential to them if they hear first-hand accounts of how unsafe food has affected people similar to them. Change happens when employees regularly interact with the ramifications of their actions.

RQ3. What does consistency or inconsistency in communication themes mean for industries that are held to these standards?

Inconsistency in communication themes between these documents can create a disconnect between different entities within the same industry. Ideas from the two-step flow theory exacerbate the idea that a disconnect will exist even before an idea reaches an opinion leader. Inconsistency in communication themes also creates issues for regulatory agencies and the standards they expect industries to uphold. For example, suppose an industry is seeking to set food safety standards for the entire industry. In that case, it takes time to identify which document would be beneficial. While legally, one may expect communication in legislation to be most beneficial, it can be difficult for some to understand without prior knowledge. The inability to understand creates the need for professionals to become immersed in the FDA food code and their state's legislative material. Inconsistencies between these two forms of communication can create further misunderstandings.

Consistency in language helps different industries connect the information they learned to what is legally expected. Consistency is present in states that have adopted the most recent version of the FDA food code. This consistency includes 18 states (*U.S. Food and Drug Administration*, 2021). However, a crucial factor is whether states have accepted the code section-by-section or reference (*U.S. Food and Drug Administration*, 2021). The language will be consistent between the individuals creating legislation and those that produced the FDA food code in states that include section-by-section acceptance. While those that have accepted it as a reference may differ in some matters of representation.

Inconsistency creates room for misunderstanding, but there is no room for misunderstandings regarding the public's safety. Consistency provides a means to close the gaps in communication themes used by the FDA and each respective state. Using these documents to learn about expectations about food safety is comparable to having several instruction manuals

for the same product. While both are functional, depending on the organization of the language, the interpretation may be different. Imagine if a different language was used in each instruction manual; this difference can create excessive confusion. It may even impair the ability to complete the project. Each industry needs consistency regarding its ‘instruction manual’ on food safety.

RQ4. What communication strategies can regulatory and inspection agencies use to identify food safety dangers?

Regulatory and inspection agencies should use communication strategies that involve cascading communication. The level of communication produced for legislative material is of little benefit in helping individuals new to industry identify food safety dangers. The communication strategies currently used by regulatory and inspection agencies to identify the standards of a food-safe working environment do not use cascading communication models. Some businesses have a support system that can turn this information into viable communication to front-line workers. However, there is no support that is universally available. Some believe this is due to the diversity in the food service and production industry.

Cascading the information would include deciphering the communication into language that is helpful to diverse levels within the food service and production industries. Breaking the information down includes corporate individuals, store level, and front-line employees. Cascading communication breaks language down and eases the transference of knowledge. Without this type of communication, understanding is fragmented. Cascading communication creates a way in which understanding can transfer to different contexts.

Progression

Several processes allow the content to transfer from this analysis to a more digestible data. The first process included collecting each state's FDA food code and appropriate documentation. While the FDA website includes links to each state and appropriate legislation, not all links work and lead directly to utilizable information. In instances such as this, the scholar used other information, such as agencies responsible for producing legislation and regulation of food safety in each state. This information led to data collection, including the legislation appropriate for this study. The collection of information outside of the FDA website created the need for additional time during this research stage. Completion time for uploading documents from all sources took around 2 hours to complete. After discovering documentation for each state, the documents were exported into PDF format for easy access and uploaded to MAXQDA. Converting documents into PDF took around 1 hour. Legislation and FDA food code were uploaded to the MAXQDA program in the documents section in the “Home” tab.

The scholar uploaded the FDA food code and state legislative documents to MAXQDA; an analysis took place. The first component of the analysis compared the words of all state legislation and FDA food codes with each other through the MAXQDA word frequencies tool. Analyzing all state legislation and FDA food codes created an enormous amount of data, including over 11,000 components of language. While most data from the analysis of all state legislation and FDA food codes were words, some merely included combinations of letters as reference points in particular documents. This stage of the process took less than 5 minutes.

After the initial thematic analysis, this scholar continued to want access to more information on language specific to food safety. The process moved from analyzing the entire data collection to comparing the FDA food code with each state’s legislation. Again, the scholar

chose the word frequency tool for this aspect of the process. Comparing the FDA food code with the legislation of each state provided data on a smaller scale but still did not offer an overall idea of what food safety language is consistent between state legislation and the FDA food code. The process provided a data set that was too broad for the analysis involved in this study. This process took the scholar around 2 hours to complete logistically.

Upon completing these processes, the scholar sought a new way to process the data through the MAXQDA software program. The word explorer tool led this scholar in a new direction with the analysis. The new direction of the thematic analysis allowed the researcher to narrow in on the coding process. However, it also provided the challenge of selecting the appropriate codes for this thematic analysis. This scholar looked at some of the professionals in food safety. These experts included the members of the FDA, NRA, and the literature composed by Frank Yiannas (2009). Literature from these organizations and Frank Yiannas provided a foundation for the coding system used in this thematic analysis. This scholar collected words from the FDA and NRA based on vocabulary selection. This scholar also ran one of Frank Yiannas's books through word frequency to compare to the selected vocabulary.

The combination of literature from these sources led to the creation of the final coding set. Chart 4.2 includes the words selected from NRA literature for use in the coding process. The word frequency information from Frank Yiannas's book, *Food Safety Culture: Creating Behavior-Based Food Safety Management System* includes 1970 terms. Only terms pertinent to this study are in chart 4.1.

Figure 1

Typical Food Safety Language

Typical Food Safety Language Table 1.0							
FDA	consumer	facilities	illness	Person	public	service	Water
Code	control	foodborne	items	Place	Rank	standards	Word
Food	documents	frequency	law	Plan	requirements	storage	
Area	employee	general	location	processing	Risk	system	
Authority	equipment	Hazard	materials	Product	Safe	temperature	
Charge	establishment	Health	number	protection	safety	time	

Context

Some food safety language is easily transferable to other facets of language. However, the context surrounding the language displayed in chart 4.1 makes it essential for food safety. Without context, this language can take on different meanings. The FDA (Food and Drug Administration) is a similar term in different contexts.

Audience

While the context surrounding language draws different meanings, the audience is crucial in the meaning represented by language. Connecting to a specific audience is sometimes a

concept thought of a message. When producing a message, one becomes confronted with the meaning one intends to produce while forgetting the audience. Leaving the audience out of relaying a message creates dissonance between the messenger and receiver. Often a message is spoiled by a lack of intentionality.

Consistency

The variations in language within these documents led this scholar to seek more consistent language to compare. Creswell and Poth (2018) find value in selecting different perspectives for analysis. The authors state that this analysis allows for encountering otherwise unattainable conclusions. The data analyzed in this study developed to become a combination of documents produced by the *Food and Drug Administration*, *National Restaurant Association*, Food Safety Professional Frank Yiannas, and state regulatory agencies. These documents include the FDA food code, NRA Servesafe vocabulary, the Frank Yiannas book, *Food Safety Culture: Creating a Behavior-Based Food Safety Management System*, and legislative material from each state regarding food safety.

The FDA guides the document. Frank Yiannas (2009) provides another base of language that informs food service workers about food safety. The final selection of literature provides consistency in this study. A thematic analysis comparison of the three supporting documents suggested 139 food safety words were similar. The original progression of this thematic analysis intended to compare the language from the FDA food code to the state legislative documents about food safety. The expectation was that this process would lead to the discovery of consistent language throughout all documents or a lack of consistency. However, the initial analysis provided evidence that 3006 words are in at least 50% of documents and 892 words are in at

least 75% of the document. Only 33 words are in 100% of documents. Only four words of 33 included in 100% of the documents were related to food safety.

When the meaning of a word has such a profound effect on an outcome, it is of the utmost importance for the audience of communication to understand the meaning. However, to portray the meaning one desires in communication, one must know the level of understanding of one's intended audience. Communication often focuses on the message one wants to portray rather than what the receiver perceives. Through this analysis, the researcher narrowed down the frequently used words associated with food safety between the documents. It is important to remark that the context of these words is vital to establishing meaning. For example, suppose these words are in a context outside of food safety. In that case, they will elicit a different meaning and serve a different purpose when peering through a different lens.

Preliminary Research Conclusion

The preliminary research conclusion from this study is that the language and formatting used to communicate in the FDA food code and state legislative material varies. Only forty words based on food safety appeared in all documents, and formatting and organization differed in numerous ways. The difference in language creates the question of whether food service and production industries can gain similar understanding through opinion leaders regardless of material creation standards. The two-step flow theory provides a foundation for the inference that individuals would gain a different meaning based on the language's context.

Summary

This qualitative applied thematic analysis took the traditional twists and turns during the process. To begin with, the initial manner of collecting data produced results that led to further assimilation. The initial process provided insight in a way that provided value moving forward.

The findings from this study provide insight into language's effect on food safety in different contexts. The two-step flow theory allowed further dissection of how language's meaning changes through context and its delivery. Chapter five provides further analysis of the findings addressed in chapter four. Chapter five provides a more in-depth look at the preliminary research conclusion.

CHAPTER FIVE: CONCLUSION

Overview

This qualitative applied thematic analysis describes the emerging themes associated with food safety language used by food regulatory agencies in the United States. The language of regulatory agencies is essential because these regulatory agencies are a huge component of ensuring public safety. This study provides evidence that their current tactics are unsuccessful in certain circumstances. Regardless of the outcome of their tactics, they are a significant component of food safety.

Different organizations and regulatory agencies define food safety through self-selected language. The two-step flow theory brings the perspective that the creators of such language create their own meaning based on the source they are using to create it. Studying the language used by regulatory agencies to identify potential dangers in food service environments can help determine how communication hinders or assists in protecting the public. Studying this language can also provide a foundation for communication to be used as a tool to help food service industry professionals produce safe food for all. This foundation can help create a standardized language used to describe dangers in food safety regardless of the preference of an opinion leader.

The two-step flow theory provides a theoretical framework that can aid in understanding the factors that affect the language that informs industry professionals on safe food production. Chapter Five addresses the findings of this qualitative applied thematic analysis, beginning with a summary of the results. Next, there will be a discussion of findings and implications while considering relevant literature and theory. This chapter also discusses the delimitations,

limitations, and recommendations for future research. The chapter concludes with a summary of the chapter and the conclusion derived from the study.

Summary of the Findings

Explaining qualitative data analysis is challenging, and the definition continues to become more complex (Creswell & Poth, 2018). This qualitative data analysis is no stranger to this phenomenon. However, a deeply rooted concept is that we aim to identify concepts to make connections using language. Safety is another difficult concept to define, but our survival depends on language to define it. A qualitative applied thematic analysis, although complex, provides crucial information on how to aid in determining viable communication in identifying safety and helping increase our survival rates. Next, we will examine how communication and qualitative thematic analysis create new meanings for communication in food safety.

This study's findings produce the results one would expect upon understanding the definitions of communication and qualitative research. Initial findings have results that magnify the complicated nature of communication. These findings include a diverse sample of the language contained in each document. Through the lens of the two-step flow theory opinion leaders can explain why language differs. An opinion leader, depending on the perspective may find language more important depending on their specific arena. It is important to remark that not all language used in this context is closely related to food safety. Yet, the interpretive nature of qualitative applied thematic analysis provided a more concise lens to examine the language. After the initial analysis delivered a diverse sample, the findings provided the ability to narrow the focus of data collection to words more closely related to food safety.

Comparing regulatory language with educational language material provided a foundation for a more concise collection of findings. Ultimately, comparing regulatory language

with educational language material reduced the findings from thousands of words to just under fifty. The analysis produced very few words regarding food safety. Having so few terms increased the probability of a gap in understanding between the audiences that rely on these documents. However, if this communication is diffused and applied it can be more meaningful to audiences with varying levels of understanding.

Applied communication research provides value to organizational communication as well as risk and crisis communication (O'Hair & O'Hair, 2020). The authors compare applied communication to problem-based research. To add more depth to this argument, the authors add that applied communication research provides a foundation for communication to solve problems using theory and methodology. The findings from this study allow industry professionals the ability to use theory and methodology-based research to reduce the likelihood of foodborne illness from occurring.

Discussion of the Findings

To discuss the finding, each research question is presented followed by associated results. The purpose of this study is to examine communication used by top entities in food safety. While standardization of communication can create valuable connections in the industry, this scholar desired to establish whether there is a uniformity of language, specifically regarding safe production in the food service industry. For example, the FDA is one entity that aims to produce information that will help the industry make safe food. State regulatory agencies are another entity that aims to create informative material. The initial data collected from comparing state legislation and the FDA food code facilitated a more concise way to gather the results of this thematic analysis. Comparing these two entities against the education material produced by the NRA and Frank Yiannas established the ability to collect uniform language between all artifacts.

RQ1. How do communication strategies differ between the FDA food code and state legislative material?

Communication strategies differ between the FDA food code and state legislative material. Formatting is one way in which legislative documents differ. The appendix of this dissertation includes examples of formatting. Some legislation is presented with formatting like the FDA food code, while others are not. Differences in formatting were also noticeable between some of the legislative documents. Certain legislative documents are web pages, while others are PDF or Word documents. The different formats made comparability difficult. All documents, regardless of original formatting, were converted into a similar format to make the documents easier to compare. Another strategy that differed between the FDA food code and state legislative material is the ability to access each document. While educational material on food safety is easily accessible, legislation, and regulation are more complex.

As far as strategy goes, Yiannas (2015) also remarked that the ease of readability of a text selection profoundly affects reading depth, persistence, or perseverance. He informs readers that written communication about food safety on standard operating procedures, food safety checklists, law and regulations, training and education curriculums, and consumer food safety recalls could benefit from research on readability. Word usage and meaning were other themes in the study of these documents. Song and Schwarz (2009) entail that many individuals associate risk with specific language. The authors explain that if a text is difficult to pronounce, an individual is likely to associate it with elevated risk. They argue that the analytic aspects of reading urge our brain to identify risk when it is unfamiliar with a set of texts. Therefore, some philosophers believe that if communicating identifies risk, the transmitter of information should

use detailed information. However, much literature on food safety, especially signage, only briefly explains the danger.

From another perspective, the FDA food code and state legislation differed in colors, fonts, numbers, order of information, and spacing. Yiannas (2015) says details affect how an individual perceives language. He states that font type influences information recall. Gasser et al. (2005) also found that some factors affect one's ability to recall information. Therefore, arranging food safety communication for different audiences can have huge implications on an individual's ability to identify information. These intricate details provide evidence of the complicated nature of communication regardless of the context.

RQ2. Why are there communication differences between the FDA food code and state legislative material?

The communication in the FDA food code and state legislative material differ in their target audience. Identifying the audience for each piece of literature shapes how entities communicate with their team and regulatory agencies. Rogala and Białowąs (2016) remark that the term "communicating" is often used interchangeably with the term "communication." However, the authors discuss that communication involves concepts such as sender and recipient. They identify that communicating is a reciprocal process that complicates how messages are sent and received. The authors also explain the complicated nature of producing a mutual message creates a realm in food safety where statements must occur in a reciprocal relationship between sender and recipient. Identifying the audience for communicating a message initiate whether a mutual relationship is necessary.

FDA food code and state legislative documents indicate that their communication targets a specific audience. For example, the FDA food code includes language the public may need.

From another perspective, the states' strategies for food safety legislation create the need for an audience of individuals running an establishment. State legislation regarding food safety governed by law implies that it is more critical than the FDA food code. The FDA uses different strategies to develop food codes as a tool for guidance. While state legislation included information that narrowed on legislation specific to the state it governs. The FDA food code covers information on all aspects of food safety. This diverse information base creates a reference point for those seeking guidance about food safety and those creating state food safety legislation.

Communicating and informing are other terms often used interchangeably (Rogala & Białowąs, 2016). However, the motivating factors behind expressing and informing are different. This is because communicating is a process that requires the establishment of a relationship. As previously mentioned, the purpose of the FDA food code and state legislative material differ. The FDA food code guides others in the creation of regulatory material. Legislative material regulates food through directive material. The differences in the content's purpose provide differences in communication through words and phrases. Communication differs from state legislation and the FDA food code, depending on who created the material. Communication is different between the FDA food code and state material because of the individuals responsible for creating it are different. For example, communication on food safety for a novice reader would differ from that meant for an expert on food safety.

RQ3. What do the themes of consistency or inconsistency in communication mean for industries that are held to these standards?

Rogala and Białowąs (2016) describe semiotic tradition as the idea of communication as a process that has shared meaning through signs. However, the authors suggest that with semiotic

tradition, the meaning comes from an individual instead of the words or symbols. Therefore, discourse is possible when inconsistencies exist in the messaging of the same information. However, it is also essential to discuss similarities and consistency in the messaging included in these documents. While there was much inconsistency in the messaging of these artifacts, there was some consistent language. The idea of consistency encourages the idea that similar meanings will occur through the transmission.

Depending on the state or entity formatting for the artifacts in this study differed. Some artifacts were simple and easy to navigate, while others would benefit from a more visually appealing format. These artifacts were more challenging to navigate. One factor that affected the artifacts was whether the state had accepted the FDA food code as its legislation. For example, California's lack of accepting a recent version of FDA food code makes a difference in what is approved by the state and placed in legislation. The conflicting means of communication in the artifacts create dissonance in how the messages are perceived. Legislation influences the strategic communication an entity has on an organizational level.

RQ4. What communication strategies can regulatory and inspection agencies use to identify food safety dangers

The artifacts used for this study provide examples of content about food safety in informational and educational strategies. Presenting the same information using different methods can create dissonance. The informational strategy, as opposed to educational, can also make messaging applicable to some individuals but not to others. Nonetheless, experts find informative content more beneficial, while a novice audience would benefit more from the educational material. The idea that the artifacts from this study cater to different audiences also raises the idea that the documents contain diverse types of language. The notion of consistent

language in each document establishes the hope for consistent language but a more realistic approach is necessary. Discourse within an industry comes when separate entities use different language to portray a similar message regarding food safety.

While dissonance occurs from using diverse ways to represent information through communication, there are some benefits. Diversity helps drive understanding from a broader spectrum of individuals. From another perspective, tactics like simplicity may need to provide more information for in-depth concerns. Language guides individuals in food safety, and the two-step flow theory describes those words are tools of meaning that create different perspectives of reality. Katz and Lazarsfeld (2006) describe that Lewinians identify reality as not absolute and that it differs between each social group. They state that social reality develops from social interaction and interpersonal relationships. This study can help individuals understand that context changes the meaning of each sign used to describe food safety. Therefore, all entities involved with food safety can produce language pertinent to their audience.

Connecting the Literature Review and Theory

The idea that language elicits a specific response from the meaning is cause for concern, especially when consistent messaging is not present. This concept is especially interesting regarding the two-step flow theory. The theory places a strong emphasis on the idea of an opinion leader (Katz & Lazarsfeld, 2006). The author state that ideas flow from a form of communication to opinion leaders to less active portions of a population. Throughout this study the importance of opinion leader has become valuable from different perspectives.

The first perspective is from the individuals creating food safety literature. From the perspective of the two-step flow theory, let us consider these individuals' opinion leaders. To

create communication in the food safety literature these opinion leaders gathered information from another source. Regardless of the opinion leader's source, they have formed meaning before creating any documentation. However, identifying this source is extremely important because if all opinion leaders responsible for creating the artifacts for this stem from the same source, it is important to remark that they are gaining different meanings. If anything, these opinion leaders are producing different messages. This provides direct results of the outcome of the two-step flow of communication. Nonetheless, there is a second perspective to point out regarding the theoretical perspective of this study.

The second perspective portrayed in the study comes by means of the opinion leaders that are using the artifacts of this study as references. These individuals are more susceptible to the differences, similarities, and themes referenced in this study. For example, the differences in formatting between documents or similarities in terms used to describe dangers in food safety. The opinion leaders using these documents as references are also more likely to be influenced by themes like whether a document has a legal or educational undertone. These individuals are more likely to be closer to the front-line workers and those encountering instances that require judgments on food safety action.

Overarching principles influence both perspectives represented by this study through the two-step flow theory. For example, different representations of a particular concept elicit a different response based on an individual's perception and life experiences. Regardless of an opinion leader's stature or role in the food safety chain, they are affected by the attributes of the communication they encounter and their perception and experiences. It is safe to say that some will produce similar messaging for an audience while others will not.

The idea of opinion leaders also elicits the idea that mass communication should aim to target potential opinion leaders as opposed to an entire audience. It is difficult to imagine an instance of mass communication in which it is possible to consider the entire audience. From a tactical perspective, identifying the opinion leader and understanding how they influence their audience is the most strategic way to use the concept. This is mainly due to the differences between perception and experience, whether personally or professionally. It also increases the ability to control an audience.

Communication is a structure of control, and language differences may serve an essential purpose in the structure of control (Mumby, 2013). Each entity provides messaging through different perspectives, which can create new meaning around the control structure. The author suggests that an organization's message includes a control that is direct and ideological. Identifying an audience is essential in many instances, including dealing with risk. Frewer et al. (2016) discussed the importance of identifying the appropriate audience when creating risk communication.

This study made the importance of identifying the appropriate audience abundantly clear. Initially, one might perceive that all communication about a particular subject should be identical, and that homogenous information would elicit a similar response. However, the authors mention a valid point with the creation of the material on food safety. The audience is of the utmost importance when creating material for messaging. They encourage cascading communication when discussing the different perspectives on food safety and how identifying an appropriate audience helps the creator of messaging produce correct and safe content.

Messaging can encourage the production of ineffective communication (Wang et al., 2019). The authors identified the specific factors that encourage ineffective communication as

missing, unnecessary, inaccurate, inferior quality, and ambiguous information. These factors are also present in the study of food safety communication. If helpful information is missing from a particular context, it could cause issues with how an audience perceives information about food safety. Different quality was also evident between different representations of food safety information, including formatting.

Another big topic is the amount of information that is unnecessary from one audience to another. Again, one might assume that the same information on a topic would be helpful to all if it is regarding one topic; however, it can overwhelm the reader. Subjective experiences and subconscious factors affect how variations in communication can hinder perceived messaging (Brown, 2014). Even with the highest quality messaging created with the best intentions, one can miss the mark based on the recipient's experiences and other subconscious factors affecting them at a given time. Just as in an experiment when a scientist wants to be able to control factors, one creating messaging should control as many factors as possible. While we can never control all the factors, it is important to control as much as possible.

Communication perceived through circumstances is essential, especially regarding safety. However, messaging has become even more critical. Perceived risk in our environment can warn us about danger. Han and Liu (2018) define risk as all destructive consequences that an individual believes possible. Therefore, ensuring an individual knows the destructive consequences surrounding risk is essential.

When it comes to food safety, many cannot identify the multitude of destructive consequences. Employees may hear a leader in their workplace talk about foodborne illnesses, but they have no idea that one consequence is death. Liu et al. (2020) express the importance of helping audiences recognize imminent danger through communication. While they studied the

effect of messaging through weather dynamics, the ultimate result of either perspective is death. Information about imminent danger regarding weather benefits experts discussing safety and risk. Credibility surrounding messaging also affects how a message is perceived (Kjellgren, 2013). Therefore, the combination of good and proven systems encourages cross-referencing of different systems.

Hartmann et al. (2018) studied how experts, producers, and consumers proceed when receiving the message of a present hazard. They were able to establish differences in how these individuals perceive danger. This information solidifies the importance of a model like cascading communication. The cascading communication model is more likely to meet different individuals' needs considering many factors.

Delimitations and Limitations

The complexity of communication places the idea of limitation no matter the context. One limitation is the researcher's limited knowledge of using software for thematic analysis. While the software program is easy to use, there are likely more efficient ways to dissect the provided content. This study has a limited scope of literature regarding food safety. More literature is available on food safety, but it is not included in the context of this study. However, this study aims to understand the literature the U.S. government produces instead of a broader spectrum of literature.

Implications

Rogala and Białowąs (2016) describe that communication has an attribute of continuity because it lasts an individual’s entire life. One crucial implication the authors represent is the notion of creating meaning. The formation of meaning inherently elicits the creation of assumptions. The authors describe that some assumptions are accurate; others create dissonance

in the transmission of information. When dealing with dangerous scenarios, dissonance can create an unsafe situation. As with any communication model, dissonance can bring unwanted assumptions.

Language is often intimidating, depending on its nature. Yiannas (2015) states that the more difficult it is to read a text, the more problematic the reader perceives an action. He states that the more difficult one anticipates an undertaking, the less likely people will attempt it. These concepts have enormous implications for food safety. For example, suppose a reader is responsible for reading the FDA food code to implement food safety procedures within an establishment but is intimidated by the language used. In that case, they are less likely to follow through. The information provided by this author also has implications for establishing the best way to represent concepts through language.

Zipkin et al. (2014) suggest that visual representations can be beneficial when describing risk to an audience. Visual representations could help more individuals understand the risks associated with food processing and preparation. Coffelt et al. (2019) describe that diverse communication skills benefit organizations as they encounter complicated issues. Therefore, instead of focusing on specific language to describe food safety, it may be more influential to include different forms of communication. For example, words combined with a visual representation may be the best way to help individuals learn more about the risk associated with food safety.

Recommendations for Future Research

Recommendations for future research hinge on the idea that adopting food safety communication will take extended time and energy. Industry leaders desire a quick fix to establish better systems around food safety communication. Industry communication about food

safety provides evidence of their desire for a quick fix. Cultural requirements in food safety also hamper any chance of quickly fixing the current issues. While direct coaching can create some quick adaptation, it is often temporary. Lasting adaptation happens when an individual feels the intrinsic motivation to prepare food safely. One of the best ways to develop intrinsic motivation is through communication that encourages a safe culture. For example, beneficial communication to build cultural change includes more positive than negative reinforcement.

The culture of many industries communicates that food safety is most important when a regulatory agency is paying attention. Many food industry cultures exhibit this type of behavior due to communication from upper-level leadership. Food safety needs communication to occur as though it is a life-or-death situation. If communication includes information about consequences, it should at least include statistics of how likely an individual is to get hurt but to the true extent of results. While industry leaders use these statistics to provide information on the likelihood of events to establish procedures, it would also be beneficial from a motivational perspective.

Suppose a food safety situation does not produce a high statistical probability of someone becoming ill or injured. In that case, the likelihood of it being a component of food safety training or ongoing communication is not high. Therefore, situations that can cause illness or injury but have a low probability of happening do not include prioritization in food safety training and communication. Although a situation may easily result in death, it can be deemed as unnessicsary after considering the complicated nature of other probable instances that promote the growth of foodborne pathogens.

Statistical probability has a significant role in food safety, but more needs to be studied on its importance in food safety training and communication. The idea of understanding one’s

audience may play a vital role in establishing when statistical probability should be in the development communication of food safety. While a situation is not considered probable to one industry, it can still be valuable to specific audiences. This value would not be based off probability, but off the knowledge itself.

While there is a harmonic effect from matching communication perfectly to the selected audience, the disconnect that happens without harmonization can have devastating results. Imagine having the opposite effect of what one intended the result of one's communication to be. While in a coffee shop, this may result in one receiving the wrong beverage. Nevertheless, in the realm of safety, it can result in severe illness or even death. Top professionals in food safety understand the dangers of not preparing food safely. Top professionals' understanding comes from their professional experience and educational background. However, individuals in the food service industry rely on understanding food safety concepts through cultural norms used in their personal life. Therefore, the understanding of these parties is different, and communication is unlikely to be harmonized without some diligent work.

For example, individuals that study and live out food safety from a professional perspective understand that cooking temperatures are scientifically proven to kill certain bacteria. Therefore, they are encouraged to incorporate specific behaviors to ensure these temperatures are met. However, an individual using cultural references to prepare food may use a technique that has been a component of a family recipe for generations. Both parties in this example would show passion and confidence in producing safe food.

Hence, these two parties received different messages regarding serving safe food. Combining these differing opinions with their backgrounds makes communication more complicated. It is unlikely that either individual would have cruel intentions, but their

perspectives create a roadblock to meaning. Likewise, communication includes vocabulary and nonverbal cues sent during encounters that establish a complicated nature. Rightfully so, this reality differs depending on one's experiences.

The discourse of interpretivism in understanding communication also brings perspective to food safety communication (Mumby, 2013). The author identifies that interpretivism forms one's world. Therefore, interpretivism in the realm of food safety adds to one's feeling of whether a particular instance is safe or not. If communication does not create one's reality, communication must establish their reality about food safety. Mumby (2013) also states that the real world is a symbolic world that provides a foundation for our existence.

A reality of the business world is that many professionals claim that identifying problems is easy; finding solutions brings challenges. One model proven to help professionals find solutions in organizational communication from the top leaders down to front-line workers is cascading communication. Cascading communication creates a natural filter for information and meaning. As opposed to discourse and dissonance, this filter allows communication to occur at various levels more naturally within an organization. Hierarchy can provide more relevant communication to take place. Moattar et al. (2022) discuss the importance of standardization of communication to help businesses find common ground for discussing matters. They state that communication systems based on agreed standard language provide a better execution foundation. The transference of a system in food safety regarding cascading communication would save lives. However, the standardization of concepts to various levels of employees is pertinent to the success of such a system.

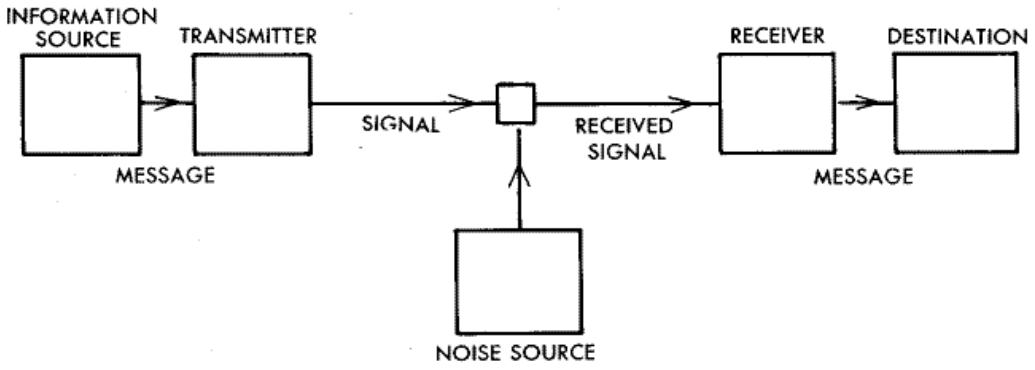
Cascading Communication

The addition of organizational communication concepts and, more specifically, strategic communication provide insight into the importance of how communication models can benefit food safety communication conceptually. Strategic communication provides intentional, purposeful, and persuasive storytelling that can benefit food service and production environments (Liang et al., 2018). Strategic communication provides the tools for entities to build a food safety culture in their adjacent environment. Awareness of strategic communication and using a communication model provides insight into whether a message will reach an audience and, even more importantly, whether the acceptance of messaging turns into action in food safety communication. This is to say that while many consider strategic communication an aspect involving one process, it should not always be accepted as such (van Ruler, 2018).

Strategic communication covers the different systems involved in communication, and Weaver and Shannon (1949) take this concept further by introducing the use of models. They use models to aid in explaining the phenomenon of communication. The author's symbolic representation of communication provides a visual representation of the flow of communication in each instance. Models provide evidence of how the differences in information and meaning often get lost in creating strategic communication (Weaver & Shannon). They produced the first and most influential linear model of communication.

Figure 2

Linear Model of Communication **(**Weaver & Shannon, 1949)



Cascading communication benefits an organization, but that is only a portion of the model's actual value. Cascading communication is valuable for an entire concept through diverse levels and entities. Misinterpretation is likely when there is a disconnect between concept and meaning through communication in an organization, and danger can follow. For example, the science behind some food safety exists within the concept of pathogens. Pathogens are disease-causing organisms. These organisms inhabit multiple environments. Many pathogens thrive in warm and moist environments. One environment they inhabit is our food. Some common pathogens found in food include E. Coli, Salmonella, and Norovirus. These diseases include symptoms such as diarrhea, vomiting, and other gastrointestinal issues. While for most individuals, the effects are considered mild. The effects can be deadly in individuals with compromised immune systems. Now, all this information is essential to individuals that work specifically from the perspective of a food safety professional. However, not all of it is necessary for all individuals that work in the food service and production industries. The identification of information that is a necessity for each level is where the cascading communication model is valid.

First, one must determine the critical factors necessary for the awareness of all industry individuals. Each entity needs to determine factors that inform and reinforce desired behaviors. FDA food code helps guide these entities to identify this information. In turn, the entity can communicate about food safety using language that is relevant to the audience. Legislative material can also provide valuable information on what is acceptable in each state to prevent foodborne pathogens from presenting themselves in food.

However, cascading communication continues. It requires additional flow to be successful. After each entity identifies appropriate information for its operations, it must break concepts down further. Employees need to know what information applies to the behaviors they perform daily. For example, when dealing with raw chicken, some industries teach employees to wear an alternate color of gloves. Tactics like this help signify that they have an elevated risk of transferring foodborne pathogens to foods that will not undergo the cooking process required to kill them before reaching the consumer. Not only does this communication include pertinent information to their role, but it also includes why it is an essential component of that role.

Next, communication can target specific behaviors for safe food handling, encouraging employees to ensure that chicken reaches proper thaw temperatures before cooking. This behavior reinforces the concept that chicken will reach the proper cooking temperature to kill foodborne pathogens. The communication that explains this concept helps prevent foodborne pathogens from being transferred to humans. Cascading communication breaks the concept down with the desire to only include the most relevant information. Relevance provides the pathway for meaning to intersect with action. This pathway continues with communication that motivates individuals to turn action into a habit. In this transaction, there is less to add to one's cognitive

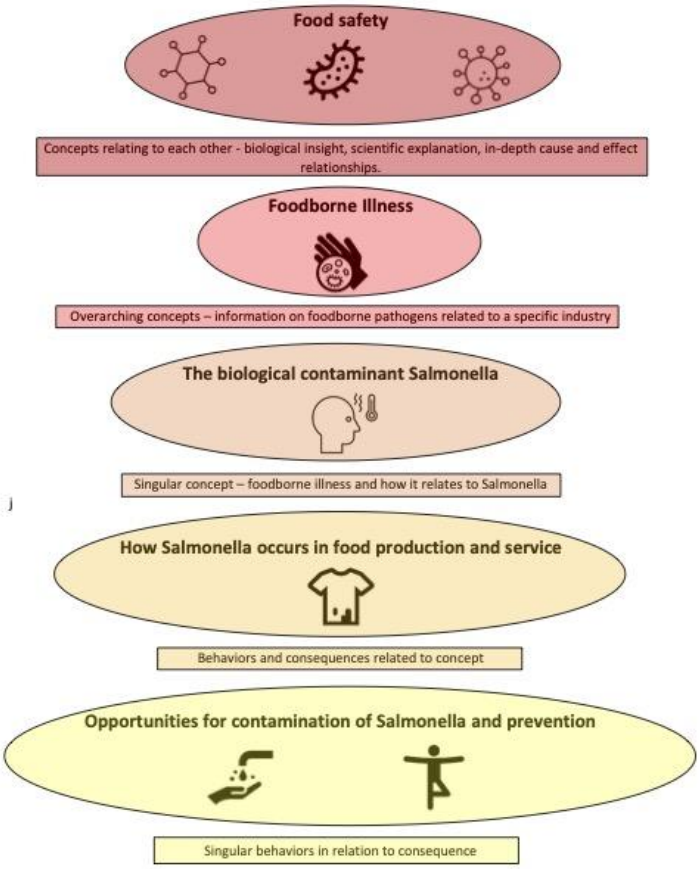
load by only including information necessary to their role. Relevant information helps individuals understand, but it also helps create a greater sense of ownership.

The specificity included with this type of communication provides employees with a more individualized educational experience. The difficulty of initiating a training program at this level involves investing time and resources. However, it pays off quickly as actions are more likely to become behaviors. The benefits outweigh the potential dangers associated with foodborne pathogens.

Cascading encourages communication, creating additional levels of understanding. An alternative meaning often transfers across the planned portion of the model. Individuals who gain meaning from the model are more likely to explain concepts to those who lack understanding. The benefits of a fully functioning cascading communication model are far-reaching. The FDA and other federal-level agencies can focus on significant overarching concepts. Likewise, state legislative professionals could focus on the legal aspects of safeguarding the public.

Figure 3

Model of Cascading Communication



In many cases, there is a need for the organization and communication of food safety concepts specific to each industry. This current disconnect creates differences between what concepts *are and are not* acceptable to operations within the same industry. Some companies have the resources to create a food safety curriculum implemented across an entire chain. These companies are better fit to run a safe operation than a smaller entity. The NRA is one association that attempts to bridge this gap for restaurants, but some consider the information in the curriculum too broad. Appropriate communication would include information specific to one realm of operation. If each realm of operation had the same opportunity to reference information

encouraging safe food handling, more operations would produce safe food. Closing the gap allows the cascade of communication to continue.

Cascading communication could be a better system. This complicated concept creates the opportunity for dissonance. However, the model's structure offers a better opportunity for meaning to reach various individuals. The food service industry needs to experience change regarding communication about food safety. To change behaviors associated with food safety, industry professionals must understand their influence on keeping the public safe. A complete understanding of influence includes clearly understanding the concepts explaining their behaviors' importance. Individuals will be encouraged to develop new behaviors and habits through the process. Breaking unpleasant habits and misconceptions about food safety will provide momentum for the societal change needed to create the desire for people to adapt their behaviors.

Summary

Throughout this study, this scholar has become familiar with communication's complexity. However, its humble beginnings plead for a focus on basic principles to improve food safety. The complicated nature of the food service industry only increases the need to discover principles that will help workers ensure the public stays safe. Yiannas (2015) includes information in his book that urges professionals to find ways to get employees to say “yes” to safe processes and procedures even when they do not seem logical and efficient. Using consistent language to speak about food safety will help more people in the food service industry say “yes” to safety.

This study analyzed the communication implemented by regulatory and educational entities of food safety. The FDA and state regulatory agencies provide information to industry

professionals on proper operating procedures that are most likely to produce safe food. Front-line industry members receive educational material from entities such as the NRA and individuals like Frank Yiannas. The two-step flow theory provided a theoretical framework for this qualitative applied thematic analysis to interpret how valuable the audience and other circumstances are in implementing communication on food safety. This study aimed to understand the uniformity in the language used to describe food safety.

Epilogue: "When Worlds Collide" – Food Safety, Moving Forward

Vacation is a time that many use to let loose and relax. It is an opportunity to create precious memories with family. One family, the Smiths, was excited to finally go on vacation after the pandemic had hampered their plans for several of the preceding years. Finally, the Smith family could travel to the coast for their annual beach trip. As lunchtime was approaching, the Smiths decided to stop and fill their gas tank and grab lunch. For many families, agreeing on one restaurant that everyone will enjoy can be difficult. Luckily, everyone decided to go through the drive-thru of their favorite restaurant. This restaurant was known for the quick production of food and popular menu items. However, more than anything else, the restaurant prides itself on producing safe food. The Smiths placed an order and were through the drive-thru in under 8 minutes. They enjoyed the meal and continued their journey to the beach.

This restaurant made sure to produce safe food through its training processes and ongoing monitoring and communication. The training process included language pertinent to each employee at the establishment. Employees knew it was important to take extra time to ensure the food was safe. Safety measures included taking the temperature of each batch of food and communicating the results to other front-line workers. Supervisors completed safety checks and provided direct communication to front-line workers of any gaps in protection measures.

Directors supported procedural and safety expectations gaps to ensure that no safety measures went unprotected.

While front-line workers, supervisors, and directors all received communication on food safety from different entities, each aligned on appropriate procedures because standardized language provided uniformity. Tony was valued in this establishment not just because he was fast but because he was safe. He was passionate, knowing that no food he served would make anyone sick. He shared passion with those around him by communicating his habits, body language, and each employee's accountability for one another.

Tony used his skills to produce food quickly and safely for customers. To help one of his coworkers, Tony moved a container of raw chicken. He placed the container on the appropriate shelf. Afterward, Tony removed his gloves and washed his hands to prevent cross-contamination of any ready-to-eat food he was preparing. Tony changed into a clean pair of gloves and returned to the assigned station. Tony continued producing quick, safe, and quality food. During Tony's shift, he prepared food for the Smith family and hundreds of other customers.

The Smith family thoroughly enjoyed their lunch. Even though Sharon, one of the family members, was immunocompromised, they knew the food they were eating was safe because the entity prided itself on producing safe food. Tony prepared food for this family, utterly unaware that a member was immunocompromised, but it did not matter as all the food was safe. While this story is easy to change on paper, this study provides evidence that establishing gaps in communication is just the beginning of providing a positive solution that ends more stories.

Handwashing seems simple, but it can seem like an irrational, time-consuming step in the quick-service industry. This mindset adapts through more consistent uniform communication. The language used in food safety education can become more sustainable and embedded in the

culture of the quick-service industry through standardization and diffusing information in a way that is pertinent to all elements involved.

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Appendix A

All Word Frequencies

Chart 4

Word	Length	Frequency	Documents %	Collectfoodwords	Original Doc
fda	3	4	100.00	2	2
code	4	3	100.00	1	2
food	4	3	100.00	1	2
area	4	2	100.00	1	1
authority	9	2	100.00	1	1
charge	6	2	100.00	1	1
consumer	8	2	100.00	1	1
control	7	2	100.00	1	1
documents	9	2	50.00	0	2
employee	8	2	100.00	1	1
equipment	9	2	100.00	1	1
establishment	13	2	100.00	1	1
facilities	10	2	100.00	1	1
foodborne	9	2	100.00	1	1
frequency	9	2	50.00	0	2
general	7	2	100.00	1	1
hazard	6	2	100.00	1	1
health	6	2	100.00	1	1
illness	7	2	100.00	1	1
items	5	2	100.00	1	1
law	3	2	100.00	1	1
location	8	2	100.00	1	1
materials	9	2	100.00	1	1
number	6	2	100.00	1	1
person	6	2	100.00	1	1
place	5	2	100.00	1	1
plan	4	2	100.00	1	1
processing	10	2	100.00	1	1
product	7	2	100.00	1	1
protection	10	2	100.00	1	1
public	6	2	100.00	1	1
rank	4	2	100.00	1	1
requirements	12	2	100.00	1	1
risk	4	2	100.00	1	1
safe	4	2	100.00	1	1
safety	6	2	100.00	1	1
service	7	2	100.00	1	1

standards	9	2	100.00	1	1
storage	7	2	100.00	1	1
system	6	2	100.00	1	1
temperature	11	2	100.00	1	1
time	4	2	100.00	1	1
water	5	2	100.00	1	1
word	4	2	100.00	1	1

Appendix B

Frequencies from NRA, FDA, and Yiannas

Chart 4.1

Word	Frequency	Documents	NRAterms	FDA.term.code	Yiannas2009_Book_FoodSafetyCulture
cooking	5	3	1	1	3
haccp	19	3	1	1	17
safe	18	3	1	1	16
storage	5	3	1	1	3
personal	22	3	1	1	20
equipment	24	3	2	2	20
time	43	3	1	1	41
consumer	3	3	1	1	1
hazard	8	3	2	1	5
water	9	3	1	3	5
safety	854	3	1	1	852
foodborne	83	3	1	1	81
area	10	3	1	2	7
service	11	3	1	1	9
outbreak	12	3	2	2	8
temperature	12	3	1	2	9
population	5	3	1	1	3
food	1075	3	9	10	1056
control	31	3	1	3	27
health	70	3	2	2	66
coli	4	3	1	2	1
code	20	3	1	1	18
physical	27	3	1	1	25
facilities	5	3	1	1	3
contamination	10	2	1	0	9
potentially	2	2	0	1	1
foundation	7	2	0	1	6
product	10	2	0	1	9
public	18	2	0	1	17
sink	6	2	0	1	5

number	17	2	0	1	16
critical	47	2	0	2	45
washing	12	2	1	0	11
item	4	2	0	3	1
care	5	2	0	1	4
program	23	2	0	1	22
cleanable	2	2	0	1	1
plant	4	2	0	1	3
drop	2	2	1	0	1
fda	13	2	0	1	12
general	7	2	0	1	6
allergen	2	2	1	1	0
establishment	24	2	0	2	22
active	2	2	1	0	1
reminder	2	2	0	1	1
restrict	2	2	1	1	0
allergic	7	2	1	0	6
biological	3	2	2	0	1
source	6	2	1	0	5
employee	52	2	0	3	49
issues	15	2	1	0	14
articles	2	2	0	1	1
core	6	2	0	1	5
action	15	2	1	0	14
cut	4	2	0	2	2
requirements	6	2	2	0	4
receiving	7	2	1	0	6
hand	18	2	2	0	16
contact	6	2	1	0	5
management	135	2	1	0	134
key	33	2	1	0	32
highly	4	2	0	1	3
sealed	3	2	0	2	1
foodservice	16	2	1	0	15
material	4	2	0	2	2
effectiveness	6	2	1	0	5
fish	3	2	0	1	2
inspecting	3	2	1	0	2

beverage	2	2	0	1	1
plumbing	4	2	0	2	2
materials	7	2	0	1	6
unsafe	11	2	1	0	10
limit	5	2	0	1	4
certified	4	2	1	0	3
reaction	4	2	1	0	3
raw	6	2	1	0	5
exclude	2	2	1	1	0
poultry	3	2	0	1	2
vomiting	3	2	1	0	2
produce	10	2	2	0	8
temperatures	8	2	1	0	7
risk	72	2	0	1	71
parasites	2	2	1	0	1
recall	5	2	1	0	4
ph	3	2	0	1	2
reporting	2	2	1	0	1
location	2	2	0	1	1
usda	3	2	0	1	2
salmonella	5	2	2	0	3
manager	15	2	1	0	14
imminent	2	2	1	1	0
purchasing	2	2	1	0	1
disease	75	2	0	2	73
point	40	2	0	1	39
controlled	4	2	1	0	3
hazardous	2	2	0	1	1
packaging	2	2	1	1	0
smooth	2	2	0	1	1
law	2	2	0	1	1
meat	4	2	0	2	2
regulations	3	2	0	1	2
utensil	3	2	0	1	2
allergens	2	2	1	0	1
person	37	2	0	2	35
measuring	10	2	0	1	9
pest	2	2	1	0	1

big	6	2	2	0	4
warewashing	2	2	0	1	1
system	113	2	0	2	111
standards	19	2	0	1	18
protection	9	2	1	0	8
authority	5	2	0	2	3
poor	12	2	1	0	11
holding	4	2	1	0	3
sanitizing	4	2	3	0	1
presentation	2	2	1	0	1
diarrhea	3	2	1	0	2
processing	5	2	0	1	4
easily	5	2	0	2	3
illness	10	2	2	0	8
toxic	2	2	0	1	1
priority	5	2	0	2	3
poisonous	2	2	0	1	1
six	2	2	1	0	1
pathogens	8	2	1	0	7
color	4	2	0	1	3
throat	2	2	1	0	1
place	29	2	0	1	28
hygiene	8	2	1	0	7
surface	2	2	1	1	0
plan	11	2	0	1	10
charge	4	2	0	1	3
fever	3	2	1	0	2
items	5	2	0	1	4
linens	2	2	0	1	1
major	17	2	0	1	16
animal	4	2	0	2	2
beef	2	2	0	1	1

Appendix C

National Restaurant Association Terms

Chart 4.2

Term Found	Matched to NRA
foodborne illness	Food Allergen
outbreak	Allergic Reaction
foodservice	Big 8 Allergens
foodborne-illness outbreak	Food Labels
contamination	Cross-contact
biological contaminants	Hand washing
chemical contaminants	Hand antiseptic
Physical contaminants	Infected wound
Unsafe source	Boil
Time-temperature abuse	Bare-hand contact
Cross-contamination	Reporting health issues
Poor personal hygiene	Staff illness
TCS time and temperature controlled for safety	Restrict
Ready-to-Eat Food	Exclude
High-risk population	Vomiting
Corrective action	Diarrhea
Certified Food Protection Manager	Jaundice
Food Code	Sore throat and fever
Fecal-oral route	Hazard
Microorganisms	Monitoring
Pathogens	Bimetallic Stemmed Thermometer
Harmful substances	Thermocouples and Thermistors
Big Six	Probes
Bacteria	Immersion probes
FAT TOM	Surface probes
Salmonella Typhi	Penetration probes
Nontyphoidal Salmonella	Air probes
Shigella spp.	Infrared (Laser) Thermometers
E. coli	Calibrate
Virus	Purchasing
Hepatitis A	Delivery
Norovirus	Receiving
Parasites	Inspecting

Fungi
Biological Toxins
MAP
sous vide food
Cleaning
Date Marking
Temperatures
Rotation
FIFO
Equipment
Quantity
Storage
Additives
Presentation
Thawing
Produce
Soaking or Storing
Fresh-cut produce
Raw seed sprouts
Pooled eggs
Pasteurized eggs
HACCP
Cooking requirements
Consumer Advisories
Reheating requirements
Holding food
Hot-holding equipment
Re-serving Food
Self-service Area
Bulk Food
Off-Site Service
Active Managerial Control
Safe Facilities
Key Drop Deliveries
Recall
Reduced-oxygen packaging (ROP)
vacuum-packed
Sanitizer Effectiveness
Sanitizing
Heat Sanitizing
Chemical Sanitizing
Potable water
cross-connection
Backflow
air gap
Grease condensation
Lighting
Ventilation
imminent health hazard
Pest Management
Dishwashing Machines

Appendix D

FDA Terms

Chart 4.3

Accredited program
Additive
Food additive
Color additive
Adulterated
Approved
Asymptomatic
aw
Balut
Beverage
Bottled drinking water
Casing
Certification number
CFR CODE OF FEDERAL REGULATIONS
CIP cleaned in place
CIP
Commingle
Comminuted
Conditional employee
Confirmed disease outbreak
Consumer
Core item
Corrosion-resistant material
Counter-mounted equipment
Critical control point
Critical limit
Cut leafy greens
Dealer
Disclosure
Drinking Water
Dry storage area
Easily Cleanable
Easily movable
Egg
Egg Product
Exclude
FDA
Fish
Food
Foodborne disease outbreak
Food-contact surface
Food employee
Food Establishment
Food Processing Plant
Game animal
General use pesticide
Grade A standards
HACCP plan
Handwashing Sink
Health practitioner
Hermetically sealed container
Highly susceptible population
Imminent health hazard
Injected
Intact Meat
Juice
Kitchenware
Law
Linens
Major Food Allergen
Meat
Mechanically Tenderized
mg/L
Molluscan shellfish
Non-Continuous Cooking
Packaged
Permit
Permit holder
Person
Person in charge

Employee
EPA
Equipment
Plumbing fixture
Plumbing system
Poisonous or toxic materials
Poultry
Premises
Primal cut
Priority Item
Priority Foundation Item
Public water system
Ratite
Ready-to-eat food
Reduced Oxygen Packaging
Refuse Regulatory authority
Reminder
Re-service
Restrict
Restricted egg
Restricted use pesticide
Risk
Safe material
Sanitization
Sealed
Service animal
Servicing area
Sewage
Shellfish control authority
Shellstock
Shiga toxin-producing Escherichia coli (STEC)
E. coli
Shucked shellfish
Single-Use Articles
Slacking
Smooth
Tableware
Temperature measuring device
Temporary food establishment
Personal Care Items
pH
Physical facilities
Utensil
Variance
Vending machine
Vending machine location
Warewashing
Whole-muscle, intact beef
USDA

Appendix E

All Chart Words

Chart 4.4

FDA
Code
Food
Area
Authority
charge
Consumer
Control
~~Documents*~~
Employee
Equipment
establishment
facilities
foodborne
~~Frequency*~~
general
Hazard
Health
Illness
Items
Law
Location
Materials
Number
Person
Place
Plan
Processing
Product
Protection
Public
Rank
Requirement
Risk
Safety
Service
Standards
Storage
System
Temperature
Time
water
Word

*Words not included as a frequency in all data sets (NRA terms, FDA terms, Yiannas Book, FDA food code and state legislation.

Appendix F

State Food Legislation Examples

Chapter 31. Alaska Food Code.

Article

1. General Operating and Permit Requirements (18 AAC 31.010 - 18 AAC 31.070)
2. Food Care (18 AAC 31.200 - 18 AAC 31.265)
3. Management and Personnel (18 AAC 31.300 - 18 AAC 31.335)
4. Equipment and Utensils (18 AAC 31.400 - 18 AAC 31.425)
5. Sanitation and Physical Facilities (18 AAC 31.500 - 18 AAC 31.575)
6. Temporary Food Service, Limited Food Service, Mobile Food Units, and Vending Machines (18 AAC 31.600 - 18 AAC 31.630)
7. Food Processing (18 AAC 31.700 - 18 AAC 31.770)
8. Markets (18 AAC 31.800 - 18 AAC 31.820)
9. Compliance Procedures and General Provisions (18 AAC 31.900 - 18 AAC 31.990)

Editor's Notes: The regulations in this chapter, effective May 18, 1997, and distributed in Register 142, have been renumbered and reorganized. The history notes at the end of each section do not reflect the history of that section as it appeared before May 18, 1997, nor do the article or section titles or numbers reflect previous titles or numbering. Previous amendments to these regulations may be reviewed at the Office of the Lieutenant Governor. Refer to regulations in and amendments to 7 AAC 25 for requirements in effect before the issuance of Executive Order No. 51 which transferred functions from the Department of Health and Social Services to the Department of Environmental Conservation. Previous amendments to some of the regulations in this chapter occurred before those regulations were transferred from 18 AAC 30.

§11-50-1

SUBCHAPTER 1

GENERAL PROVISIONS

§11-50-1 Purpose. The purpose of this chapter is to provide minimum requirements for the protection of the life, health, safety, and welfare of the general public.

(1) This chapter applies to all food establishments, or portions thereof, used, designed, or intended to be used as a food establishment or food operation within the State;
(2) The minimum requirements established herein shall not be construed as lowering the standards established by local ordinances or rules;
(3) Whenever local requirements contain more stringent provisions than any of the minimum requirements of this chapter, the more stringent requirements shall govern; and
(4) No ordinance, rules, ruling, or decision of any municipal body or officer of authority of any county shall repeal, amend, modify, or dispense with any of the minimum requirements provided in this chapter. [Eff 2/24/2014; comp SEP 01 2017]
(Auth: HRS §321-11) (Imp: HRS §321-11)

§11-50-2 Definitions. As used in this chapter:

"Adulterated" has the meaning stated in section 402 of the Federal Food, Drug, and Cosmetic Act.

"Approved" means acceptable to the department based on a determination of conformity with principles, practices, and generally recognized standards that protect public health.

"Asymptomatic" means without obvious symptoms; not showing or producing indications of a disease or other medical condition, such as an individual infected with a pathogen but not exhibiting or producing any signs or symptoms of vomiting, diarrhea, or jaundice. Asymptomatic includes not showing symptoms because symptoms have resolved or subsided, or because symptoms never manifested.

"A_w" means water activity which is a measure of the free moisture in a food, is the quotient of the water vapor pressure of the substance divided by the vapor pressure of pure water at the same temperature, and is indicated by the symbol A_w.

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