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TESTING THE MESSAGE: MAKING SENSE OF CONVERGING MULTIMODAL
MESSAGES IN A FOODBORNE ILLNESS OUTBREAK

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DISSERTATION

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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Communication and Information
at the University of Kentucky

By
Bethney A. Wilson

Lexington, Kentucky

Co-Directors: Dr. Timothy Sellnow, Professor of Communication
and   Dr. Derek R. Lane, Professor of Communication

Lexington, Kentucky

2014

ABSTRACT OF DISSERTATION

TESTING THE MESSAGE: MAKING SENSE OF CONVERGING MULTIMODAL
MESSAGES IN A FOODBORNE ILLNESS OUTBREAK

The goal of risk and crisis communication is to reduce and contain the harm inherent in a threat. In order to achieve this goal, risk and crisis scholars call for continued testing of messages surrounding these events; specifically, messages that address the needs of the at-risk message receiver. Previous scholarship suggests that these messages should include adapting and instructing information (Coombs, 2012), and should be designed using pedagogically sound instructional approaches (Frisby, Sellnow, Sellnow, Lane, & Veil, 2011; Sellnow & Sellnow, 2010). In order to meet this call, this dissertation tested an instructionally sound message that includes both adapting and instructing information related to a foodborne illness event including a hypothetical E. coli contamination in ground beef affecting the state of Kentucky. Foodborne illness outbreaks are unique in that they must address those at risk of contamination while simultaneously addressing the needs of those experiencing the crisis (i.e. those already contaminated). The research tested the ability of participants to make positive sense of risk message related to the E. coli outbreak; specifically exploring the effect of augmenting traditional video warning messages with converging Twitter messages and positive sensemaking on behavioral intentions and self-efficacy. Results indicate that individuals who are able to make positive sense of the message, report greater self-efficacy and behavioral intentions in line with message recommendations. Further, individuals who receive an IDEA model message and converging Twitter messages report greater attitudes and beliefs related to the message than individuals who receive a traditional video warning message. These findings indicate a need for continued research on the role of positive sensemaking and the type of message received as they directly affect perceptions of messages and intentions to comply with recommendations.

KEYWORDS: Crisis Communication, Sensemaking, Foodborne Illness, Social Media, Twitter

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August 5, 2014

TESTING THE MESSAGE: MAKING SENSE OF CONVERGING MULTIMODAL
MESSAGES IN A FOODBORNE ILLNESS OUTBREAK

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Table of Contents

List of Tables

Chapter One: Introduction

Risk and crisis messages serve a central role in minimizing harm. These messages provide information about avoiding harm through product recalls, instructions for decontaminating products, instructions for evacuating or sheltering in place, or recommending any number of preventative and protective behaviors. The messages may also provide information about how to protect oneself when affected by a crisis (i.e., experiencing negative outcomes associated with the crisis). Understanding the need for risk and crisis messages warrants a discussion of the ever-increasing nature of risk and crisis events. Perrow (1999) provides a systemic approach to exploring the nature of what he refers to as "normal accidents," explaining that accidents (e.g., times of high risk or crisis) are inherent in the coupling and interactions within a system. He argues, systems are tightly coupled, meaning the subsystems comprising the system are time sensitive and cannot tolerate delays in interaction, lead to inevitable accidents. The inevitability of incidents is the fundamental argument for normal accidents. This extends to the area of public health, as "crises and disasters are increasingly dynamic events, interacting with technological, social, political, economic, and natural factors in highly complex, unpredictable, and unanticipated ways" (Seeger & Reynolds, 2008, p. 5). Specifically, "most kinds of public health crisis can be described as severe threats to the physical and psychological security, stability, health, and well-being of the public, resulting from complex, nonlinear, and unanticipated interactions" (Seeger & Reynolds, 2008, p. 6).

Increase in Crises

The interconnectivity of production systems has the potential to create widespread and cascading crises. The risk of an impending crisis increases through "advancing

technology, unprecedented globalization, and insatiable demand for energy… that continue to complicate human activity" (Sellnow, Ulmer, Seeger, & Littlefield, 2009, p. 3). The tightly coupled interconnected nature of the food production system makes the system especially vulnerable to crises. "From agricultural production systems on farms, orchards, and ranches, through processing in industrial settings to transportation, distribution, wholesale and retail outlets on to the consumer, preparation and consumption, modern food production is very susceptible to systematic breakdown" (Seeger, 2005, p. 80). While modern techniques have reduced incidents of foodborne illness brought about by contamination in food, the complexity and globalization of the food supply has altered the profile of foodborne illness outbreaks (Seeger, 2005).

The Centers for Disease Control and Prevention (CDC; n. d. b) define foodborne illness as "a common, costly-yet preventable—public health problem. Each year, 1 in 6 Americans gets sick by consuming contaminated foods or beverages. Many different disease-causing microbes, or pathogens, can contaminate foods, so there are many different foodborne infections" (para. 1). Because more than 250 foodborne diseases have been described, "there is no one 'syndrome' that is foodborne illness. However, [in foodborne illness] the microbe or toxin enters the body through the gastrointestinal tract, and often causes the first symptoms there, so nausea, vomiting, abdominal cramps and diarrhea are common symptoms" (CDC, n. d. a, para. 3). The CDC (n. d. b) further explains "an outbreak of foodborne illness occurs when a group of people consume the same contaminated food and two or more of them come down with the same illness" (para. 49). The complexity and globalization accompanying advancement in food production increases the potential for widespread harm resulting from food system flaws.

2

Cuite and Hallman (2009) echo Seeger's sentiment, suggesting "as our ability to identify these types of [foodborne illness] outbreaks improves, and as our food system becomes increasingly interconnected, we are likely to encounter large scale recalls and warnings more frequently" (p. 24).

The recent rash of food product recalls speaks to the changing environment of food safety. In 2006 the Food and Drug Administration (FDA) warned the public to avoid fresh spinach (FDA, 2007). In 2007, a recall on melamine contaminated pet food was issued (FDA, 2008a), followed by the largest meat recall in history in early 2008, when more than 143 million pounds of beef was recalled (Healy & Schmit, 2008). In the spring and summer of that same year, the largest incidence of foodborne illness in a decade emerged from Salmonella Saintpaul, which was ultimately linked to contaminants in fresh jalapeno peppers imported from Mexico (FDA, 2008c). In 2009, the largest food recall in United States history occurred with more than 2,100 peanut products being recalled for Salmonella Typhimurium. The peanut product recall was linked to the Peanut Corporation of America, a company that produced a peanut paste used in a variety of products (FDA, 2008d; FDA 2009). In 2010, a Salmonella Enteritidis outbreak in shelled eggs led to the recall of over 170 million eggs, sold under five different brand names (FDA, 2010; MSNBC, 2010). In the fall of 2011, a multistate recall of cantaloupe contaminated with Listeria Monocytogenes caused 147 people in 28 states to become ill, killing 33 people (CDC, 2012). The frequency, size, and publicized nature of these foodborne illness events has shaken America's confidence in the food supply (Consumer Reports National Research Center, 2008). Further, these outbreaks speak to the need for additional evaluation of risk and crisis messages related to foodborne illness.

Unique Challenges of Foodborne Illness Outbreaks

A foodborne illness event creates a unique communication environment, as foodborne illness is both a risk to individuals not infected and a crisis to those experiencing symptoms. Those uninfected have the potential of coming in contact with the contaminated product and need to be warned of the danger in order to avoid the product and protect themselves. While those already experiencing symptoms need information about what to do in order to reduce the inherent harm. An additional challenge is "as the old folk wisdom has it: 'You are what you eat'. Food is necessary for life, health, and well-being; it is not a luxury item people can choose to do without" (Sellnow et al., 2009, pp. 147-148). The necessity of food makes communication about foodborne illness essential in ensuring the health and well-being of the public.

The CDC (n. d.) estimates that every year roughly 48 million people get sick, 128,000 are hospitalized, and 3,000 die of foodborne disease. While these numbers have improved from a decade ago (Mead et al., 1999), they still indicate that Americans are frequently exposed to pathogens causing foodborne illness. Based on estimates from the CDC (n. d.), in 2011 eight known contaminates were responsible for the majority of foodborne illness outbreaks. Further, 91 percent of domestically acquired foodborne illnesses were linked to one of five pathogens (i.e., Norovirus, nontyphoidal Salmonella, Clostridium perfringens, Campylobacter spp., and Staphylocaccos aureus), 88 percent of hospitalizations were linked to nontyphoidal Salmonella, Norovirus, Campylobacter spp., Toxoplasma gondii, and E. coli 0157. Additionally, 88 percent of deaths were attributed to nontyphoidal Salmonella, Toxoplasma gondii, Listeria monocytogenes; Norovirus, and Campylobacter spp..

The numbers speak to the serious nature of foodborne illness. While the terms risk communication and crisis communication are used somewhat interchangeably in the literature, a clear distinction can be drawn. Simply put, crisis is "risk manifest" (Heath, 2006, p. 1). Distinguishing between a risk and crisis events is essential in determining the necessary elements of the communication response. Risk communication is "an interactive process of exchange of information and opinion among individuals, groups, and institutions" (National Research Council, 1989, p. 2). "Crisis communication occurs when the risk is high to an audience that has experienced a breach in stability and in search of information that will help alleviate the problems at hand" (Maggee, Payne, & Ratzan, 2008, p. 236). A failure to communicate risk messages can lead to intense crises (Ulmer, Sellnow, & Seeger, 2007). The shared goal of risk and crisis communication is to empower affected stakeholders (Palenchar, 2009). In a foodborne illness event, if an individual does not receive risk messages, the individual will be unable to protect him or herself from potential harm. Thus, risk messages should be distributed through a variety of formats and channels in order to reach the greatest number of affected publics.

Three characteristics distinguish a crisis from an unpleasant occurrence: surprise, threat, and short response time (Herman, 1963; Ulmer et al., 2007). Based on these characteristics, a foodborne illness outbreak is a crisis: Individuals expect that the food they purchase will be safe (surprise). The presence of a microbial contaminate in the food has the potential to cause an array of issues from discomfort to death (threat of serious illness). If not addressed and contained, contaminated food could be widely distributed and consumed (short response time). While Perrow would suggest that accidents are

normal, the lack of information, short response time, and potentially high threat of harm place foodborne illness in the category of crisis as opposed to incident or accident.

Crisis communication is marked by three distinct phases: pre-crisis, acute crisis, and post-crisis (Coombs, 2012). The pre-crisis stage is marked with messages intended to mitigate harm and encourage preparation for the crisis event (i.e., messages calling for the avoidance of contaminated products). Communication in the acute phase of a crisis involves disseminating instructing and adjusting information to help individuals cope with the crisis event (e.g., what to do if you are exposed to contaminated products). Finally, post-crisis communication provides an opportunity for communication after activities have returned to normal, specifically providing an opportunity to explain organizational learning and renewal (e.g., what led to the contamination, what is being done to ensure that another contamination will not occur, and information about the returned safety of the contaminated product). The pre-crisis stage is strongly tied to risk messages, in essence risk and pre-crisis messages work together to warn the public and minimize the harm inherent in the acute crisis (Coombs, 2012). The messages tested in this dissertation are designed to be employed during the acute phase of a crisis. That is, the message are designed to inform and instruct those infected what to do and those not yet affected how to avoid contamination.

Risk messages surrounding foodborne illness outbreaks are unique. Organizations and public health practitioners cannot afford to wait until a clear picture of the contamination is available before warning the public. The "foodborne illness surveillance systems require time to accurately identify the food that is causing an outbreak, and as a result of this we are likely to continue to receive dynamic, changing messages from the

6

FDA" (Cuite & Hallman, 2009, p. 24). The continual flow of information necessitates multiple messages potentially with varied content and warnings. The dynamic nature of foodborne illness often makes it difficult for a specific company to issue a product recall. In some cases, the contamination is larger than a single company. The contaminated product may be an additive in a variety of products sold by multiple companies, as was the case of the peanut paste distributed by the Peanut Corporation of America. If a company is unwilling or unable to provide a warning message to the public, the responsibility shifts to governmental agencies (Millner, Veil, & Sellnow, 2011). Specifically, when consumers may benefit from avoiding products linked to a foodborne illness, a federal agency, such as the FDA, may issue a warning to consumers (Hallman & Cuite, 2009). For example, during the 2008 Salmonella Saintpaul outbreak, the initial FDA reports stated that tomatoes were the likely cause of the outbreak, but a month later the contamination was linked to jalapeno peppers (FDA, 2008b, 2008c). The changing content of the warning message creates a problem for risk and crisis communicators as initial media coverage has passed and, likely with it, the publics' attention.

    While food avoidance warnings and product recalls originate from individual companies or federal agencies, the news media serve as intermediate receivers of the message, transmitting the warning to the end receivers, the public. Media outlets serve as an important communication channel for foodborne illness events, because the public's understanding, concern, and attitude toward food contamination are shaped by media coverage (Barnett et al., 2011). Experts suggest that food warnings should provide information about the symptoms, treatment, and avoidance strategies to the public (Reynolds & Seeger, 2005). However, conveying outbreak information through

traditional news outlets can be problematic. The realities of outbreaks make the dissemination of information less exact. The dynamic and evolving nature of foodborne illness outbreaks results in multiple press releases, conference calls, and growing lists of affected areas over potentially long periods of time, all of which must be conveyed to the affected public (Cuite et al., 2009). While the goal of the information disseminated from government agencies is to provide information about the symptoms, treatments, and avoidance strategies, the nature of media coverage is not always conducive to clear and thorough reporting of food recalls (Frisby, Veil, & Sellnow, 2013). Often traditional media outlets sensationalize stories in order to draw an audience (Potter, 2013), which is a problem for message distributors. The necessary information may be aired a few times during the initial phase of an outbreak, but subsequent messages are likely to center around more sensational elements of the story including loss of life or blame.

In an attempt address issues surrounding risk and crisis communication a number of best practices have been proposed (Seeger, 2006; Sellnow et al., 2009). Best practice approaches are popular in a variety of organizational and professional communication settings; Seeger (2006) explains that "process improvement generally involves systematic overview, analysis, and assessment of organizational process in an effort to improve quality and efficiency" (p. 233). In order to pose best practices in risk and crisis communication, scholars and practitioners systematically analyzed communication surrounding risk and crisis situations and developed abstract applications that can be molded to fit the unique qualities of each event. The underlying themes of the best practice approach to crisis communication are communicating openly with honesty and integrity. The best practices are meant as a guide for organizations disseminating

messages; however, the best practices fail to address a strategy for gaining media compliance in disseminating multiple and convergent messages.

Access to information alone may not influence behavior. However, avoidance behavior would be impossible without the dissemination of relevant information and instruction. Food recalls must include information about the recalled product, information about the harm inherent in the threat of the toxin or pathogen, and recommendations for behaviors that will protect against contamination (Witte, 1992; Hallman & Cuite, 2009). These needs place a high demand on media outlets to present pertinent, up-to-date information in a timely manner. Unfortunately, studies on news reports surrounding foodborne illness outbreaks indicate that news reports tend to focus on blame, and "fail to provide consumers with details about where they can find such [additional] information" (Hallman & Cuite, 2009, p. 6). For example, after the initial 2009 Salmonella Saintpaul outbreak news reports focused on the number of deaths, illnesses attributed to the outbreak, and progress of the investigation. Subsequent media reports failed to focus on what products were safe, what products were unsafe, symptoms of Salmonella, at-risk populations, or practical information about how consumers could protect themselves and avoid contamination. The messages lacked instructions on "what to do" (Nucci, Cuite, & Hallman, 2009, p. 257). While traditional news broadcasts have failed to disseminate all of the necessary information to at-risk publics, new media provides additional opportunities. Various new media formats allow minimally restricted access to large portions of the population, making new media a potential source to disseminate additional converging information.

Content of a Foodborne Illness Outbreak Message

Risk messages disseminated in the face of a crisis are adapted from technical reports and altered for audience members' comprehension. The intent is for audience members to believe the messages are important and meant for them. The goal of risk messages is to "translate and operationalize technical understanding of risk into behaviors through persuasive and informative messages while addressing public concern or fear" a concern which, "often requires addressing the cultural or social factors related to the risk" (Seeger & Reynolds, 2008, p. 11). As the purpose of risk communication is to prevent crisis, these messages are generally forward-looking with the hope of reducing the likelihood of a crisis (Sellnow et al., 2009). Risk messages emerge in situations that are inherently uncertain and riddled with ambiguity due to a lack of information. Easing the uncertainty fostered by the lack of information in a crisis is possible through the generation of credible messages comprised of available evidence (Sellnow et al., 2009). The role of governmental agencies in distributing food product recall information speaks to the credibility of the source and the available evidence. Sellnow (2009) and colleagues explain, "*ambiguity* occurs when the available information is interpreted in more than one way and the quality or appropriate application of this evidence is debated" (p. 7). Unfortunately, these warning messages are ambiguous because not all information is immediately available. The complex trace systems involved in determining the contaminated item take time, meaning that early warning information may have to be ambiguous (Hallman & Cuite, 2009).

The messages produced in a crisis serve two functions, to provide instructing and adjusting information (Coombs, 2012). Instructing messages are the messages that allow

10

individuals to cope physically, while adjusting information provides information needed to cope psychologically with the crisis. Instructional communication plays an essential role in responding to the chaos invoked by the surprise, threat, and short response time inherent in crisis. The scope of instructional communication is broad, including the role of communication in learning in any context. Crises provide impetus for 'learning' as affected publics need to learn, or acquire, the necessary skills for mitigating or avoiding harm. The goal of instructing information is to provide those affected with strategies to protect themselves from the crisis (Coombs, 2012). Coombs call for instructing information falls in line with Reynolds and Seeger (2008) conceptualization of crisis communication. Reynolds and Seeger assert that "crisis communication seeks to *explain* the specific event, *identify* likely consequences and outcomes, and *provide* specific harm-reducing information to affected communities in an honest, candid, prompt, accurate, and complete manner" [emphasis added] (p. 11).

Instructional messages disseminated in a crisis should include elements explaining the threat and harm inherent in the situation, as well as information to promote self and response-efficacy in the necessary behaviors to avoid the risk. To accomplish these objectives, instructing messages should provide an assessment of the risk in order to gain attention from the intended receivers (audience), provide messages that enhance receiver self-efficacy, and provide clear insight that completing the prescribed action will in fact prevent the harm (response-efficacy) (Coombs, 2012). Seeger, Reynolds, and Sellnow (2009) are in agreement with Coombs, asserting that, in the acute crisis phase, the key goals are to reduce uncertainty, increase self-efficacy to follow instructions, and provide reassurance about the crisis response. Instructional messages must provide those

11

affected with information about the immediate threat, a general understanding of the circumstances, and an understanding of the necessary personal response activities. Personal response activities include any action that needs to be taken by an individual (or public as a whole) to prevent harm. Messages should be constructed in line with the principles of instructional communication in order to help the public avoid harm.

Changing access and opportunity in new news media. Information seeking behaviors place pressure on organizations to create messages that are accessible and aid the public in making sense (Seeger, Vennette, Ulmer, & Sellnow, 2002). Information is necessary for affected individuals to make informed decisions, because, "individuals cannot make informed choices about engaging in some behavior, or taking some risk, without the benefit of accurate information about that risk" (Sellnow et al., 2009, p. 149). The demand for information serves as a call for meaningful access to risk information so all affected individuals are able to interact with credible sources and obtain information necessary to make informed judgments about a risk. Understanding that the public is actively seeking information in the event of a crisis places the demand on message producers to create and disseminate information.

Mass media outlets, specifically television, have traditionally been the avenue through which the public has learned about foodborne illness outbreaks. As recent as 2009, television has been hailed as the most common medium for information seeking in risk and crisis situations based on its ability to provide immediate information and visual aids (Heath & O'Hair, 2009). The majority of Americans (66%) learned about the 2006 spinach recall from television, and again, the majority of Americans (71%) reported learning about the 2008 Salmonella Saintpaul outbreak from television (Lenhart, 2009).

Findings from the Pew Research Center add further support for television as a primary

medium, reporting that 55% of Americans receive risk and crisis messages from

television (Smith & Brenner, 2012). However, Lenhart and others acknowledges that the

media usage pattern of Americans is changing. Despite findings of the prominence of

televised news, an "increasing number of consumers are using social networking sites

such as Facebook, Twitter, and blogs" to access information, so much so that "the USDA,

FDA, CDC, and other federal agencies and industry organizations are starting to

communicate with the public using these tools" (Hallman & Cuite, 2009, p. 5). In 2012,

39% of Americans reported receiving their news from online or mobile devices (Duggan

& Brenner, 2013).

Crisis messages via an online or mobile device have the potential to increase

awareness of an incident and access to necessary information. Kreps and colleagues

(2005) point out, "one of the biggest challenges… [is] making relevant information

accessible and understandable to highly varied subgroups in society" (p. 196). The

changing nature of media access increases the potential of crisis messages reaching the

affected public. Specifically, the ability of communicators to create and disseminate

messages with highly varied and specific target audiences in mind, through a channel that

at-risk publics actually access, has the potential to prevent harm in a way traditional

media could not. A 2010 Pew Internet survey found that 33% of mobile phone owners

read newspapers on their mobile phones, and 37% of Internet users distribute news

content through social media sites such as Twitter and Facebook (Hong, 2010, p. 69). The

use of the internet and social media has the potential to create "a shared connection of

people and/or organizations… with common values and interests" which can result in "an

inherently higher trust factor for information because of the shared network of friends, contacts and organizations" (Crowe, 2011, p. 410). The shifting and growing nature of media consumers drives the need for research linking social media use and risk and crisis messages. The unique challenges of foodborne illness outbreaks, specifically the timely release of accurate information, makes social media outlets, like Twitter, ideal for disseminating informative messages.

Project Overview

The purpose of the current dissertation is to evaluate the effectiveness of traditional televised crisis messages incorporating an IDEA model and augmented with congruent social media messages. Further, the current study explored the ability of message receivers to make positive and protective sense of the warning message. The analysis compared news broadcasts surrounding a foodborne illness; specifically participants received one of four stimuli messages. The first condition, the comparison video, consisted of a video warning message with content based on an actual news script used to report a 2011 E. coli outbreak in ground beef. The second condition, the treatment video, was a video warning message based on the same 2011 E. coli outbreak script, but the content was altered to reflect the IDEA model (i.e., Internalization, Distribution, Explanation, and Action). The third condition consisted of the comparison video message followed by a series of Twitter messages (30 tweets). The tweets were comprised of three official sources cited in the video messages reporting convergent and in some cases congruent information about the outbreak. The fourth condition consisted of the treatment IDEA model video and the accompanying Twitter messages. The content for all of the messages was designed to reflect a local contamination.

Overview of chapters. The dissertation is organized into the following chapters. Chapter One served as an introduction and rationale for continued research on the testing of messages in a crisis. Chapter Two provides a review of literature pertaining to social media, sensemaking, risk and crisis messages, and message convergence. Chapter Three describes the method and tools used for data collection. The results are provided in Chapter Four. Finally, Chapter Five provides a discussion of the results, limitations, future research, and the conclusion.

Chapter Two: Literature Review

In risk and crisis situations (i.e., foodborne illness events), individuals work to make sense of the many messages received in order to protect themselves. The focus of this dissertation is to understand how individuals make sense of converging multimedia instructional messages in order to protect themselves in the face of a foodborne illness event. The research draws on a number of theories, including Weick's (1979; 1995) theory of sensemaking, aspects of Mayer's (1996) work on multimedia learning, and the message convergence framework (Sellnow et al., 2009) to evaluate attitudes, beliefs, behavioral intentions, and the fostering of effective sensemaking through the augmentation of televised news casts with social media messages. The literature review begins with an exploration of the use of multimedia and social media messages in risk and crisis situations, followed by a discussion of sensemaking, and the role of instructional risk models in facilitating in sensemaking. The literature review concludes with a discussion of the potential positive impacts of creating and disseminating multiple messages to create convergence toward positive, self-efficacious sensemaking in a crisis. Finally, the research hypotheses and question are posed.

Incorporating Social Media

The rise of the Internet, portable digital electronic communication devices, and social media are changing the way people communicate. Communication scholars have been studying the uses and effects of the Internet on group and interpersonal communication since the early 1990s. However, the growth of social networking sites since 2004 has created a renewed vigor in mediated communication research. In line with the focus of this research, scholars have begun evaluating the use of social media in crisis

communication. Notably, scholars have focused on how social media allows

organizations to communicate directly with their publics, and government agencies to

transmit information, and the unofficial or backchannel use of social media during crises

(Bertoto, Jaeger, & Hanse, 2012; Schultz, Utz, & Goritz, 2011; Smith, 2010). Schultz and

colleagues (2011) and Seltzer and Mitrook (2007) explain social media is a valuable tool

in disseminating messages. Specifically focusing on McLuhan and Fiore's (1967) dictum,

"the medium is the message," they suggest that technology has the potential to determine

the use and effects of messages. Social media is emerging as an "important technology

for disaster response… consists of tools that enable open online exchange of information

through conversation and interaction… the content of the conversation or interaction

[serves] as an information artifact in the online environment" (Yates & Paquette, 2010, p.

6). Augmenting traditional news broadcasts with social media messages has the potential

to increase access to crisis messages and reduce harm.

Employing the Internet in response to crises is not a new strategy. Government

organizations have been using the Internet in response to crises through email lists,

Usenet, and bulletin boards. These outlets have facilitated interactions and discussion

surrounding crises across time and space (Bertot et al., 2012). Beyond government

organizations, "before the advent of social media tools, news organizations would post

their news stories on their websites and depend on search engines or aggregators to direct

traffic to them" (Hong, 2010, p. 70). While much of the previous Internet research was

not specific to high-risk or crisis situations, understanding how governmental and non-

governmental organizations have employed mass media and are beginning to employ

17

new media technologies is important in understanding the opportunities afforded by technology.

The use of social media has been evaluated in a variety of crises, including: natural disasters (e.g., earthquakes, tsunamis, wildfires, and floods), terrorist events (e.g., Virginia Tech school shooting, Boston Marathon bombing), and organizational accidents (e.g., Fukushima Diacchi nuclear accident). The use of social media by crisis managers and government agencies communicating directly with the public has been evaluated as a tool through which to foster community, create understanding, share information, and track events. Scholarship has also focused on the ways organizations responsible for crises have employed social media to rebuild or repair reputations, in order to reestablish organizational legitimacy (Schultz et al., 2011; Smith, 2010). However, relatively little scholarship has been conducted to evaluate the use of social media by official sources (e.g., media news outlets or governmental organizations and agencies) in disseminating instructional information in a crisis.

Opportunities in social media. The urgency in a crisis makes the instantaneous nature of social media ideal for disseminating instructional risk messages. Specific to foodborne illness events, the ability to provide continuous and instant updates to the public allows for the multiple and evolving messages to reach the public (Freberg, 2012). Some scholars warn that the rapid advance of social media may pose a challenge for message dissemination. Freberg, Graham, McGaughey, and Freberg (2011) cite the lack of known factors contributing to the credibility of social media content as a potential threat to risk message dissemination. In response, Freberg (2012) conducted a study comparing intentions to comply with legitimate organization (e.g., the CDC) generated

18

messages and user-generated or unofficial messages. The findings indicate that intentions to comply with social media food recalls are greater when messages originate from legitimate organizational sources than from user-generated sources. These findings were consistent with earlier research surrounding food safety messages. Williams and Hammit (2001) found that people are more likely to comply with food safety messages when the messages originate from government agencies and organizations. Potentially of greater consequence, there was not a significant difference in intention to comply with organizational-generated and user-generated content when the content of the message was *confirmed* by a legitimate source. However, when the content of the message was *unconfirmed* the intention to comply was greater when the message originated from legitimate organizational sources (Freberg, 2012). These findings indicate that messages disseminated in a foodborne illness event should be distributed through confirmed sources (e.g., the CDC, USDA, etc.) to garner compliance. Social media platforms allow messages from legitimate sources to be shared creating greater access to legitimate and confirmed messages. The ability to easily share risk messages makes social media a beneficial channel for disseminating information in a crisis.

In addition to creating greater access to risk messages, social media provides crisis managers and governmental organizations with access to a larger audience. Social media demographics, specifically those of Twitter, suggest access to underrepresented groups including younger individuals who are less likely to access traditional media news outlets (i.e., televised news, newspapers, or radio) and minority Americans (Kavanaugh et al., 2012; Smith, 2010). Access to traditionally underrepresented groups makes social media an important channel for message dissemination in a crisis.

19

Twitter. Understanding the constraints of Twitter, a popular microblogging site, is important in understanding how Twitter can aid in crisis message dissemination. Twitter users (Twitterers) can send an unlimited number of messages, called tweets, to those who have opted to follow or subscribed to the messenger. These individuals are referred to as "followers." Messages are confined to 140 characters per tweet, which limits the amount of information that can be disseminated in any single tweet. However, a series of tweets can be connected using a shared hashtag (e.g., #FoodborneIllness) to identify the continuation or shared content of related tweets. The hashtag serves additional functions within the Twitter platform; specifically, Twitterers are able to search the twitter feed for tweets that include specific hashtags. The search includes the characters directly following the hashtag until a space is included. For example, if a Twitterer seeks information regarding a foodborne illness, a variety of hashtags could be searched (e.g., #FoodIllness, #CDCFoodWarning #EcoliOutbreak, #contamination). In addition to the hashtag, Twitters can incorporate the @ symbol to indicate a designated message receiver or specific user reference @[username]. Twitterers can retweet (RT@[username]) another user's tweet. Starbird and Palen (2010) point out that retweeting "allows Twitterers to attribute authorship to the original tweet authors while re-broadcasting or forwarding the tweet, propagating a tweet from the initial set of followers (1st degree connections) to the subscriber's followers (2nd degree connections)" (p. 3). Each Twitter account, referred to as a Twitter handle, provides a profile of the person or organization that manages the account. The profiles include the name, location, bio, and a list of other account followers. Understanding how Twitter

functions allows an understanding of the opportunities and challenges of the medium in making sense during and after a crisis.

Risk, crisis, and emergency communication research focusing on Twitter has been conducted in a variety of contexts. The role of Twitter has been evaluated during wildfires (Shklovski, Palen, Sutton, 2008; Starbird & Palen, 2010; Sutton, Palen, & Shklovski, 2008), floods (Starbird & Palen, 2010; Vieweg, Hughes, Starbird, & Palen, 2010), school shootings (Herevin & Zach, 2012; Palen, Vieweg, Liu & Hughes, 2009), and hurricanes (Hughes & Palen, 2009). During the 2007 California wildfires, Twitter promoted and legitimized backchannel communication. Previously, backchannel or peer-to-peer communication has been associated with the spread of misinformation or rumor. However, during the wildfires Twitter allowed for the networking and sharing of information between official and unofficial sources (Sutton et al., 2008). The dissemination of tweets and the retweeting of official sources and confirmed information provided access to a greater number of people, giving individuals the information necessary to protect themselves. The 2009 Oklahoma Grassfires (Starbird & Palen, 2010) and the simultaneously occurring North Dakota Red River Floods (Starbird & Palen, 2010; Vieweg et al., 2010) saw the adaption of Twitter as a tool for creating situational awareness. During the grassfires individuals used Twitter to report geo-locations, informing others about the location of people, fires, and evacuation routes. With the Red River Floods, geo-locations were used to direct people to volunteer sites and provide flood level updates. Researchers found that in both events Twitter users were more likely to retweet information from credible or legitimate sources (i.e., local emergency management agencies) than from non-credible sources (Starbird & Palen, 2010). Herevin

21

and Zach (2012) found that immediately following violent crisis events (i.e., college-campus school shootings) Twitter served as an information seeking and sharing tool. The authors analyzed tweets disseminated after a shooting incident discovering themes related to understanding and situational awareness. In response to Hurricane Gustav and Hurricane Ike, Twitter served as an information brokerage site. Directly following the hurricanes, roughly half of the tweets related to the hurricanes were information seeking and sharing and included URLs to additional information (Hughes & Palen, 2009). This research suggests that in a crisis individuals turn to Twitter for information, instructions, and situational awareness. However, little experimental research has been conducted to determine how individuals respond to Twitter messages.

With support for the use of social media, specifically Twitter, in disseminating crisis messages there is a need to understand how individuals make sense of and respond to crisis messages disseminated through social media. Further, there is a need to understand how social media messages work in tandem with convergent media messages through other channels to aid those at-risk in making positive sense of the situation and engaging in the self-efficacious behaviors.

Making Sense in a Crisis: Sensemaking

In a foodborne illness event, at-risk individuals need to know how to protect themselves. Protecting themselves may mean cooking food a certain way, discarding contaminated products, washing hands, and/or what to do if contamination symptoms occur. Sensemaking, as the name implies, is a theory used to understand how sense is made or established in a crisis. In relation to a foodborne illness event, sensemaking can be used to understand how message receivers make sense of the environment cues and

22

messages received in order to decide on a course of action. Understanding how individuals make sense of information before and during a crisis allows for the creation of self-efficacious messages to aid in mitigating harm.

Weick (1979) originally posed sensemaking in response to organizational crises, focusing on the way that individuals within an organization dealt with the ambiguity and uncertainty inherent in crises. Recent applications of sensemaking can be seen in nontraditional organizational contexts, specifically within communities (Coffelt, Smith, Sollitto, & Payne, 2011). The initial construction of sensemaking includes four tenets: 1) ecological change, 2) enactment, 3) selection, and 4) retention (Weick, 1979). A broad understanding of the theory demonstrates that sensemaking is applied in crisis to construct, filter, frame, and create the facilitation of information (Frost & Morgan, 1983; Morgan, Frost, & Pondy, 1983). Through this facilitation of information, stakeholders, publics, or at-risk individuals are able to decide on a best course of action.

Properties of sensemaking. In addition to the central tenets, Weick (1995) outlines seven properties of sensemaking, explaining sensemaking as a process that is: 1) grounded in identity construction, 2) retrospective, 3) enactive of sensible environments, 4) social, 5) ongoing, 6) focused on and by extracted cues, and 7) driven by plausibility rather than accuracy (p. 17). These properties exemplify the sensemaking process. Each property incorporates action and context, and all seven can be represented as part of a sequence. These properties are meant as a loose boundary more than a rigid set of propositions; the list serves more as what Weick (1989) refers to as raw materials for disciplined imagination. The properties guide the sensemaking process. In order to apply

23

sensemaking to risk and crisis situations a more clear understanding of each process is necessary.

Identity construction in a crisis. An individual's identity emerges and forms as the individual reacts to and in turn shapes her or his own environment. "The sensemaker is himself or herself an ongoing puzzle undergoing continual redefinition, coincident with presenting some self to others and trying to decide which self is appropriate" (Weick, 1995, p. 20) in response to what is occurring in the environment. In order to construct identity, the sensemaker must ask "How can I know what I know until I see what I say?" (Weick, 1995, p. 18). This question poses identity construction as a central element of the enactment process. Following the premise that the self, and the construction of the identity of self, is a dynamic structure of self-enhancement, self-efficacy, and self-consistency— identity construction is different for each person (Erez & Earley, 1993). While this statement seems counter to Weick's (1995) assertion that "no individual ever acts like a single sensemaker" (p. 18), the identity construction process is social and dependent on how the individual has learned to make sense of her or himself. The need to experience coherence and continuity drives identity construction, which involves a "complex mixture of proaction and reaction" (Weick, 1995, p. 23). In a foodborne illness outbreak, an individual must respond to warning messages in order to develop continuity between her or his behaviors and beliefs regarding personal efficacy and the course of action on which he or she decides.

Retrospective. Retrospection allows for the creation of meaning because "people can know what they are doing only after they have done it" (Weick, 1995, p. 24). Individuals can only attend to what exits, that is, what has already occurred. Weick

24

suggests that the sensemaking process begins shortly after the actual act, dismissing the notion of significant bias in memory. While hindsight may make an event or act more clear, retrospection cannot obliterate the actual memory of the event. In sensemaking, meaning emerges through enactment with and attention to the environment. In making sense, the problem is equivocality and confusion and not uncertainty or ignorance. While sensemaking focuses on previous experiences, Weick (1979) suggests that sensemaking can focus on the future through a "future perfect" hypothetical situation (p. 198). The "future perfect" situation allows an individual to assume the action that he or she would take, thus allowing for retrospective sense based on the future-perfect decision. When faced with a foodborne illness event, individuals who have never experienced contamination or an outbreak must decide how to deal with the outbreak. The individual must determine what recommendations to follow, and the consequences of not adhering to recommendations. Through both televised and Twitter messages, individuals have the opportunity to engage with others who may have past experiences with foodborne illness. The engagement and attention paid to the experiences of others may help those who lack past personal experiences to make sense of and create a "future perfect" scenario from which to base a decision.

Enactment of sensible environments. Arguably, the most important components of sensemaking are enactment and selection. Enactment with the environment is crucial. No two individuals perceive the same environment. Through enactment, individuals construct their own environments. An individual is a part of the environment he or she creates; acting within the constructed environment creates or establishes the materials that become the opportunities and constraints from which sensemaking occurs (Weick,

25

1995). However, constructed environments may be so large, confusing, and complex that attending to all elements is impossible (Seeger, Sellnow, & Ulmer, 2003). By providing individuals with appropriate messages, crisis managers can foster the development of an environment that encourages sensemaking. In foodborne illness outbreaks, constructing messages that provide opportunities for engagement or enactment with necessary information allows for the selection of protective information and interpretations. Aiding in the selection of protective information facilitates the creation of an environment that fosters positive sensemaking and guides positive outcomes.

Social Process. Sensemaking is a social process through which the negotiation of meaning is possible. "Those who forget that sensemaking is a social process miss a constant substrate that shapes interpretations and interpreting," often one's "conduct is contingent on the conduct of others, whether those others are imagined or physically present" (Weick, 1995, p. 39). The interaction and influence of others will impact the sense made in any given situation. Influences on sensemaking do not arise solely from physical presence, but also through interaction, or the enactment of the environment through social construction. Weick contends that physical presence of others is not necessary. Weick's notion is supported by Blumer's (1969) construction of the "symbolic other." The constructed symbolic other allows an individual to socially process the event or action to decide what has happened, and possibly what should be done about the event or action based on what the symbolic other would do.

The social nature of sensemaking poses both a threat and an opportunity in a crisis. Crisis managers work to disseminate uniform messages to aid and structure collective sensemaking surrounding a crisis. However, affected publics or stakeholders

26

receive messages from multiple sources and these multiple messages have the potential to alter the sense made. As Weick (1995) suggests, "To understand sensemaking is to pay more attention to sufficient cues for coordination such as a generalized other, prototypes, stereotypes, and roles" (p. 42), including the convergence of multiple sources or multiple messages. Individuals who are receiving crisis messages via an interactive medium (i.e., Twitter) will be able to engage with others, at the very least viewing what others are saying about the crisis. The social aspect inherent in Twitter lends to the sensemaking process. Even without the explicit ability to view the decisions of others, through well-constructed messages, crisis communicators can shape the construction of the symbolic other in such a way as to promote positive sensemaking.

Ongoing. Sensemaking is an ongoing process that Weick (1995) argues never starts and never stops. He suggests that "to understand sensemaking is to be sensitive to the ways in which people chop moments out of continuous flows and extract cues from those moments." Weick suggests, "people are always in the middle of things, which become things, only when those same people focus on the past from some point beyond it" (p. 43) in an attempt to make sense of those things. The ongoing nature of sensemaking requires that, in a crisis, messages constructed to aid in positive sensemaking be constantly accessible. Employing a medium that allows individuals to access and engage with information on their own time and at their own pace should aid in fostering positive sensemaking. Twitter is not restricted by time. Crisis managers can publish updates as information becomes available, granting the public constant access to up-to-date information with which to enact, extract cues, and make sense.

27

Extracted cues. Sensemaking is a rapid process, such that "we are more likely to see products than process" (Weick, 1995, p. 49). Extracted cues are the only elements that can be interpreted. Starbuck and Milliken (1988) distinguished between noticing and sensemaking, suggesting noticing includes classification, filtering, and comparing, while sensemaking refers to the interpretation and is activity employed to determine the meaning of the extracted cues. Individuals notice information as a tool for classification, filtering out unnecessary content, and comparing messages elements. Crisis messages should be designed to encourage receivers to notice key elements of the warning message to aid in and simplify the sensemaking process. The brief nature of Twitter messages demands that messages be designed to emphasize the key elements of the message, thus making extracting cues a less arduous process. In extracting cues, the constraints of Twitter may actually serve as a strength compared to traditional video messages that do not adhere to the same character or word constraints. The lack of character or word constraints in televised message allows messages to contain additional, potentially non critical information (e.g., speculative blame), thus forcing message receivers to work harder to sort and extract necessary informational or instructional cues.

Plausibility. Finally, plausibility of information, not accuracy, guides sensemaking. "The strength of sensemaking as a perspective derives from the fact that it does not rely on accuracy and its model is not object perception" (Weick, 1995, p. 57). Instead, plausibility entails "pragmatics, coherence, reasonableness, creation, invention, and instrumentality" (Weick, 1995, p. 57). The need for plausible information creates opportunities and challenges for message developers. The desire for plausibility over accuracy puts pressure on message creators to provide messages that are both accurate

28

and are clearly plausible. For example, on Twitter, in line with findings from Freberg (2012), Starbird and Palen (2010), and others, credibility can be established through the source (e.g., the Twitter handle) or the content of the message (e.g., source attribution or confirmed content) in order to help establish the plausibility and accuracy of message content.

Process of sensemaking. Beyond the seven properties, sensemaking is comprised of four distinct tenets: ecological change, enactment, selection, and retention (sometimes referred to as remembering).

Ecological change. The first phase of sensemaking, ecological change, comes as a result of the acute phase of a crisis. Individuals actively scanning the environment observe changes that can be noticed first hand, or can be experienced through mediated channels. Ecological change represents a violation of an expectation, creating equivocality and uncertainty (Weick, 1979). The change disrupts daily functions in some way altering expectations and behaviors. The necessary element in ecological change, as the trigger of sensemaking, is awareness. If an individual is unaware of the change or does not see how the change will affect her or his expectations or behaviors there is not a violation. Weick (1993, 1995, 2009) defines the breach in expectation, or continuity of the system, as a cosmology episode. Specifically, Weick (1993) explains a cosmology episode as:

> When people suddenly and deeply feel that the universe is no longer a rational, orderly system. What makes such an episode so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse together. (p. 633)

Ecological scanning and the cosmology episode serve as the first step in sensemaking. Worthy of note is Weick's (2009) assertion that not every instance of sensemaking will follow a complete cosmology episode. Instead, "we expect to find efforts at sensemaking whenever the current state of the world is perceived to be different than the expected state of the world" (p. 140).

A change in the environment promotes two types of occasions or opportunities for sensemaking: changes that promote ambiguity and changes that promote uncertainty. Weick (1995) suggests that there is a difference in the "shock" associated with ambiguity and uncertainty. Specifically, in "ambiguity, people engage in sensemaking because they are confused by too many interpretations, whereas in the case of uncertainty, they do so because they are ignorant of any interpretation" (p. 91). By disseminating messages in a foodborne illness event, affected individuals can access messages and interpretations of the situation that allow them to move beyond uncertainty. Conversely, the number of individuals capable of responding or sharing on social media creates an opportunity for ambiguity. However, as Freberg (2012) and others found, source attribution of messages should work to prevent ambiguity and message overload. In order to combat both uncertainty and ambiguity, credible sources need provide clear explanations to help receivers create both plausible and accurate interpretations. Further, convergence of available information should reduce uncertainty and aid message receivers in sensemaking.

Enactment. The underlying notion of enactment is that cognition occurs during action, as action focuses cognition. Weick (1988) demonstrates how action precedes cognition, explaining "the sensemaking sequence implied in the phrase, 'How can I know

what I think until I see what I say?' involves the action of talking, which lays down traces that are examined, so that cognitions can be inferred" (Weick, 1988, p. 307). Cognitions inferred from the episode of talk will affect the next episode of talk, as will the context in which the talk occurs. Through enactment with the environment, materials are collected for making sense of the environment.

Enactment is the only process in sensemaking where engagement with the external environment occurs. All subsequent sensemaking is based on the collected materials (Smirchich & Stubbart, 1985; Weick, 1979). As crisis represents a change or departure from expectations, individuals cannot begin to understand the crisis without taking initial action (Seeger, Sellnow, & Ulmer, 2003). Enactment is the initial action taken that constructs the reality of the situation. Weick (1979) explains, "The product of enactment is not an accident, an afterthought, or a byproduct. Instead, it is an orderly, material, social, construction that is subject to multiple interpretations, enacted environments contain real objects" (p. 130). The existence of the objects in enactment is not questioned; instead, the significance of the content is questioned. Using Twitter to disseminate crisis messages allows individuals to take action. Individuals can choose to take action online that may be a precursor to action in real life. Providing individuals an opportunity to engage with information enhances the opportunity for enactment.

Selection. The products of enactment are central to the selection process; the products are interpreted during selection. Individuals develop a sensible or plausible interpretation of the information in an attempt to reduce uncertainty (Miller & Horsley, 2009). Once enacted information reaches the selection process, the interests and experiences of the individual actor determine the meaning (Weick, 2001). However, as

31

information passes into the selection process, the collective pragmatics rather than the individual alone establish the meaning of the enacted materials. The shift from an individual to a collective meaning suggests that different publics will attend to the products in different ways (Weick, 1979). Selection is the process of determining what elements of enactment are valuable in reducing the equivocal state left by the breach of expectation. In a foodborne illness event, the tweets viewed may serve as both the first experience with the changing environment and as the enacted materials through which the selection process begins. Designing Twitter messages in a sequential fashion allows individuals to learn about the changing environment. The available information may provide interpretations of the event and suggest action, thus aiding in the selection and protective behaviors.

Retention or remembering. The final phase in sensemaking is retention. Retention involves interpretations from the process being employed in subsequent sensemaking. Retention is the "relatively straight forward storage of the products of selection" resulting in an enacted environment, that provides "a punctuated and connected summary of previously equivocal displays" (Weick, 1995, p. 397). Sensemaking relies on the results of retention to provide feedback to all three prior processes. Essentially, "when a plausible story is retained, it tends to become more substantial because it is related to past experience, connected to significant identities and used as a source of guidance for further action and interpretation" (Weick, Sutcliffe, & Obstfeld, 2005, p. 414). Positive self-efficacious interpretations of a foodborne illness message are important in preventing harm to message receivers. Helping individuals make sense of the outbreak allows them to behave in a protective manner.

Positive sensemaking. Weick argues that sensemaking is neither positive nor negative, but instead a neutral construction. In a crisis, however, establishing positive sense is possible. Positive sensemaking is the ability to make sense of messages through enactment and selection to foster protective attitudes and beliefs in accordance with message recommendations. Both televised and Twitter warning messages allow individuals to enact with crisis messages to select plausible information. Twitter further allows the individual to engage with the message at her or his own pace. The decision to move from one tweet to another, or the pace at which one navigates the Twitter feed, is a personal decision. By contrast, engaging with televised messages can be problematic because the information is presented within the time constraints of a news broadcast or public service announcements. In fostering positive sensemaking, the ability to enact with the environment, or the crisis messages, is imperative as these messages provide the information necessary to make protective or preventative decisions. Thus, incorporating Twitter in crisis response plans may help to foster positive sense and promote protective behaviors.

Applications of sensemaking. Sensemaking has been applied in a variety of contexts to explain the process of interpreting and understanding the behaviors of organization or community members during and after a crisis. In applying sensemaking to the Bhopal Union Carbide chemical leak, Weick (1988; 2010) explains that prior to the gases escaping into the atmosphere, environmental cues were overlooked or misinterpreted. However, the physical cues alone (i.e., pressure gauges, noise, and odor) do not account for the crisis. Through retrospective analysis, Weick was able to conclude that the social cues received by plant employees and missed environmental cues played a

large role in the crisis. The social cues surrounding the crisis, specifically the value attributed to the organization members, promotes the need for recognizing the value of both the institution (e.g. the organization) and the individual (or in the case of a foodborne illness event, the public) when addressing issues.

Sensemaking was applied in a minimal organizational context exploring membership, systems, structure, and disruption of a system in the Mann Gulch wildfire. The fire took the lives of 13 smokejumpers (Weick, 1993). The smokejumpers (a specialized group of parachuting firefighters) were part of a tightly-coupled system that required effective and efficient communication to ensure safety. Unfortunately, the Mann Gulch fire of August 4, 1949, which began for the smokejumpers like any other fire, would cost most of the smokejumpers their lives. A series of abnormalities including the destruction of the radio on descent, unknown variables about the fire and the terrain, and the seemingly random compilation of the crew led to a crisis. The cosmology episode came for the men when their foreman, Wagner Dodge, turned the working crew around and told them to retreat upslope. The fire was circling around, blocking access to the river, and threatening to close in on the crew. Dodge ordered the crew to drop their tools in order to move faster. Shortly after, he stopped and lit an additional fire in the grass and asked or ordered the men to join him in the ashes. At this point, the second in command disobeyed saying, "to hell with that, I'm getting out of here" (Maclean, 1992, p. 95) and continued running up the hill, leaving the other members of the crew to make sense of the situation. The men chose to run up the hill. Three men made it to the top of the hill, two of whom survived. Dodge also survived without injury. The discontinuity between the perceived environmental cues (everything is normal) and the cues from the leader

(retreat; lay in the ashes for protection) impacted the crews ability to make positive sense. In a crisis, positive sensemaking requires effective instructional communication and convergent messages to ensure that message receivers are able to engage in sensemaking.

During the 1997 Red River Valley flooding, the inability of local officials to make sense of environmental cues impaired their ability to respond to the rising water. Expectations held based on previous floods and information systems constrained their sensemaking abilities (Sellnow & Seeger, 2001). The existing expectations of the flood and flood response were the information selected for processing. The river gauges had been effective in the past, and initial measurements were in line with previous floods. Unfortunately, a number of variables rendered the gauges ineffective causing a reactive stance by the local officials and community members that inhibited positive sensemaking. The cosmology episode for crisis managers came when they realized that the water had exceeded previous records. The cosmology episode for community members ensued when they were ordered to evacuate. The inability to make positive sense of environmental cues prior to the onset of what became a cascading crisis constrained the ability of crisis managers to minimize the damage to Grand Forks and evacuate the city earlier. These findings amplify the need for continued communication between crisis managers (i.e. the CDC or USDA) and the potentially affected public to ensure that the public is making appropriate protective sense of the situation.

Beyond traditional organizational settings, sensemaking has been evaluated in community settings. Coffelt (2011) and colleagues applied sensemaking to a community experiencing a natural disaster. In January 2009, an ice storm struck Southern Illinois and Western Kentucky. The storm was expected, however, the magnitude of the storm was a

35

surprise. Two rounds of ice covered Western Kentucky causing an outage of power in the area. Eventually, 91 counties declared a state of emergency. Coffelt and colleagues examined how residents employed sensemaking, specifically the enactment and selection, during and after the ice storms. Information available prior to the ice storms led community members to believe that the storm would be routine. Community members believed they would be able to continue their daily activity with some regularity. Coffelt and colleagues argue that the lack of information prior to the storm lead to a cosmology episode as expectations were violated. The lack of communication about how to adequately prepare for the crisis lead community members to engage in negative or defensive sensemaking. Coffelt and colleagues suggest that elevating the perceived threat is necessary to garner attention of the at-risk public. If the public does not perceive the risk as severe, they are unlikely to attend to the protective recommendations of the message. These findings indicate that in order to promote engagement with risk messages and positive sensemaking an element of threat must be included in risk messages.

Research applying sensemaking theory has been predominately conducted through qualitative organizational case studies. Sensemaking research is expanding, however, to include quantitative explorations in quasi-organizational community settings (see Coffelt et al., 2011). Regardless of the qualitative or quantitative exploration of sensemaking, the key constructs remain the same and can be applied to risk and crisis messages. Exploring how messages can foster positive sensemaking to help those affected to better understand the risk or crisis has the potential to reduce harm. This study extends the quantitative application of sensemaking through a quasi-experimental setting in regards to a foodborne illness event.

Risk Messages and Cognitive Processing

Foodborne illness events require that the public receive risk messages in order to protect themselves from harm. There is consensus that these messages must contain certain elements, including information regarding the contaminated products and instructions on how individuals can protect themselves. The goal is to increase efficacy and compliance with behavioral recommendations. These warning or risk messages do not follow a stimulus-response process, instead, "the process is typically characterized as involving individuals, messages, behaviors, attributes, perceptions and social structures" (Sellnow & Seeger, 2013, p. 57). Further, the process includes interpretation, personalization, and the assessing and confirming of the messages.

Risk and warning message models. A number of warning or risk message models have been developed in an attempt to meet the needs of the complex communication process surrounding risk and crisis situations. Mileti and Sorenson (1990) pose the "Hear-Confirm-Understand-Decide-Respond" which adapts traditional one-way models of communication to account for the processing of risk messages. The model has been tested in a variety of contexts including natural disasters (i.e., tornados, earthquake) and industrial or organizational accidents (i.e. Three Mile Island). These applications revealed a number of risk message recommendations. In applying the model to earthquakes, Mileti and Darlington (1995) found that the public is more likely to hear and respond to a message when the message is delivered by credible sources through multiple channels. Sorenson (2000) and Mileti and Sorenson (1990) outline a number of factors associated with the message that influence behavioral responses to recommendations. Specifically, they suggest that: social cues, electronic channel, number of channels,

37

media, personal versus impersonal messages, message consistency, message certainty, source credibility, source familiarity, and frequency. The communication factors outlined by Mileti and Sorenson can be applied generally to risk messages.

A more robust model was developed by Lindell and Perry to link the communication processes to the decisional systems. Lindell and Perry (1992, 2004, 2012) pose the multistage protective action decision model (PADM) to identify and describe factors that influence behavioral responses to warning messages. The model attempts to explain the decisional process from pre-crisis to action through three general sub-processes, namely the warning process, pre-event factors and perceptions, and behavior. In line with the "Hear-Confirm-Understand-Decide-Respond" model, the early stages of the PADM rely on traditional communication factors including source credibility, channel, message and receiver characteristics, as well as social and environmental cues to affect the perception or understanding process. The sub-processes and decision for behaviors are evaluated based on a number of individual values, including: efficacy, safety, time requirements, and perceived barriers to implementation (Sellnow & Seeger, 2013).

Directly related to this research, Seeger and Novak (2010) posed the four-stage integrated model of food recall. The first stage of the model involves the accumulation of cues regarding harm in order to make recommendations regarding the harm or potential harm of the product. The second stage involves the distribution of recall notices. As mentioned, often recalls are handled by regulatory agencies like the FDA who distribute recall notices to producers and distributors. The third stage is marked by the distribution of messages to the intended or affected audiences. In line with recommendations of both

the "Hear-Confirm-Understand-Decide-Respond" and PADM, Seeger and Novak acknowledge that consumers may need to hear the message multiple times from multiple sources in order to confirm the consistency of the messages and assess personal risk. The fourth stage is the action stage, where audience members take action as a response to the recall. In applying this model, Novak and Biskup (2011) found that warning messages disseminated in during stage two of a recall are often written at reading levels that exceed that of nearly half of the population impeding the ability of message receivers to engage in stage three processing of the message to decide on a course of action. These findings indicate a need to continue testing foodborne illness recall messages in order to develop strategies to make the technical product recall information accessible to the lay public.

      Instructional messages. In response to Coombs (2012) call for a greater focus on the creation of instructional risk messages scholars have begun testing strategies to increase self-efficacy and compliance to behavioral recommendations through instructional approaches. Rooting message design in sound instructional communication practices has the ability to increase learning and in turn positively impact efficacy and compliance with behavioral recommendations. Sellnow and Sellnow (2010) contend that learning can "only be measured accurately by considering comprehension, retention, and application" (p. 121). In the event of a foodborne illness, message receivers must learn to protect themselves from contamination. That is, the at-risk public must comprehend the information in the warning message, retain the information, and when faced with choices related to the contaminated product, make decisions in line with the recommendations. To achieve this goal, messages disseminated in a foodborne illness event should include information about the symptoms, treatment, and avoidance strategies (Frisby, Veil, &

Sellnow, 2013). Further, messages should contain information about the recalled product(s), the harm inherent in the contamination, and assuage consumer fears by assuring that the recommended action will prevent illness (Hallman & Cuite, 2009).

The IDEA model. The calls to include instructional messages in response to risk and crisis situations has led to the development of new and pedagogically sound approaches to risk and crisis messages. Research indicates that creating messages that include elements of explanation, internalization, and action result in higher degrees of self-efficacy and intentions to comply with behavioral requests than messages focused only on information and explanation (Sellnow & Sellnow, 2010; Sellnow, Sellnow, & Seeger, 2012). Sellnow, Lane, Littlefield, Sellnow, Wilson, and Beauchamp (2013) tested the IDEA model comprised of internalization (I), distribution (D), explanation (E), and action (A). Their findings suggest that tailoring messages through the IDEA model can increase comprehension and produce an appropriate self-protective action. The model differs from traditional news reports, specifically those of food recalls, which tend to focus heavily on the explanation and distribution without providing receivers with opportunities to internalize the message or instruction on how to act in order to prevent harm. The IDEA model has the potential to increase positive sensemaking among message receivers. Applied, the model provides individuals with information necessary to decide on a course of action through the future perfect self that could result in an appropriate self-protective response.

Multimedia video and Twitter messages. In line with recommendations from Mileti, Lindell, Sorenson, and others, foodborne illness messages are disseminated through a variety of media channels. The use of multiple channels allows message

receivers to engage in positive sensemaking through enactment with messages. New and social media channels allow message receivers to engage with the message at their own pace, thus providing greater opportunities to engage with and internalize the message. The use of new media further provides an opportunity for instruction. Online instruction is referred to as e-learning. E-learning has been defined as, "training delivered on a digital device such as a smart phone or laptop computer that is designed to support individual learning" (Clark & Mayer, 2011, p. 7). In accordance with the definition, foodborne illness warning messages disseminated via Twitter constitute an e-learning experience. Twitter warning messages are designed to teach or train individuals to protect themselves from harm. Central to E-learning is the premise that multimedia message receivers learn better when messages are presented both verbally and visually, the format "takes advantage of the full capacity of humans processing information" (Mayer, 2009, p. 6). Creating access to convergent video and Twitter messages should increase message receivers' ability to process information and make positive sense.

Evidence suggests that multimedia approaches work best for *novice* learners, Clark and Mayer (2011) explain that the "recommendation to use words and graphics is particularly important for learners who have low knowledge of the domain" (p. 83). For example, multimedia instructional messages created for televised warnings as well as Twitter messages should provide access to vulnerable "low knowledge" or *novice* audiences who are likely at greater risk for contamination due to their lack of knowledge. These suggestions fall in line with Novak and Biskup's (2011) finding that food recall reports are written at too great a level for half of the population. Translating high-level reports into accessible multimedia messages, both video messages and social media

41

messages, has the potential to increase access, comprehension, action, and positive

sensemaking.

Message Convergence Framework: Creating Convergence

The communication environment surrounding foodborne illness events is unique

as the messages serve both individuals at-risk of contamination and those already

experiencing symptoms. In risk and crisis situations the problem is rarely a shortage of

messages, but instead an abundance of messages from a variety of channels. The

interactive nature of messages in this communication environment provides individuals

experiencing crises an opportunity to engage with multiple messages in order to make

sense of the crisis (Sellnow, Littlefield, Vidoloff, & Webb, 2009; Sellnow et al., 2009). A

message centered approach to risk communication focusing on "the multiple, often

conflicting messages on any given risk issue, leads us to view risk communication as a

process of interacting arguments" (Sellnow et al., 2009, p. 10). Sellnow and colleagues

foundation for the message-centered approach is the interacting arguments perspective

described by Perelman and Olbrechts-Tyteca (1969). The central idea is that individuals

process arguments, or messages, systematically with their attentions shifting as

competing arguments emerge. The individual has two paths through which to engage

with the risk messages:

> (1) "[B]y a more thorough, closer, or differently conducted analysis of the
>
> statements made"
>
> (2) [B]y giving consideration to an increasing number of spontaneous arguments
>
> having the discourse as their subject." (Perelman & Olbrechts-Tyteca, 1969, p.
>
> 460).

These available strategies for processing messages demonstrate the need to create messages that focus on both the technical issues surrounding a risk as well as the social discourse.

Message-centered approach. While multiple messages may focus on a single theme, for example foodborne illness, the content of the message, the sender of the message, the accuracy of the message, and the timeliness of the message may vary greatly. The message-centered approach suggests that message receivers work to make sense of the multiple messages that they receive in order to make a decision. Sellnow and colleagues suggest the framework as a complimentary model to understand how messages related to a shared topic (e.g., a foodborne illness event) interact and influence behavior.

Interacting messages. The ultimate goal of the message convergence framework is to understand the interaction of messages. Perelman and Olbrechts-Tyteca, (1969) suggest that within a communication environment the following interactions occur between arguments:

• Interaction between various arguments put forward

• Interaction between the arguments and the overall argumentative situation

• Interaction between the arguments and their conclusion

• Interaction between the arguments occurring in discourse and those that are about the discourse (p. 460).

Sellnow and colleagues (2009) adapt this notion, suggesting that message convergence occurs "when distinct bodies of knowledge overlap, resulting in some capacity of agreement" (p. 12). From a risk communication perspective, a high degree of message

43

convergence is desired as it reduces uncertainty. The repetition of messages or agreement between multiple sources allows message receivers to feel more confident in the information received. Essentially, converging messages serve to reinforce the content or recommendations provided.

While the convergence of multiple messages is desirable when the argument are preventative or protective in nature other interactions may occur. Message congruence occurs when all available messages display a shared theme and argument. In times of risk or crisis, congruence may occur when all organizations are disseminating shared information. Conversely, message divergence occurs when multiple arguments or perspectives are available that require the attention of the receiver. In crisis situations divergent messages may prevent individuals from taking appropriate protective or preventative actions. The framework was designed with an understanding that convergent or congruent messages are important in risk and crisis situations.

Messages convergence in risk and crisis situations. The message-convergence framework was developed to understand and ultimately aid in managing risk. The framework has been employed in understanding the multiple messages in a time of risk (i.e., a crisis). The approach was employed by Sellnow et al. (2009) to examine how Milwaukee Water Works dealt with the outbreak of Cryptosporidiosis. Cryptosporidiosis is a water-borne parasite that travels easily throughout a water supply and is characterized by diarrhea, fever, vomiting, stomach cramps, and other gastrointestinal symptoms. The message convergence framework was employed to understand how multiple sources were ineffectually communicating with one another and the public to properly control the situation and protect the public. Through the case study, Sellnow and colleagues were

able to identify gaps in communication between the various sources (e.g., the water company and city officials) and how messages from different sources were providing different and often conflicting information. Based on these findings, Sellnow and colleagues were able to provide recommendation for improving risk communication for future situations.

The framework was used to examine the role of media in creating message convergence or divergence. Anthony and Sellnow (2011) examined the communication environment surrounding Hurricane Katrina and how Gulf Coast residents made sense of the available media messages (e.g., different channels, including local and national media outlets). The messages of greatest concern for the situation occurred shortly before and for several months after the hurricane. The temporal element limits the total number of messages related to the specific crisis that an individual needed to evaluate, or makes sense of, in deciding on a course of action (e.g., whether or not to evacuate). While the ultimate goal of information distribution through the media is to reduce harm (Seeger, 2006), the crisis was covered differently in local media than in the national media. Anthony and Sellnow (2011) found that residents in the affected area preferred local media and government agencies to national media. These findings were consistent with other previous studies indicating that that in a crisis, specifically a natural disaster, affected publics prefer local news outlets (Sellnow & Seeger, 2001; Sellnow, Seeger, & Ulmer, 2002). In the aftermath of Hurricane Katrina, resident reported feeling as though the local media provided information needed to warrant specific actions. Conversely, the national media sensationalized the story and, in some cases, residents found the news reports "disruptive, unethical, and insensitive" (Anthony & Sellnow, 2011, p. 94).

In constructing risk and crisis messages surrounding a foodborne illness outbreak, the temporal element discussed by Anthony and Sellnow (2011) is evident. A foodborne illness event likely has a pre-crisis or risk phase where the public is made aware of the harm. However, foodborne illness events are not clearly defined at the onset of the outbreak. Until all trace back mechanisms have been employed and the contaminate has been determined the media messages may change. This means that the messages may converge on the theme of foodborne illness, however, the lack of information may lead to mixed or divergent messages. For example, the 2008 Salmonella outbreak involved numerous messages, the initial reports attributed the contamination to tomatoes but the warning was revised to jalapeno peppers (FDA, 2008b). Crisis managers must provide continual messages to ensure access to appropriate and converging messages to help at-risk publics create positive and protective sense.

Making Sense of Converging Multimedia Messages: Research Hypotheses and Question

Testing Convergence. Creating convergent multimedia foodborne illness messages by employing social media messages to accompany tradition video messages should positively affect an individual's attitudes, beliefs, and behavioral intentions related to a foodborne illness event. The first hypotheses are direct tests of the convergence hypothesis where a video only message (H1 = comparison video ; H2 = treatment IDEA model video) is compared to the same video message combined with the addition of Twitter messages in terms of several dependent constructs: self-reported self-efficacy (a), perceived knowledge (b), message effectiveness (c), message importance (d), and behavioral intentions related to talking about the message (e). Hypothesis one tests a

comparison video message against the video plus Twitter convergent messages on several

attitudes, beliefs, and behavioral intentions:

H1a: Participants who viewed the comparison video and Twitter messages will report

greater self-efficacy than participants who only viewed only the comparison video

message.

H1b: Participants who viewed the comparison video and Twitter messages will report

greater perceived knowledge than participants who only viewed only the

comparison video message.

H1c: Participants who viewed the comparison video and Twitter messages will report

greater message effectiveness than participants who only viewed only the

comparison video message.

H1d: Participants who viewed the comparison video and Twitter messages will report

greater perceived message importance than participants who only viewed only the

comparison video message.

H1e: Participants who viewed the comparison video and Twitter messages will report

greater likelihood to talk about the message than participants who only viewed

only the comparison video message.

Hypothesis two addresses the need for pedagogically sound warning messages that

employ the IDEA model message and the augmentation of the message with converging

Twitter messages. Thus, hypothesis two tests an IDEA model treatment video message

against the IDEA model video plus Twitter convergent messages on several attitudes,

beliefs, and behavioral intentions:

47

H2a: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater self-efficacy than participants who only viewed only the

treatment IDEA video message.

H2b: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater perceived knowledge than participants who only viewed only

the treatment IDEA video message.

H2c: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater message effectiveness than participants who only viewed only

the treatment IDEA video message.

H2d: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater perceived message importance than participants who only

viewed only the treatment IDEA video message.

H2e: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater likelihood to talk about the message than participants who only

viewed only the treatment IDEA video message.

In further exploring the role of the IDEA model and message convergence, a message

constructed using the IDEA model and accompanied by convergent Twitter messages

should create greater attitudes, beliefs, and behavioral intentions than a comparison

information only video message. The third hypotheses are a direct test of the convergence

hypotheses, where a comparison video only message is compared to an IDEA model

message combined with Twitter messages in terms of several dependent constructs: self-

reported self-efficacy (a), perceived knowledge (b), message effectiveness (c), message

importance (d), and behavioral intentions related to talking about the message (e). Thus,

the third hypotheses test a comparison video message against the IDEA model message

accompanied by converging Twitter messages on several attitudes, beliefs, and

behavioral intentions:

H3a: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater self-efficacy than participants who only viewed only the

comparison video message.

H3b: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater knowledge than participants who only viewed only the

comparison video message.

H3c: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater message effectiveness than participants who only viewed only

the comparison video message.

H3d: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater perceived message importance than participants who only

viewed only the comparison video message.

H3e: Participants who viewed the treatment IDEA model video and Twitter messages

will report greater likelihood to talk about the message than participants who only

viewed only the comparison video message.

Exploring Sensemaking. As positive sensemaking implies, participants who are

able to make positive sense of a message will be able to enact with the messages in a way

that fosters positive and protective beliefs and behavioral intentions in accordance with

the foodborne illness warning recommendations. The fourth hypotheses are a direct test

of sensemaking, where the comprised sensemaking variable is tested on a number of

dependent variables, specifically self-efficacy and a number of behavioral intention items. The following hypotheses are posed:

H4a: Participants who make positive sense of the message to which they are exposed will report greater self-efficacy than those who do not report positive sensemaking.

H4b: Participants who make positive sense of the message to which they are exposed will report greater behavioral intentions in line with the prescribed behaviors than those who do not report positive sensemaking.

This reasoning suggests that participants who view the treatment IDEA model message and converging Twitter messages and report positive sensemaking should also report greater beliefs and behavioral intentions in line with the foodborne illness warning message. The fifth research hypotheses directly test message convergence and sensemaking on a number of dependent variables, specifically self-efficacy and behavioral intentions. The following hypotheses are posed:

H5a: Participants who view the treatment video message and converging Twitter messages who are also able to make positive sense of the messages will report greater behavioral intentions than those who view only the comparison message.

H5b: Participants who view the treatment video message and converging Twitter messages who are also able to make positive sense of the messages will report greater self-efficacy than those who view only the comparison message.

Theoretical understandings of message convergence and sensemaking demonstrate that individuals who are able to make positive sense of converging media messages should respond with greater attitudes and behavioral intentions than individuals who do not

make positive sense of the warning messages. But, how does previous social media use impact a participants ability to make sense of the message?

R1a: What effect do differences related to media use (i.e., Twitter use), sensemaking, and convergence have on participants' self-efficacy?

R1b: What effect do differences related to media use (i.e., Twitter use), sensemaking, and convergence have on participants' behavioral intentions toward the recommended protective behaviors?

Chapter Summary

    This chapter explores the role of sensemaking in risk and crisis communication. The chapter reviewed the properties and processes of sensemaking as a process through which individuals make sense of events during and after a crisis event. Next, the chapter explored risk and crisis communication models outlining how the IDEA model has the potential to meet the needs of message receivers. The chapter then addresses the role of message convergence or congruence in shaping message receivers attitudes and understanding of a message. Finally, the research hypotheses and question were posed.

Chapter Three: Methods

In order to test each of the research hypotheses and question posed in the previous chapter a between-subjects, quasi-experimental, cross-sectional survey design was employed. This chapter describes the procedures through which data was collected, including: (a) research design, (b) participants, (c) measures, (d) procedures for data collection, and (e) data analysis techniques.

Research Design

Experimental design. Participants were randomly assigned through the Qualtrics survey design system to one of four conditions (comparison video, treatment video, comparison video and Twitter messages, treatment video and Twitter messages). The random assignment generator in Qualtrics was programmed to distribute the participants equally between the four conditions.

Stimulus materials. Four conditions were created to test the effect of augmenting traditional video warning messages with convergent Twitter messages. The first condition, the comparison video, consists of a video warning message with content based on an actual news script used to report a 2011 E. coli outbreak in ground beef. The comparison video message is 89 seconds, containing the typical information and explanation only approach. The second condition, the treatment video, is a video warning message based on the same 2011 E. coli outbreak script, but the content has been altered to reflect the IDEA model (i.e., Internalization, Distribution, Explanation, and Action). The treatment video is 171 seconds. Sellnow et al., (2013) tested the comparison and treatment video messages. Consistent with their findings, the videos are significantly different such that individuals who viewed the treatment IDEA model video reported

greater attitudes, beliefs, and behavioral intentions in line with the message recommendations. The third condition consists of the comparison video message followed by a series of Twitter messages. The fourth condition consists of the treatment IDEA model video and the Twitter messages. The Twitter messages consist of 30 tweets comprised of three official sources cited in the video messages (i.e., Center for Disease Control and Prevention Outbreak Warning, United States Department of Agriculture Food Safety and Inspection, Ron Blome NBE News) reporting convergent and in some cases congruent information about the outbreak. The content for all messages is designed to reflect a local contamination. The video messages were evaluated and critiqued by food scientist experts from the National Center for Food Protection and Defense to ensure that the claims were scientifically sound. The video messages were recorded using broadcast news industry professionals to ensure that the messages appear realistic to participants. The Twitter messages were evaluated and critiqued by an expert on social media affiliated with the National Academy of Sciences.

Participants

Participants who were enrolled in lower-level courses in the College of Communication and Information were recruited using the SONA System human subjects pool between March and April 2014 and were compensated for their participation with course credit. Participants ($n = 261$) included 143 males and 118 females, the majority of whom were between 18-21 years old (85.8 %; n = 224) and Caucasian (78.9 %; $n = 206$). Additionally, 8.4% ($n = 22$) of participants racially identify as African American/Black, 3.8% ($n = 10$) racially identify as Asian American, 2.7 % ($n = 7$) racially identify as Latino Hispanic, and 6.2 % ($n = 16$) of participants report a racial identity of 'other'. All

53

participants were college students, 52.9% of whom were first year students ($n = 138$),

20.3% report being second year students ($n = 53$). The majority of participants reported

between low to middle yearly income (80.1%; $n = 209$), with 49.8% reporting low

income ($n = 130$), and 19.9% ($n = 52$) reporting upper-middle to high income. Geo-

demographically, the majority of participants (78.2 %; $n = 201$) report being raised in one

of three areas: the 29.1% ($n = 76$) of participants report being raised in a mid-size city

(25,000-100,000), 25.7% ($n = 67$) report being raised in a small town (5,000-25,000), and

23.4% ($n = 61$) report being raised in a large city (100,000-500,000).

Measures

 Message importance. This eight-item scale is designed to measure attitudes

related to the perceived importance of the message. Participants responded using a five-

point Likert-type scale ranging from not at all important (1) to extremely important (5).

The following is a sample of included items: (1) How important is it for you to learn that

E. coli had been discovered in ground beef? (2) How important is if for you to learn that

E. coli had been discovered in your state? (3) How important is it for you to hear from the

epidemiologist? (4) How important is it for you to hear a description of what E. coli

poisoning is? The unidimensional, eight-item scale was reliable ($\alpha = .93$, $M = 4.31$, $SD =$

.70).

 Message effectiveness. This nine-item scale is adapted from Harris (2007) and

Noar, Palmgreen, Zimmerman, Lustria, and Lu (2010) to measure attitudes related to

perceived message effectiveness. Participants responded using a five-point Likert-type

scale ranging from strongly disagree (1) to strongly agree (5). The following is a sample

of included items: (1) This message would catch my attention. (2) This message is

believable. (3) This message would make me more likely to not eat potentially contaminated food. (4) This message would help convince people my age to not eat potentially contaminated food. This unidimensional, nine-item scale was reliable ($\alpha = .92$, $M = 3.92$, $SD = .65$).

Knowledge. The ten-item scale is adapted from Wrench (2007) to measure individual's perceived knowledge related to foodborne illness. Participants responded using a five-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). The following is a sample of included items: (1) I know the risks involved with foodborne illness. (2) I do not feel knowledgeable about the risks involved with foodborne illness. (3) The risks involved with foodborne illness are very clear to me. (4) I do not know the risks involved with foodborne illness. (5) I do not comprehend the risks involved with foodborne illness. This unidimensional, ten-item scale was reliable ($\alpha = .92$, $M = 3.77$, $SD = .66$).

Likelihood to talk about the outbreak. This eight-item scale is adapted from Sellnow and colleagues (2012, 2013) to measure how likely an individual is to tell others about the message. Participants responded using a five-point Likert-type scale ranging from very unlikely (1) to very likely (5). The following is a sample of included items: (1) How likely are to you tell others about this E. coli food contamination? (2) How likely are you to tell others about this E. coli food contamination in face-to-face settings? (3) How likely are you to tell others about this E. coli food contamination via text message? (4) How likely are you to tell others about this E. coli food contamination via a telephone call? This unidimensional, six-item scale was reliable ($\alpha = .88$, $M = 3.10$, $SD = .97$).

Sensemaking. Sensemaking has traditionally been operationalized and evaluated in a qualitative manner with few examples of quantitative operationalization (see Coffelt et al., 2011). Weick's (1979, 1995) original value-free notion of sensemaking as a neutral construct through which individuals enact with their surroundings to make sense in a crisis has been adapted to reflect a value-laden construct. For the purpose of this dissertation, positive sensemaking is the ability of an individual to engage with the environment and construct protective attitudes and beliefs in accordance with message recommendations. In order to determine if participants are engaging in positive or negative sensemaking, a number of scales were employed and the results compiled to determine the individuals sensemaking designation.

To create a sensemaking variable four scales were employed: message importance, message effectiveness, knowledge, and likelihood to talk about the outbreak. First, a perceived message importance scale was employed to determine if the participant viewed the outbreak as worthy of attention. As participants are being exposed to messages related to the E. coli outbreak, asking if they are aware of the outbreak is an inadequate measure of an environmental scan. By measuring perceived message importance, participants can report how important the outbreak is to them, and thus whether or not they would engage in a process of sensemaking. Individuals who are indifferent to the message or report that the message is unimportant are unlikely to engage in a sensemaking process relating to the outbreak. Second, message effectiveness and perceived knowledge scales were employed to understand how individuals enacted with the constructed environment (i.e., the reported E. coli outbreak). Enactment with a message allows the individual to gain information or artifacts to make sense of during the

selection process. The measures of message effectiveness and perceived knowledge demonstrated to what extent the participant was able to enact with the cues available through the social environment. High levels of message effectiveness and perceived knowledge suggest that the participant effectively enacted with the message, and through the selection process was able to make positive sense of the message. Finally, Weick (1995) explains that sensemaking is an inherently social process where individuals make sense through action and/or social interaction. Based on the need for social sensemaking, a measure of the participant's likelihood to talk about the outbreak is included. Operationalizing sensemaking through these four measures allows sensemaking to be evaluated quantitatively through a future perfect analysis in order to address the research hypotheses.

Positive sensemaking. To calculate a value-laden variable for sensemaking composite scores from the message importance, message effectiveness, knowledge, and likelihood to talk about the message scales were used. In order to create a positive sensemaking variable, composite means for each of the four scales were evaluated. As each of the scales employed operates on a five-point Likert-type measure, participants whose mean score for each of the four scales was greater than 3.0 were designated as making positive sense. A mean score of 3.0 indicates a neutral opinion, thus a mean score greater than 3.0 indicates positive sense. The sensemaking variable is dichotomous, thus participants are either making positive sense of the message or not making positive sense. The positive sensemaking variable assumes that participants whose mean scores are greater than 3.0 are aware of the changing environment, are enacting with the messages and through the selection process and are likely making sense of the message in a

protective manner in accordance with message recommendations. Finally, the participant

is willing to engage in a social interaction surrounding the sense they have made of the

message demonstrating both the social nature of sensemaking as well as retention of the

message.

Foodborne illness self-efficacy. This nine-item scale was created through a series

of studies on lettuce contaminations (Frisby, Sellnow, Sellnow, Lane, & Veil, 2011; Veil,

Frisby, Lane, Sellnow, & Sellnow, 2011) and adapted for the specific E. coli outbreak in

ground beef. Participants responded using a five-item Likert-type scale ranging from very

uncertain (1) to very certain (5). The following is a sample of included items: (1) I'm

certain I can master the skills to protect myself from foodborne illness. (2) I'm certain I

can figure out how to take action to prevent foodborne illness. (3) I believe I can do

things to protect myself from foodborne illness. (4) I know I can take action to protect

myself from foodborne illness. This unidimensional, nine-item scale was reliable (α =

.91, M = 4.03, SD = .56).

Behavioral intentions. Six individual items adapted from Sellnow and colleagues

(2012, 2013) will be employed to measure specific behavioral intentions associated with

an outbreak of E. coli in ground beef. Participants will responded using a five-point

Likert-type scale ranging from very unlikely (1) to very likely (5). The following six

items were employed: (1) Based on the message you just saw, how likely would you be

to throw away ground beef you had purchased? (2) Based on the message you just saw,

how likely would you be to return your ground beef to the store where you purchased it?

(3) When eating out how likely are you to pick off ground beef that comes on your plate?

(4) When eating out how likely are you to send back food that comes with ground beef?

(5) How likely would you be to tell others not to eat ground beef? (6) How likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted ground beef?

Procedures

      Collection procedure. Upon completion of registration, participants received a hyperlink to complete the survey instrument. Once participants accessed the study, they received a welcome message introducing the study, explaining that the study would take approximately 45 minutes and the procedures necessary for completion. After the welcome message, to ensure that participants were able to access the survey instrument and stimuli messages, a number of audiovisual checks were completed. Once the audiovisual check was completed participants provided consent to participate in the study. After providing consent, participants answered a number of pre-manipulation questions regarding their knowledge of foodborne illness, followed by a manipulation message, finally participants completed post-manipulation survey items relating to their knowledge, attitudes, beliefs, behavioral intentions, media use and demographic information. Once responses were submitted and the survey was completed, participants were directed to an external SONA site to input their personal information for course credit to be awarded.

      Sampling procedure. Following approval from the Institutional Review Board, participants were recruited and registered to participate through the SONA human subjects system. In order to address the research hypotheses and question with adequate power, a minimum of 30 participants per cell was necessary (Cohen, 1988), or 120 total participants. However, based on formative online data collection, a dropout or incomplete

59

data rate of approximately 30% was expected, thus the data collection minimum was increased to 36 participants per cell, or 144 participants. In total, 402 participants accessed the survey link, with 261 valid responses. That is, of the 402 participants 261 provided consent, were able to view the stimuli messages, and completed the online survey.

Data Analysis

The first three hypotheses were tested using a between-subjects 2 (condition) X 2 (distributions type) one-way analysis of variance (ANOVA) to determine the effect of condition and distribution type on attitudes and beliefs. A traditional factorial design was not used to address the first three hypotheses, as the conditions varied across all four cells. Employing a traditional factorial design would have failed to adequately address the research hypotheses. The fourth hypotheses were tested using an independent-sample *t*-test to address the differences between participants who made positive sense of the messages and those who were unable to make positive sense on self-efficacy and behavioral intentions. The fifth hypotheses were tested using a between-subjects 2 (positive sensemaking) X 2 (distribution convergence) factorial ANOVA on self-efficacy and behavioral intentions. To address the research question, a series of 2 (social media use) X 2 (sensemaking) X 2 (distribution convergence) univariate ANOVA on self-efficacy and behavioral intentions were employed (Huberty & Morris, 1989).

Chapter Summary

The third chapter provides an overview of the research design employed in this dissertation. The chapter discusses the quasi-experimental nature of the research, the selection process for participants, the measures used to collect data, the procedures for

data collection, and the procedures for sampling. The chapter concludes with a discussion

of the data analysis technique used to evaluate the results.

Chapter Four: Results

To address the first three research hypotheses, a one-way between-subjects ANOVA was conducted. To address the fourth research hypotheses an independent-sample *t*-test was conducted. The fifth research hypotheses were addressed using a between-subjects factorial ANOVA. To answer the research question a series of univariate ANOVAs were conducted. The results from these tests will be discussed in this chapter.

Table 4.1 Pearson's Correlation Matrix for all Dependent Variables

		Message Importance	Message Effectiveness	Knowledge	Likelihood to Talk	Self-Efficacy	Beh. Int. 1	Beh. Int. 2	Beh. Int. 3	Beh. Int. 4	Beh. Int. 5	Beh. Int. 6
Message Importance	Pearson R	1										
	Sig. (2-tailed)											
Message Effectiveness	Pearson R	.570**	1									
	Sig. (2-tailed)	.000										
Knowledge	Pearson R	.138*	.277**	1								
	Sig. (2-tailed)	.025	.000									
Likelihood to Talk	Pearson R	.296**	.362**	.029	1							
	Sig. (2-tailed)	.000	.000	.646								
Self-Efficacy	Pearson R	.292**	.303**	.691**	-.019	1						
	Sig. (2-tailed)	.000	.000	.000	.754							
Beh. Int. 1	Pearson R	.333**	.326**	.164**	.194**	.295**	1					
	Sig. (2-tailed)	.000	.000	.008	.002	.000						
Beh. Int. 2	Pearson R	.269**	.315**	.196**	.284**	.121	.111	1				
	Sig. (2-tailed)	.000	.000	.001	.000	.051	.072					
Beh. Int. 3	Pearson R	.321**	.372**	.083	.398**	.039	.251**	.243**	1			
	Sig. (2-tailed)	.000	.000	.182	.000	.532	.000	.000				
Beh. Int. 4	Pearson R	.367**	.494**	.162**	.340**	.137*	.314**	.387**	.636**	1		
	Sig. (2-tailed)	.000	.000	.009	.000	.027	.000	.000	.000			
Beh. Int. 5	Pearson R	.443**	.510**	.253**	.385**	.300**	.377**	.350**	.496**	.650**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000		
Beh. Int. 6	Pearson R	-.139*	-.140*	-.217**	.151*	-.245**	.090	-.079	.083	-.030	-.085	1
	Sig. (2-tailed)	.024	.024	.000	.015	.000	.149	.205	.182	.630	.170	

Note: *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Hypotheses One

The first set of hypotheses predict that participants who are exposed to a comparison warning message that is accompanied by converging Twitter messages will report greater levels of self-efficacy, perceived knowledge, message effectiveness, message importance, and likelihood to talk about the foodborne illness event with others than participants who view only the comparison warning message. To address the first hypotheses, a one-way between-subjects ANOVA was calculated. Findings indicate no significant difference between participants who viewed the comparison message accompanied by converging Twitter messages and those who viewed only the comparison message (See Table 4.2). On self-efficacy, participants who viewed the comparison message and converging Twitter messages (M = 3.97, SD = .60) reported slightly lower levels of self-efficacy than those who viewed only the comparison warning message (M = 4.00, SD = .59) [F (3, 257) = .50, p > .05, η^2 = .01]. On perceived knowledge, in accordance with the hypothesis prediction, participants who viewed the comparison message and converging Twitter messages (M = 3.78, SD = .63) reported greater perceived knowledge than those who viewed only the comparison warning message (M = 3.60, SD = .79) [F (3, 257) = 2.45, p > .05, η^2 = .03]. On message effectiveness, participants who viewed the comparison message and converging Twitter messages (M = 3.81, SD = .58) reported slightly lower levels of message effectiveness than those who viewed only the comparison warning message (M = 3.92, SD = .61) [F (3, 257) = .80, p > .05, η^2 = .01]. On message importance, participants who viewed the comparison message and converging Twitter messages (M = 4.18, SD = .80) reported slightly lower levels of message importance than those who viewed the comparison

message (M = 4.36, SD = .77) [$F(3, 257) = 1.08$, p > .05, $\eta^2 = .01$]. On likelihood to talk about the foodborne illness outbreak, participants who viewed the comparison message and converging Twitter messages (M = 3.04, SD = .87) reported slightly lower likelihood to talk about the message with others than those who viewed only the comparison warning message (M = 3.16, SD = 1.10) [$F(3, 257) = .56$, p > .05, $\eta^2 = .01$]. Because there are no statistical differences between participants who received the comparison message and those who viewed the comparison message and accompanying Twitter messages, the first set of hypotheses were not supported.

Table 4.2 One-way ANOVA Results for the Comparison Message and the Comparison Message Accompanied by Twitter Messages

Variable	Comparison		Comparison & Twitter		F	df	p	η^2
	M	*SD*	*M*	*SD*				
Self-efficacy	4.00	.59	3.97	.60	.50	3, 257	.68	.01
Knowledge	3.60	.79	3.78	.63	2.45	3, 257	.06	.03
Message Effectiveness	3.92	.61	3.81	.58	.80	3, 257	.50	.01
Message Importance	4.36	.77	4.18	.80	1.08	3, 257	.36	.01
Likelihood to Talk	3.16	1.10	3.04	.87	.56	3, 257	.64	.01

Hypotheses Two

The second set of hypotheses predict that participants who are exposed to a treatment IDEA model message that is accompanied by converging Twitter messages will report greater levels of self-efficacy, perceived knowledge, message effectiveness, message importance, and likelihood to talk about the foodborne illness event with others than participants who view only the treatment warning message. To address the second

set of hypotheses a one-way between-subjects ANOVA was calculated. Findings indicate

no significant difference between participants who viewed the treatment IDEA model

message accompanied by converging Twitter messages and those who viewed only the

treatment IDEA model message (See Table 4.3). On self-efficacy, participants who

viewed the treatment IDEA model message and converging Twitter messages (M = 4.06,

SD = .51) reported slightly lower levels of self-efficacy than those who viewed only the

treatment IDEA model message (M = 4.07, SD = .54) [F (3, 257) = .50, p > .05, η^2 =

.01]. On perceived knowledge, participants who viewed the treatment IDEA model

message and converging Twitter messages (M = 3.85, SD = .57) reported slightly less

perceived knowledge than those who viewed only the treatment IDEA model message (M

= 3.86, SD = .57) [F (3, 257) = 2.45, p > .05, η^2 = .03]. On message effectiveness, in

accordance with hypothesis predictions, participants who viewed the treatment IDEA

model message and converging Twitter messages (M = 3.99, SD = .70) reported slightly

higher message effectiveness than those who viewed only the treatment warning message

(M = 3.94, SD = 71) [F (3, 257) = .80, p > .05, η^2 = .01]. On message importance, in

accordance with hypothesis predictions, participants who viewed the treatment IDEA

model message and the converging Twitter messages (M = 4.40, SD = .64) reported

greater levels of message importance than those who viewed only the treatment warning

message (M = 4.31, SD = .57) [F (3, 257) = 1.08, p > .05, η^2 = .01]. On likelihood to talk

about the foodborne illness outbreak, in accordance with hypothesis predictions,

participants who viewed the treatment warning message and converging Twitter

messages (M = 3.20, SD = .97) reported slightly higher likelihood to talk about the

foodborne illness outbreak than those who viewed only the treatment IDEA model

message ($M = 3.01$, $SD = .95$) [F (3, 257) = .56, p > .05, $\eta^2 = .01$]. Because there are no

statistical differences between participants who viewed the IDEA treatment message and

those who viewed the IDEA treatment message and accompanying Twitter messages, the

second set of hypotheses were not supported.

Table 4.3 One-way ANOVA Results for the Treatment IDEA Model Message and the Treatment IDEA Model Message Accompanied by Twitter Messages

Variable	Treatment		Treatment & Twitter		F	df	p	η^2
	M	SD	M	SD				
Self-efficacy	4.07	.54	4.06	.51	.50	3, 257	.68	.01
Knowledge	3.86	.60	3.85	.57	2.45	3, 257	.06	.03
Message Effectiveness	3.94	.71	3.99	.70	.80	3, 257	.50	.01
Message Importance	4.31	.57	4.40	.64	1.08	3, 257	.36	.01
Likelihood to Talk	3.01	.95	3.20	.97	.56	3, 257	.64	.01

Hypotheses Three

The third set of hypotheses predict that participants who are exposed to a

treatment IDEA model message that is accompanied by Twitter messages will report

greater levels of self-efficacy, perceived knowledge, message effectiveness, message

importance, and likelihood to talk about the messages with others than participants who

view only the comparison warning message. To address third hypotheses a one-way

between-subjects ANOVA was calculated. Findings indicate no significant difference

between in participants who viewed the treatment IDEA message accompanied by

Twitter messages and participants who viewed the comparison message, all means are in

the predicted direction (See Table 4.4). On self-efficacy, participants who viewed the

treatment IDEA model message and converging Twitter messages ($M = 4.06$, $SD = .51$)

reported greater self-efficacy than those who viewed the comparison video warning

message ($M = 4.00$, $SD = .59$) [F (3, 257) = .50, p > .05, $\eta^2 = .01$]. On perceived

knowledge, participants who viewed the treatment IDEA model message and converging

Twitter messages ($M = 3.85$, $SD = .57$) reported greater knowledge than those who

viewed the comparison message ($M = 3.59$, $SD = .79$) [F (3, 257) = 2.45, p > .05, $\eta^2 =$

.03]. On message effectiveness, participants who viewed the treatment IDEA model

message and converging Twitter messages ($M = 3.99$, $SD = .70$) reported greater message

effectiveness than those who viewed the comparison warning message ($M = 3.92$, $SD =$

.61) [F (3, 257) = .80, p > .05, $\eta^2 = .01$]. On message importance, participants who

viewed the treatment IDEA model message and converging Twitter messages ($M = 4.40$,

$SD = .64$) reported greater message importance than those who viewed the comparison

warning message ($M = 4.36$, $SD = .77$) [F (3, 257) = 1.08, p > .05, $\eta^2 = .01$]. On the

likelihood to talk about the foodborne illness outbreak, participants who viewed the

treatment IDEA model message and converging Twitter messages ($M = 3.19$, $SD = .97$)

reported greater likelihood to talk about the outbreak than those who viewed the

comparison warning message ($M = 3.16$, $SD = 1.02$) [F (3, 257) = .56, p > .05, $\eta^2 = .01$].

Because perceived knowledge was approaching significance at the .05 level, a Fisher

LSD post hoc analysis was conducted. Results revealed a significant difference between

participants who viewed the treatment IDEA message and accompanying Twitter

messages ($M = 3.85$, $SD = .57$) reported greater knowledge than those who viewed the

comparison message ($M = 3.59$, $SD = .79$) (p. < .05). Because there are no statistical

differences between participants who viewed the comparison message and those who

viewed the treatment IDEA message, the third set of hypotheses were not supported.

**Table 4.4 One-way ANOVA Results for the Comparison Message and the
Treatment Message Accompanied by Twitter Messages**

Variable	Comparison		Treatment & Twitter		F	df	p	η^2
	M	*SD*	*M*	*SD*				
Self-efficacy	4.00	.59	4.06	.51	.50	129	.68	.01
Knowledge	3.59	.79	3.85	.57	2.45	118	.06	.03
Message Effectiveness	3.92	.61	3.99	.70	.80	129	.50	.01
Message Importance	4.36	.77	4.40	.64	1.08	129	.36	.01
Likelihood to Talk	3.16	1.02	3.19	.97	.56	129	.64	.01

Hypotheses Four

In order to address the fourth set of hypotheses, which predict that participants

who are able to make positive sense (*n* = 103) of the message will report greater

behavioral intentions in line with protective message recommendations and self-efficacy

than participants who did not make positive sense (*n* = 158), an independent-sample *t*-test

was conducted. On self-efficacy, a statistically significant difference was revealed such

that participants who were able to make positive sense (*M* = 4.20, *SD* = .50) of the

message reported greater self-efficacy than participants who did not make positive sense

of the message (*M* = 3.92, *SD* = .57) [*t* (237) = -4.08, p < .05]. On likelihood to throw

away purchased ground beef, participants who made positive sense of the message (*M* =

4.26, *SD* = 1.01) were significantly more likely than those who were unable to make

positive sense (*M* = 3.85, *SD* = 1.26) to throw away the ground beef [*t* (259) = -5.15, p <

.05]. On likelihood to return ground beef to the store from which it was purchased, participants who made positive sense of the message ($M = 3.95$, $SD = 1.26$) were significantly more likely than those who were unable to make positive sense ($M = 3.09$, $SD = 1.35$) to return the ground beef to the store [t (229) = -5.23, p < .05]. On likelihood to pick ground beef off of their plate when eating out, participants who made positive sense of the message ($M = 3.91$, $SD = 1.24$) were significantly more likely than those who were unable to make positive sense ($M = 3.20$, $SD = 1.16$) to pick ground beef of off their plates [t (237) = -4.65, p < .05]. On likelihood to send food back that comes with ground beef, participants who made positive sense of the message ($M = 3.86$, $SD = 1.20$) were significantly more likely than those who were unable to make positive sense ($M = 3.10$, $SD = 1.20$) to send food back [t (219) = -4.08, p < .05]. On likelihood to tell others not to eat ground beef, participants who made positive sense of the message ($M = 4.22$, $SD = .80$) were less likely than those who were unable to make positive sense ($M = 3.28$, $SD = 1.11$) to tell others not to eat ground beef [t (259) = -7.40, p < .05]. On likelihood to use an over-the-counter diarrhea medicine if they learned they had consumed contaminated beef, participants who made positive sense of the message ($M = 2.44$, $SD = 1.46$) were less likely than those who were unable to make positive sense ($M = 2.54$, $SD = 1.30$) to use an over-the-counter diarrhea medicine [t (199) = .57, p > .05]. Significant differences were revealed such that participants who were able to make positive sense of the message reported great levels of self-efficacy and of behavioral intentions on five of the six items than participants who were unable to make positive sense, thus the fourth set of hypotheses were partially supported.

Table 4.5 Independent-Sample *t*-Test Positive: Sensemaking on Self-Efficacy and Behavioral Intentions

Variable	Positive Sensemaking		No Positive Sensemaking				
	M	SD	M	SD	Df	t	p
Self-Efficacy	4.20	.50	3.92	.57	237	-4.08	.001
How likely would you be to throw away ground beef you had purchased?	4.26	1.01	3.85	1.11	259	-5.15	.001
How likely would you be to return your ground beef to the store where you purchased it?	3.95	1.26	3.09	1.35	229	-5.23	.001
When eating out how likely are you to pick off ground beef that comes on your plate?	3.91	1.24	3.20	1.16	207	-4.65	.001
When eating out how likely are you to send back food that comes with ground beef?	3.86	1.20	3.10	1.20	219	-5.03	.001
How likely would you be to tell others not to eat ground beef?	4.22	.80	3.28	1.11	259	-7.40	.001
How likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted ground beef?	2.44	1.46	2.54	1.30	199	.57	.56

Hypotheses Five

The fifth set of hypotheses predict that participants who view the treatment IDEA model message and converging Twitter messages and were able to make positive of sense (*n* = 33) will report greater behavioral intentions and self-efficacy than participants in any other group. Specifically, those who received the treatment IDEA model message and converging Twitter messages and did not make positive sense (*n* = 22), those who received the comparison message and made positive sense (*n* = 32), or those who received the comparison message and did not make positive sense (*n* = 43). In order to address these hypotheses a 2 (Sensemaking) X 2 (Convergence) MANOVA was employed. This analysis revealed a significant main effect for sensemaking, $\Lambda = .67$, *F*

$(22, 106) = 2.43$, $p < .05$, $\eta_p^2 = .34$, a significant main effect for convergence condition, Λ = .66, F $(22, 106) = 2.49$, $p < .05$, $\eta_p^2 = .34$, but no interaction effect for sensemaking by convergence condition $\Lambda = .82$, F $(22, 106) = 1.05$, $p < .05$, $\eta_p^2 = .18$.

Table 4.6.1 MANOVA Interaction Effects for Sensemaking and Message Convergence on Self- Efficacy and Behavioral Intentions

Variable	Positive Sensemaking				No Positive Sensemaking				F	df	p	η_p^2
	Treatment & Tweets		Comparison Video		Treatment & Tweets		Comparison Video					
	M	SD	M	SD	M	SD	M	SD				
Self-Efficacy	4.19	.49	4.28	.53	3.93	.53	3.88	.59	.22	1, 127	.64	.00
How likely would you be to throw away ground beef you had purchased?	4.44	.99	4.33	1.04	3.53	1.46	4.02	1.04	.91	1, 127	.34	.01
How likely would you be to return your ground beef to the store where you purchased it?	3.97	1.33	3.61	1.47	3.28	1.55	2.93	1.13	.00	1, 127	.98	.00
When eating out how likely are you to pick off ground beef that comes on your plate?	3.85	1.35	4.48	.79	2.88	1.24	3.40	1.16	.07	1, 127	.80	.00
When eating out how likely are you to send back food that comes with ground beef?	3.76	1.37	4.26	.86	3.06	1.39	2.98	1.26	1.69	1, 127	.20	.01
How likely would you be to tell others not to eat ground beef?	4.21	.70	4.22	.95	3.22	1.29	3.07	1.21	.17	1, 127	.68	.00
How likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted	2.18	1.40	3.57	1.27	2.41	1.41	3.02	1.21	2.93	1, 127	.10	.02

An examination of the univariate analyses for the main effect of sensemaking

revealed significance on five of the six behavioral intention measures and self-efficacy.

Table 4.6.2 Univariate Effects for Sensemaking on Self-Efficacy and Behavioral Intentions

Variable	Positive Sensemaking $n = 56$		No Positive Sensemaking $n = 75$		F	df	P	η_p^2
	M	SD	M	SD				
Self-Efficacy	4.20	.48	3.90	.56	10.01	1, 127	.00	.07
How likely would you be to throw away ground beef you had purchased?	4.02	1.04	3.83	.1.25	8.79	1, 127	.00	.07
How likely would you be to return your ground beef to the store where you purchased it?	3.82	1.39	3.08	1.43	7.29	1, 127	.01	.05
When eating out how likely are you to pick off ground beef that comes on your plate?	4.11	1.19	3.17	1.12	23.82	1, 127	.00	.16
When eating out how likely are you to send back food that comes with ground beef?	3.96	1.21	3.01	1.39	19.07	1, 127	.00	.13
How likely would you be to tell others not to eat ground beef?	4.21	.80	3.13	1.19	32.48	1, 127	.00	.20
How likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted ground beef?	2.75	1.51	2.76	1.32	.451	1, 127	.50	.00

An examination of the univariate analyses for the main effect of message

convergence revealed significance on two of the six behavioral intention measures and

self-efficacy.

Table 4.6.3 Univariate Effects for Message Convergence on Behavioral Intentions and Self-Efficacy

Variable	Treatment Message and Tweets $n = 65$		Comparison Message $n = 66$		F	df	p	η_p^2
	M	SD	M	SD				
Self-Efficacy	4.06	.51	4.00	.59	.01	1, 127	.94	.00
How likely would you be to throw away ground beef you had purchased?	3.94	1.23	4.17	1.05	2.10	1, 127	.15	.02
How likely would you be to return your ground beef to the store where you purchased it?	3.63	1.47	3.17	1.41	1.98	1, 127	.16	.02
When eating out how likely are you to pick off ground beef that comes on your plate?	3.37	1.37	3.77	1.16	7.45	1, 127	.01	.06
When eating out how likely are you to send back food that comes with ground beef?	3.42	1.41	3.42	1.29	.85	1, 127	.36	.01
How likely would you be to tell others not to eat ground beef?	3.72	1.14	3.47	1.19	.15	1, 127	.70	.00
How likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted ground beef?	2.29	1.40	3.21	1.28	17.90	1, 127	.00	.12

Partial support for the fifth hypotheses was found, support was found for sensemaking on self-efficacy and a number of behavioral intention measures.

Research Question One

To address research question one, a series of factorial ANOVAs were calculated to explore whether Twitter use, sensemaking, and message convergence affects self-efficacy and behavioral intentions. A series of 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate ANOVA on self-efficacy revealed a main effect for sensemaking, such that participants who made positive sense ($M = 4.10$, $SD = .52$) of the message reported greater levels of self-efficacy than those who did not make positive sense ($M = 3.79$, $SD = .63$) [$F (1, 123) = 6.98$, p $< .05$].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate

ANOVA on *likelihood to throw away purchased ground beef* revealed main effects for

Twitter use and sensemaking. For Twitter use, participants who reported using Twitter

($M = 4.21$, $SD = 1.08$) reported a greater likelihood to throw away ground beef than

participants who did not report Twitter use ($M = 3.55$, $SD = 1.36$) [F (1, 123) = 8.14, p <

.05]. For sensemaking, participants who were able to make positive sense ($M = 4.38$, SD

= 1.00) of the message reported greater likelihood to throw away purchased ground beef

than participants who were unable to make positive sense ($M = 3.81$, $SD = 1.25$) of the

message [F (1, 123) = 10.22, p < .05].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate

ANOVA on *likelihood to return ground beef to the store* revealed a main effect for

sensemaking. Findings revealed that participants who were able to make positive sense of

the message ($M = 3.82$, $SD = 1.39$) reported a greater likelihood to return ground beef to

the store than participants who were unable to make positive sense ($M = 3.08$, $SD = 1.43$)

of the message [F (1, 123) = 5.34, p < .05].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate

ANOVA on the participants *likelihood to pick off ground beef that comes on a plate*

revealed a main effect for sensemaking and the convergence condition. Findings revealed

that participants who were able to make positive sense ($M = 4.11$, $SD = 1.19$) were more

likely to pick ground beef off of their plates than participants who were unable to make

positive sense ($M = 3.17$, $SD = 1.21$) of the message [F (1, 123) = 13.06, p < .05].

Further, participants who viewed a convergent message ($M = 3.37$, $SD = 1.38$) reported

76

less likelihood to pick ground beef off of a plate than participants who viewed non-converging messages (M = 3.77, SD = 1.16) [F (1, 123) = 6.17, p < .05].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate ANOVA on the participants *likelihood to send food back that is served with ground beef* revealed a main effect for sensemaking. Findings indicate that participants who were able to make positive sense of the message (M = 3.96, SD = 1.21) reported a greater likelihood to send back food that is served with ground beef than participants who did not make positive sense (M = 3.01, SD = 1.31) of the message [F (1, 123) = 8.25, p < .05].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate ANOVA on the participants *likelihood to tell others not to eat ground beef* revealed a main effect for sensemaking. Findings indicate that participants who were able to make positive sense of the message (M = 4.21, SD = .80) reported a greater likelihood to tell others not to eat ground beef than participants who did not make positive sense (M = 3.13, SD = 1.19) of the message [F (1, 123) = 18.94, p < .05].

The 2 (social media use) X 2 (sensemaking) X 2 (convergence) univariate ANOVA on the participants *likelihood to use an over-the-counter diarrhea medicine if they learned they had consumed tainted ground beef* revealed a main effect for convergence. Findings indicate that participants who viewed convergent media messages (M = 2.29, SD = 1.40) reported a being less likely to use an over-the-counter diarrhea medicine if they learned than they had consumed tainted ground beef than participants who did not view converging messages (M = 3.21, SD = 1.25) [F (1, 123) = 8.68, p < .05].

Chapter Five: Discussion, Implications, and Conclusions

The purpose of this dissertation was to explore the contributions of message design, message convergence and congruence, and positive sensemaking on attitudes, beliefs, and behavioral intentions in a foodborne illness outbreak. The results describe how message design, message convergence and congruence, and positive sensemaking can help explain how individuals make decisions related to foodborne illness events. The results provide support for including the IDEA model in risk and crisis messages and extend the theoretical scope of sensemaking to include a value-laden and quantitative construct. Developing a value-laden and quantitative construct of sensemaking extends the use of quantitative methods in what has been a predominately qualitative area of scholarship allowing for empirical testing of the concept. The results of this research provide a justification for distinguishing between positive and non-positive sensemaking as positive sensemaking may explain the differences in self-efficacy and behavioral intentions in risk and crisis situations. This chapter will begin with a discussion of the practical implications of the results including drawing connections to theoretical research on sensemaking and message convergence. Next, the limitations of the research will be discussed followed by a discussion of potential future research directions. Finally, the dissertation will conclude with overall conclusions.

Implications

The findings for this research are applied in nature. In line with Eadie's (1982) explanation, "applied communication research is always theoretically informed, its goal rests with explaining to the greatest extent possible what is going on with regard to a particular problem" (p. 4). While applied research is based on a particular situation,

"evaluating the results of efforts that might have been made to change the situation, and in providing the basis for making educated guesses about how the situation might be managed effectively in the future" (Eadie, 1982, p. 4). The findings and implications from the current research can be applied to risk and crisis situations that share commonalities related to time constraints and message distribution channels.

IDEA message design. The findings related to the IDEA model of risk and crisis message design and message convergence can be applied in risk and crisis events. The principles of the IDEA model (Internalization, Distribution, Explanation, and Action) serve as a guide for message developers in creating messages that enhance self-efficacy and protective behavioral intentions. The results suggest message design employing the IDEA model coupled with converging messages (in this case convergent and in some cases congruent Twitter message) may positively affect receivers' attitudes, beliefs, and behavioral intentions toward message recommendations at a greater rate than traditional video only messages. The practical application of the IDEA model in risk and crisis message design has been empirically tested in direct comparison to a non-IDEA model message in previous studies (Sellnow & Sellnow, 2010; Sellnow et al., 2012; Sellnow et al., 2013), the current work explored the role of the IDEA message and converging and in some instances congruent social media messages. The findings attempt to explain how multiple converging and congruent messages affect the receiver's attitudes, beliefs, and behavioral intentions toward message recommendations.

Positive Sensemaking. Weick (1995) originally posed sensemaking as a value-neutral construct through which retrospective sense is used to explain how individuals made sense in a crisis and how the sense made affected their attitudes, beliefs, and

79

behaviors. As a value-laden construct, sensemaking seeks to explain differences in attitudes, beliefs, and behavioral intentions between individuals who were able to make positive sense and those who were unable to make positive sense. Additionally, the creation of a value-laden construct for positive sensemaking allows for sensemaking to be empirically tested. The results of hypothesis four suggest individuals who were able to make positive sense of the messages were likely to report greater levels of self-efficacy in a foodborne illness outbreak and greater behavioral intentions in line with the message recommendations. While Weick had not intended sensemaking to be employed in a future-perfect sense to explain how individuals might act and react if an event occurred, the ability to explain why some individuals engage in positive and protective behaviors and others do not is important for message designers. If the testing of positive sensemaking could identify communication elements (e.g., the IDEA model or other models) these elements could be included in future risk and crisis messages to foster positive sense among message receivers. The potential for positive sensemaking will be discussed further in the future research section.

In line with Weick's construction of sensemaking, there are some concerns in employing or constructing positive sense. A primary concern is that sensemaking is based in plausibility rather than accuracy. As demonstrated by results from the fourth hypothesis, plausible interpretations of a message may not in fact be protective or positive for message receivers. In the fourth hypothesis, individuals who made positive sense of the message reported that when eating out they would be likely to pick ground beef off of their plate and continue to eat the meal. While picking the ground beef off makes *plausible* sense (that is, not consuming the actual product is protective in nature)

80

the actual behavior is not protective but dangerous. Once a contaminated product comes in contact with other products those products are compromised and may also be dangerous to consume. In risk and crisis situations, accurate information is imperative for safety. The individuals that made positive sense of the messages and felt confident in their understanding of the messages and ability to protect themselves from contamination might actually be engaging in dangerous behaviors based on inaccurate interpretation.

Message convergence. In extending instructional communication to risk and crisis communication, the IDEA model was employed in the treatment video while a comparable comparison informative message served as the control message. Both of the video messages employed in this study conveyed strong warnings and arguments surrounding foodborne illness. The messages included information about the outbreak, symptoms associated with E coli, as well as preventative and protective recommendations. Regardless of condition, participants reported a positive valence toward the recommended attitudes, beliefs, and behavioral intentions. While means in all conditions were positively valenced, there were some substantively significant, but statistically non-significant, findings of interest associated with message convergence.

In line with Sellnow and colleagues previous research, participants who received the IDEA model messages reported greater attitudes, beliefs, and behavioral intentions than individuals who received the comparison information only video message (Sellnow & Sellnow, 2010; Sellnow et al., 2012; Sellnow et al., 2013). The results for the first three hypotheses provide information related to the social and cognitive value of convergence. While the first two hypotheses predicted that convergence of arguments or messages between a video message and convergent and congruent Twitter messages

81

would yield greater attitudes, beliefs, and behavioral intentions than a video message alone, the findings suggest simple convergence may not be enough. The results indicate that creating and disseminating convergent messages is not enough to significantly alter attitudes, beliefs, and behavioral intentions toward foodborne illness. In some cases, the inclusion of additional messages actually created an iatrogenic effect such that individuals who received the converging messages reported slightly lower, but non-significant, attitudes, beliefs, and behavioral intentions than individuals who received only a video message. The iatrogenic effect, especially related to the information only video, may speak to the lack of understanding and internalization of the message by receivers. If the video message was unclear to the recipient, receiving additional information via a secondary channel may have created confusion rather than understanding.

The third hypothesis tested convergence of an IDEA model message and converging Twitter messages against a comparison only video message. All means were in the predicted direction. The positive means associated with the IDEA model provide a justification for continued research on the role of the message convergence framework in risk and crisis communication. While message convergence was non-significant, these findings are a first attempt at experimentally testing convergence and lay groundwork for future research on converging messages. As message convergence has predominately been evaluated through case study and in-depth interview approaches, experimentally testing message convergence is in its infancy (see Anthony & Sellnow, 2011; Head, 2014; Sellnow et al., 2009). The findings suggest that message convergence plays a role in shaping attitudes, beliefs, and behavioral intentions, but further testing is necessary to

understand fully how message convergence affects message receivers and how convergence can be employed by risk and crisis message designers to help protect those at-risk.

Blending theoretical implications. The need for both plausible and accurate interpretations of risk and crisis messages places the impetus on message creators to provide enough information and instruction to aid in the creation of accurate sense while not overloading or confusing message receivers. While message convergence and positive sensemaking each provide avenues through which to explore the effects of messages on the individual's attitudes, beliefs, and behavioral intentions, this research attempts to bridge these theoretical lenses. That is, individuals who receive multiple convergent or congruent messages should be more likely to make positive sense of the messages in a protective manner. Traditional video messages and Twitter messages were employed to simulate multiple convergent and in some cases congruent arguments surrounding foodborne illness from which message receivers could make sense. Based on a theoretical understanding of sensemaking and the principles of message convergence, the two should be complimentary in generating positive attitudes, beliefs, and behavioral intentions.

Social media use. By employing social media as a channel through which convergent messages were disseminated, the question became how does previous social media use, specifically that of Twitter, the channel employed in this study, affect an individual's perceptions of self-efficacy and behavioral intentions toward the message recommendations. Previous social media use was not a predictor of beliefs or behavioral intentions toward the messages. Of note, current media trends suggest that college age

individuals are likely to access news related information through social media outlets like Twitter (Smith, 2010). An assumption was made that previous Twitter use would impact perceptions of the value and understanding of the series of 140 character tweets. The 140 character restriction of Twitter alters the way that information is presented, particularly with the adoption text specific jargon and symbols (specifically the #hashtag and @ attribution symbols in Twitter). However, the college age sample, and statistics related to social media (Twitter and other platforms) use among the age group may help to explain why previous social media use did not interact with message convergence or sensemaking to affect self-efficacy or behavioral intentions. College age students are likely to engage with social media use of some sort, or be familiar with the characteristics of the platforms in such a way that the message format would be familiar.

In employing social media as a tool for risk and crisis communication, message designers must remember that users self-select to participate with the platform and self-select which users they choose to follow or engage. Self-selection may serve as a barrier to widespread distribution of risk and crisis messages. However, self-selection does not guarantee that risk and crisis messages will not be viewed by individuals who are engaging with the media for purely social (non-news related) reasons. On Twitter, a user is subject any information that the Twitter handles they follow retweet. While a Twitter user may not self-select to follow a governmental agency or news outlet, the retweeting of messages by friends, acquaintances, or other followed Twitter handles may provide access to risk and crisis messages. Understanding the constraints of the platform and of self-selection message designers must work to create messages that are clear and concise fitting within the 140 character constraint so in the event that a message is retweeted the

end user will be able to make some accurate sense of the message. As a channel for risk and crisis communication, Twitter requires a high volume of messages to be distributed in order for the messages to be viewed on news feeds and in hopes that those messages are retweeted. The retweeting of messages ensures that a larger audience has the opportunity to engage with the messages.

Limitations of Research

While the study provides a number of practical suggestions for risk and crisis communications and extends theoretical research related to message convergence and sensemaking, some limitation should be noted. First, the use of college students as a convenient sample should be addressed. College students may not be a representative sample of the entire population and thus create some concern for the generalization of the findings. College students may be less likely to purchase their own food from a grocery store or possibly less likely to prepare their own food, however, the warning and recommendations in the stimuli messages relate to food consumed both in and out of the home. Based on social media statistics the convenient college sample is actually an appropriate sample to test message convergence related to traditional and new media. However, the social media use by the college age sample may be greater than that of the population, which creates some questions regarding the generalizability of these findings to the general population or non-social media using groups. While a less than representative sample of the population was employed, the findings of the study are reliable in that the population is a food consuming and social media using group.

An additional limitation in this study with respect to message convergence is the lack of messages or arguments with which to engage. In line with Sellnow and colleagues

(2009) conceptualization of message convergence, convergence occurs when the receiver synthesizes messages from multiple sources in order to determine a uniform interpretation of the arguments. While this research employed multiple messages through two separate channels, the messages were similar in nature verging on congruent and were confined to a very short span of time. Sellnow and Anthony (2011) and Head (2013) suggest that convergence occurs as messages accumulate, regardless of the instantaneous nature of the crisis. Thus, the reliability of the message convergence findings may need further investigation. Specifically, additional research may need to be employed that discusses an outbreak over a greater span of time, with a variety of messages possibly demonstrating a greater level of ambiguity that is common in foodborne illness outbreaks. Further, the messages in this study were presented through a traditional video news format and Twitter, but the same sources (e.g., the CDC and NBEnews) were employed. In a foodborne illness outbreak it is unlikely that so few messages or message sources would be interacting as multiple local and governmental agencies would be creating and disseminating messages to the public through a variety of traditional and new media outlets.

The use of only two channels to distribute the immediate warning messages draws the ecological validity of the findings into question. While testing the effects of converging or congruent messages lays the groundwork for understanding the message convergence framework, and ultimately aids in testing the framework, the ecological validity of the study is questionable. Further, all messages in this study were convergent or congruent in nature, the lack of divergent or ambiguous information is not representative of risk and crisis events. In risk and crisis events the problem is often that

there are too many arguments or messages to sort through in order to make sense of the arguments. By employing two channels this research attempted to simulate convergence, but did not account for other outlets through which at-risk individuals could access information. A further threat to ecological validity is that foodborne illness outbreaks require time and complex trace back systems to identify contaminates (Cuite & Hallman, 2009; Seeger, 2005). While the messages in this study acknowledge that a trace back system has been employed, the temporal element and ambiguity often inherent in foodborne illness events could not be simulated to create ecological validity. The limitations inherent in this study can be addressed through future research, suggestions for that research will be discussed in the following section.

A fundamental limitation to this research lies in the message design with regard to message convergence. Participants viewed either the IDEA model message or the traditional information only video message and then were directed either immediately to the Twitter feed or on to the rest of the survey. The immediate follow-up of convergent and congruent message may not have had the same impact as repeat exposure over time to convergent arguments. The lack of statistical significance related to message convergence is problematic; the implications from the third hypotheses indicate that convergence may play a role in positive sensemaking and preventative or protective attitudes and beliefs. While means were positively valenced in the IDEA model condition, there were no statistically significant findings to explain the differences between stimuli conditions. The treatment IDEA model message and the control comparison information message are both well-constructed messages that provide information about the outbreak, scientific information about E coli, and behavioral

recommendations that may have created a ceiling effect. The IDEA model explains at greater length the action necessary for protective behaviors and provides affective information to help the message receiver internalize the message. The quality of both messages account for the positively valenced means related to attitudes, beliefs, and behavioral intentions, but make testing differences problematic.

Future Research

The findings and limitations from this application of the message convergence framework and sensemaking serve as a prompt for future research. Directions for future research are discussed categorically in the following paragraphs.

Message convergence. In risk and crisis situations individuals must work to make sense of all of the competing messages they receive. Messages may emerge from traditional media outlets (e.g., television, radio, or newspaper), from new media outlets (e.g., Internet including social media and email), and interpersonal contacts, but regardless of where the information comes from message receivers must work to make sense of the messages in order to decide on a course of action. The current research served to empirically test the message convergence framework employing a both a new and traditional media outlet. While no statistical significance was revealed, the results provide impetus to continue experimental research related to the message convergence framework. The framework would benefit from continued research in the interaction of specific arguments (e.g., what elements of the arguments were most influential) and how the channel through which the message was delivered affected perceptions about the message (e.g., traditional media, new media, or interpersonal sources of information). The rhetorical or persuasive elements of arguments could be evaluated to determine what

message elements are necessary for convergence, which may vary significantly between message receivers. Additionally, understanding how message and source credibility can be retained through various outlets warrants further research.

Specific to the current research, while communication research has focused a great deal on source credibility and risk and crisis research has focused on the legitimacy of official sources, the role of social media as a channel through which to access risk and crisis messages shifts the dynamics of credibility. Strategies have been developed by practitioners in an attempt to retain message and source credibility, however, little research has been conducted to evaluate receiver perceptions of credibility. For example, Freberg's (2012) research on credibility points to a variety of strategies for establishing credibility including distributing information through official sources (e.g., official social media pages or webpages) or citing official sources in the message. Another suggestion is to test the inclusion of hyperlinks or mini-hyperlinks in social media messages that connect to governmental or news organizations as a strategy for bolstering credibility. Social media will continue to play a role in risk and crisis communication. Thus, further testing of the role of social media in message convergence is necessary to ensure that the messages employed are able to help message receivers make positive or protective sense of the messages.

A final suggestion for future research on message convergence is the possibility of message overload. In an organic environment, individuals receive messages over a period of time, often long periods of time, and begin to form attitudes and beliefs based on the weight given to the various arguments. In an experimental setting, providing arguments through multiple sources and channels may overload the message receiver and

prevent them from engaging with the arguments in a meaningful manner. Future research should work to create an ecologically valid format for testing message convergence.

Sensemaking. The development of a value-laden construct of sensemaking requires additional testing in order to establish a valid and reliable measure of positive sensemaking. By developing a value-laden construct through which to determine if individuals are participating in positive and protective sensemaking future research could focus on the predictive value of the construct. Determining if positive sensemaking actually predicts protective behavioral compliance could have great implications for risk and crisis communicators. In order to determine the predictive value of positive sensemaking, future research should focus on how individual differences or covariates affect the ability to make positive sense of a message. By understanding how individual factors contribute to the ability to make positive sense of a message, message designers can construct message that effectively meet the needs of the information seeking public. Future research in positive sensemaking should also focus on what elements of the message encourage positive sense to be made. Specifically, exploring which elements within a message help the receiver to make positive and protective sense of the message recommendations is needed.

Blending theory. A final suggestion for future research is the continued study of the role of social media in message convergence and positive sensemaking**.** While the current dissertation did not find statistical significance for message convergence or the role of social media, continued research focusing on various social media outlets and message convergence in relation to positive sensemaking are warranted. Social media use continues to expand, as does the number of people who seek health-related information

from these outlets. Thus, continued research to test the effect of convergent social media messages with traditional warning messages on the ability of participants to make positive sense of the message recommendations is warranted.

Conclusion

In conclusion, the results of the dissertation provide additional support for the incorporation of the IDEA model in message construction and extend sensemaking research to include a value-laden construct of positive sense. The findings suggest converging message incorporating the IDEA model yield greater means for attitudes, beliefs, and behavioral intentions than messages constructed using an information only approach. While statistical significance was not found for message convergence, the framework added to the understanding of the value of constructing messages based on the IDEA model. Further, the current research theoretically extends sensemaking to include a value-laden construct. While Weick's original notion of sensemaking was neutral, in risk and crisis communication the ability to construct positive and protective sense is important in avoiding harm.

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Appendix A: Survey Instrument

Welcome and thanks for signing up for this study!

You will be guided through a process of answering a few questions, watching a video, and answering questions. The
entire process will take about 45 minutes to complete. You will only earn credit for doing the study if you take your time and thoughtfully answer each question. So please help us collect accurate data by responding thoughtfully. Doing so will help us design messages that will ultimately **save lives**. Surveys that are completed in less than 30 minutes cannot be used in the study and will be discarded.

Thanks again for helping us with this important work.

Introduction

Thank you for participating in this research study about effective messages in crisis situations. The research is being sponsored by the Department of Homeland Security's National Center for Food Protection and Defense. The purpose of the study is to find out what you think about public information messages sent before, during, and after a crisis involving the food supply.

Sound-check
Before we begin, please check to be sure that your sound is working. If you do not hear sound, please adjust the volume settings on your computer, check your headphones to be sure they are plugged in.

Message Importance
Please answer the following questions about the importance of the information you just learned.

1. How important is it for you to learn that E. coli had been discovered in ground beef?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

2. How important is if for you to learn that E. coli had been discovered in your state?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

3. How important is it for you to hear from the epidemiologist?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

4. How important is it for you to hear a description of what E. coli poisoning is?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

5. How important is it for you to hear what can happen to people who get E. coli poisoning?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

6. How important is it for you to learn what you should do if you get E. coli poisoning?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

7. How important is it for you to know the symptoms of E. coli poisoning?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

8. How important is it for you to learn about people who died from E. coli poisoning?

1--------------2------------3------------4------------5------------6------------7
Not at all Important   Neutral   Extremely Important

Message Effectiveness
The following items concern how you reacted to the message that you saw. Please rate the following items regarding the message you just viewed on a scale from Strongly Disagree to Strongly Agree.

1. This message would catch my attention.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

2. This message is believable.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

3. This message would make me more likely to not eat potentially contaminated food.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

4. This message is memorable.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

5. This message is effective.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

6. This message would make people my age more likely to not eat potentially contaminated food.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

7. This message would help convince people my age to not eat potentially contaminated food.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

8. This message is truthful.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

9. This message would help convince me to not eat potentially contaminated food.
   1--------------2------------3------------4------------5------------6------------7
   Strongly Disagree   **Neutral**   **Strongly Agree**

105

Perceived Knowledge
After viewing the video, please rate your knowledge level using the scale provided:

1. I know the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

2. I do not feel knowledgeable about the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

3. The risks involved with foodborne illness are very clear to me.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

4. I do not know the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

5. I do not comprehend the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

6. My knowledge of the risks involved with foodborne illness is limited.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

7. I understand the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

8. I feel knowledgeable about the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

9. I comprehend the risks involved with foodborne illness.
   1--------------2------------3------------4------------5------------6-----------7
   Strongly Disagree   Neutral   Strongly Agree

10. The risks involved with foodborne illness are not clear to me.
    1--------------2------------3------------4------------5------------6-----------7
    Strongly Disagree   Neutral   Strongly Agree

Likelihood to Talk

Please answer the following questions about how likely you would tell others about the information you just learned.

1. How likely are to you tell others about this E. coli food contamination?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

2. How likely are you to tell others about this E. coli food contamination in face-to-face settings?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

3 How likely are you to tell others about this E. coli food contamination via text message?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

4. How likely are you to tell others about this E. coli food contamination via a telephone call?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

5. How likely are you to tell others about this food contamination via email?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

6. How likely are you to tell others about this food poisoning via Facebook?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

7. How likely are you to tell others about this food poisoning via Twitter?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**
8. How likely are you to seek additional information about this outbreak from an expert authority?
1--------------2------------3------------4------------5------------6-----------7
Very Unlikely   **Neutral**   **Very Likely**

Behavioral Intentions

An outbreak of E. coli in ground beef was recently reported in the news. Please answer the following questions with this information in mind:

1. Based on the message you just saw, how likely would you be to throw away ground beef you had purchased?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

2. Based on the message you just saw, how likely would you be to return your ground beef to the store where you purchased it?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

3. Based on the message you just saw, when eating out how likely are you to pick off ground beef that comes on your plate?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

4. Based on the message you just saw, when eating out how likely are you to send back food that comes with ground beef?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

5. Based on the message you just saw, how likely would you be to tell others not to eat ground beef?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

6. Based on the message you just saw, how likely would you be to use an over-the-counter diarrhea medicine if you learned you had eaten tainted ground beef?

1--------------2------------3------------4------------5------------6------------7
Very Unlikely   **Neutral**   **Very Likely**

Media Evaluation

How realistic was the video you watched?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Realistic   Neutral/Mixed   Very Realistic

How believable was the video you watched?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Believable   Neutral/Mixed   Very Believable

How similar was this video compared to other news clips you have watched?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Similar   Neutral/Mixed   Very Similar

How realistic were the Tweets you just viewed?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Realistic   Neutral/Mixed   Very Realistic

How believable were the Tweets you just viewed?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Believable   Neutral/Mixed   Very Believable

How similar were the Tweets you just viewed compared to other Tweets you have seen?

1--------2--------3--------4--------5--------6--------7--------8--------9--------10
Not Very Similar   Neutral/Mixed   Very Similar

Experiences with Foodborne Illness

How many times have you had food poisoning?
__ 0   __ 1-3   __ 3-5   __ 5+

How severe was your worst case of food poisoning?
1--------------2------------3------------4------------5------------6------------7
Mild   Severe

How many people do you know that have had food poisoning?
__ 0   __ 1-3   __ 3-5   __ 5+

Of the people you know, what was the severity level of the worst case of food poisoning?
1--------------2------------3------------4------------5------------6------------7
Mild   Severe

How often do you eat ground beef?
     __ Often
     __ Occasionally
     __ Never

Who currently purchases most of your food?
     __ Self
     __ Parent/Guardian
     __ Roommate/Spouse
     __ Other Family Member

Demographics:
What is your sex: __ Female __ Male
Age: __18-21   __22-25   __26-29   __30-33   __34+
What is your ethnicity:

  __ African-American/Black
  __ Caucasian
  __ Latino/Hispanic
  __ Asian American
  __Native American (please specify registered tribe below)
  __ Pacific Islander
  __ Other (please specify)

What is your approximate income:

  __ Low income
  __ Low middle income
  __ Middle income
  __ Upper middle income
  __ High income

In what setting were you raised:

  __ Country/Rural (population under 5,000)
  __ Small Town (population 5,000-25,000)
  __ Mid-size City (population 25,000 – 100,000
  __ Large City (population 100,000-500,000)
  __ Major Metro Area (population 500,000+)

What is the family configuration living with you in your home? (check all that apply)

  __ Two parents
  __ Single parent
  __ Other guardian (grandparent, etc.)
  __ Single generation
  __ Many generation

What is the current living situation, that is who currently lives with you in your home? (check all that apply)

  __ Two parents
  __ Single parent
  __ Other guardian (grandparent, etc.)
  __ Single generation
  __ Many generation

Highest education level of a member of your immediate family?
        __ Some schooling
        __ High School Diploma
        __ Tech/Associates Degree (two-year degree)
        __ Bachelor's Degree
        __ Master/Doctorate Degree (graduate/professional)

If you are currently a student, what year in school are you?
        __ Not a student
        __ First year undergraduate
        __ Second year undergraduate
        __ Third year undergraduate
        __ Fourth year undergraduate
        __ Fifth year undergraduate
        __ Other

Please indicate below your typical or average daily use of the media
        __ Radio (hours spent listening)
        __ Television (hours spent watching)
        __ Newspaper (hours spent reading)
        __ E-mail (number of times you check your email)
        __ Text Messages (number of text messages)
        __ Social Media (number of times you check your social media)

Do you have a Twitter account?
        __ Yes
        __ No

How many times per day do you check Twitter?   __

How likely are you to retweet information about a local ground beef contamination?
    1--------------2------------3------------4------------5------------6------------7
   Very Unlikely   **Neutral**   **Very Likely**

Would you seek more information on ground beef contamination?
        __ Yes
        __ No

How would you seek out more information? (check all that apply)
        __ Radio
        __ Television
        __ Searching the Internet
        __ Social Media
        __ E-mail
        __ Telephone

Have you participated in any previous studies involving the contamination of food products in the last year?

      __ Yes

      __ No

      __ Unsure

Please assess the LEVEL OF THOUGHT and/or HONESTY you gave when completing this survey. A response of "0" would mean you just "clicked through" without thinking and a"10" would mean that you gave every question full consideration and answered honestly.

Please assess the level of focus or distraction you experienced during the survey. A response of "0" would mean you were very distracted and unfocussed and a "10" would mean that you were totally focused and undistracted.

Appendix B: Content of Video Messages

IDEA Model Message: "Outbreak Announced"
A new outbreak of a potentially deadly food contamination involving ground beef is touching the entire state of Kentucky today that word comes from the U.S. Food Safety and Inspection Service (FSIS). Correspondent Ron Blome has the details:

The recall is based on an outbreak of food borne illness that appears to be associated with ground beef. Meat sold in a number of regional chains and locally owned grocery stores throughout the state.

Experts believe the rare form of *Salmonella* is to blame for 27-confirmed illnesses and 1-death. Salmonella Typhimurium is a microscopic bacteria that can cause infection and is most commonly found in under cooked food including beef. As to the source, 19 of those infected have reported consuming ground beef purchased directly from Kentucky stores over the past month. The beef recall includes any size package of ground beef that have sell by dates of October 15 or earlier. Consumers who have purchased ground beef with sell by dates of October 15 or earlier should return the meat to the store for a full refund.

One infected individual was Winona Richards, a cook at a Lexington deli. She became ill two nights ago with cramps and diarrhea and believed it would pass. But within a day she was rushed to an emergency room and then rushed to an emergency room where she would die within a day.

Symptoms of *Salmonellosis* include diarrhea, abdominal cramps, and fever within 12 to 72 hours of eating the contaminated meat. If you or someone you know has eaten beef over the past 3 days and is experiencing severe symptoms, you should contact your physician, or go to the nearest emergency room, or call 911. Do NOT use any over-the-counter anti-diarrhea drugs as these could keep the bacteria in your system longer.

Officials from the FSIS and CDC are directing the investigation and say past outbreaks are actually helping them.

CDC Dr. Mason Williams: "First, our hearts go out to the Richard family for their loss. And to others who might have been sickened by this incident. At the CDC we are making this a top priority and we are using past investigations to guide us as we look for the source of this outbreak in order to protect consumers"

Ron Blome: Officials say the tainted the tainted ground beef could be found in many food products containing ground beef and the exposure can go beyond the home to restaurants and other prepared foods. In the meantime, health officials are warning the public to
• use a food thermometer to cook all fresh or frozen ground beef to an internal temperature of at least 160 degrees
• wash hands often with hot soapy water,

Officials say they have no idea how much of the suspect beef has reached consumers but they do point out that this is a particularly dangerous outbreak because this strain of salmonella is resistant to common antibiotics. You can find out more about the outbreak on our website.

Ron Blome, NBE News, reporting...

Control Message: Outbreak Announcement

A new outbreak of a potentially deadly food contamination affecting fresh ground beef is touching the entire state of Kentucky the U.S. Food Safety and Inspection Service (PSIS) announced today. Correspondent Ron Blome has the details:
  The recall is based on an outbreak of food borne illness that appears to have been caused by ground beef prepared in and purchased from a number of regional chains and locally owned grocery stores throughout the state. The product recall includes any size packages of ground beef that have sell-by dates of October 10th or earlier.

Officials are concerned that some of the beef may already be in consumers' freezers. They report no way of knowing how much contaminated meat has already reached consumers' homes at this time. When available, additional information regarding product description list(s) will be posted on the PSIS website.

Twenty seven people are officially confirmed as sickened from this rare form of Salmonella Typhimurium -an infection caused by microscopic bacteria. Salmonellosis is most commonly caused from eating undercooked beef, chicken, turkey, and eggs, but has also been linked to tainted fruits and vegetables such as alfalfa sprouts, cantaloupe, and tomatoes, and in processed foods such as peanut butter, pot pies, and frozen pizzas. Of the 27 confirmed cases, 18-have been hospitalized, three have life threatening conditions, and one person has died. 19 of those infected have reported consuming ground beef purchased from a North Dakota store over the past month. No other product descriptions are available at this time.

This strain of Salmonella has tested resistant to multiple commonly prescribed antibiotics including drug classes such as beta-lactams, aminoglycosides, and cephalosporins. Additional information about drug resistance will be made public as soon as it becomes available.

Symptoms of salmonellosis include diarrhea, abdominal cramps, and fever within 12 to 72 hours of eating the contaminated meat, as well as chills, headache, nausea, and vomiting that can last up to seven days. Left untreated, salmonellosis can cause bleeding in the brain or kidneys and death.

[SOT - CDC Representative} "This is a hard strain to identify but it can be very dangerous and we need to watch out for this one." Officials from the PSIS along with

epidemiologists from the CDC have initiated an investigation and stress that where the recalled ground beef originated is unknown at this time.

[SOT - CDC Epidemiologist] "The mission for the CDC is to track down this dangerous organism and stop it from getting into the product and out into the public. We WILL run this strain of salmonella poisoning down, get an answer, and solve the problem. "

The tainted meat could be found in many food products including deli sandwiches and casseroles, restaurant foods, and ground beef purchased for in-home consumption. The PSIS will continue to provide information as it becomes available.

In the meantime, health officials are warning the public to refrain from eating ground beef in any products-including fast food, restaurant, grocery store deli, and cafeteria products--to make sure the recalled meat does not infect any more consumers .... Ron Blome reporting, etc.

Appendix C: Content of Twitter Messages

CDC Outbreak @CDCOutbreak
@USDA_FSIS Potentially deadly form of Salmonella discovered in ground beef
affecting entire state of Kentucky according to #KYOutbreak

#KYOutbreak 27 confirmed ill and 1 death attributed to Salmonella Typhimurium a
microscopic bacteria found in under cooked food

#KYOutbreak #Beefrecall we WILL run this strain of salmonella poisoning down, get an
answer, and solve the problem

#KYOutbreak 19 infected reported consuming ground beef purchased in Kentucky stores
over the past month #Beefrecall

#KYOutbreak #Beefrecall Return any size package of ground beef that have sell by dates
of October 15 or earlier. Do NOT consume

#KYOutbreak #Beefrecall avoid consuming ground beef in the home, restaurants, or in
other prepared food

#KYOutbreak #Beefrecall CDC is using past investigations as guide as we look for the
source of this outbreak in order to protect consumers

#KYOutbreak #Beefrecall Salmonellosis symptoms: diarrhea, abdominal cramps, and
fever within 12 to 72 hours of eating the contaminated meat

#KYOutbreak #Beefrecall Eaten beef over the past 3 days, experiencing severe
symptoms, contact physician, go to emergency room, or call 911

#KYOutbreak #Beefrecall avoid contamination: wash hands often with hot soapy water
when handling ground beef

#KYOutbreak #Beefrecall Do NOT use over-the-counter anti-diarrhea drugs as these
could keep the bacteria in your system longer

#KYOutbreak #Beefrecall no way of knowing how much contaminated meat has already
reached consumers' homes at this time

UDSA Food Safety and Inspection Service @USDA_FSIS
#KYOutbreak Outbreak: Potentially deadly form of Salmonella discovered in ground
beef affecting entire state of Kentucky

@CDCOutbreak #KYOutbreak 27 confirmed ill and 1 death attributed to Salmonella
Typhimurium a microscopic bacteria found in under cooked food

#KYOutbreak #Beefrecall Eaten beef over the past 3 days, experiencing severe symptoms, contact physician, go to emergency room, or call 911

#KYOutbreak #Beefrecall Avoid contamination: use food thermometer to cook all ground beef to an internal temperature of at least 160 degrees

#KYOutbreak #Beefrecall particularly dangerous outbreak because this strain of Salmonella is resistant to common antibiotics

#KYOutbreak #Beefrecall avoid contamination: wash hands often with hot soapy water when handling ground beef

#KYOutbreak #Beefrecall avoid contamination: wash hands often with hot soapy water when handling ground beef @CDCOutbreak

Ron Blome @NBENewsLexington
@CDCOutbreak #KYOutbreak 27 confirmed ill and 1 death attributed to Salmonella Typhimurium a microscopic bacteria found in under cooked food

#KYOutbreak #Beefrecall Officials say tainted ground beef could be found in many food products containing ground beef @CDCOutbreak @USDA_FSIS

#KYOutbreak #Beefrecall no way of knowing how much contaminated meat has already reached consumers' homes at this time @CDCOutbreak

#KYOutbreak #Beefrecall Avoid contamination: use food thermometer to cook all ground beef to an internal temperature of at least 160 degrees

#KYOutbreak #Beefrecall particularly dangerous outbreak because this strain of Salmonella is resistant to common antibiotics @USDA_FSIS

#KYOutbreak #Beefrecall avoid contamination: wash hands often with hot soapy water when handling ground beef @USDA_FSIS @CDCOutbreak

#KYOutbreak #Beefrecall local woman dead.

#KYOutbreak #Beefrecall Deli cook Winona Richards became ill two nights ago, within a day rushed to emergency room, where she would die.

#KYOutbreak #Beefrecall Do NOT use over-the-counter anti-diarrhea drugs as these could keep the bacteria in your system longer @CDCOutbreak

#KYOutbreak #Beefrecall ground beef with sell by dates of October 15 or earlier should be returned to the store for a full refund

#KYOutbreak #Beefrecall @CDCOutbreak says we WILL run this strain of salmonella poisoning down, get an answer, and solve the problem

118

Bethney A. Wilson
College of Communication and Information
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Education

Ph.D. University of Kentucky   Expected: August 2014
       Primary Area: Instructional Messages
       Secondary Area: Risk and Crisis Communication
       Advisor: Dr. Timothy L. Sellnow & Dr. Derek R. Lane
       Committee: Dr. Timothy Sellnow, Dr. Derek Lane, Dr. Anthony Limperos,
       and Dr. Mark Swanson
       Dissertation: *Testing the Message: Making Sense of Converging*
       Multimodal Messages in a Foodborne Illness Outbreak

M.A. University of Alabama Birmingham   December 2010
       Primary Area: Communication Management
       Secondary Area: Instructional Communication
       Advisor: Dr. Mark Hickson
       Committee: Dr. Mark Hickson III, Dr. Larry Powell, and
       Dr. Jonathon Amsbary
       Comprehensive Exams: December 2010

B.A. Birmingham- Southern College   May 2009
       Primary Area: History
       Secondary Area: Secondary Education
       Cum Laude, Kappa Delta Epsilon,
       Division I Softball

Academic Employment

Research Assistant, National Center for Food Protection and Defense, Lexington, KY
       January 2012-Present

Graduate Teaching Assistant, University of Kentucky, Lexington, KY
       August 2011-Present

Adjunct Faculty Member, University of Alabama Birmingham, Birmingham, AL
       January 2011-May 2011

Graduate Teaching Assistant, University of Alabama Birmingham, Birmingham, AL
       August 2010 – December 2010

Graduate Research Assistant, University of Alabama Birmingham, Birmingham, AL
       January 2010 –May 2010

Academic Resource Center Tutor, Birmingham-Southern College, Birmingham, AL
January 2008-May 2009

Refereed Journal Articles

5. **Wilson, B. A**. (under review). Assessing the relationship: Perceived self-efficacy and risk knowledge on foodborne illness.

4. Sellnow, D. D., Lane, D. R., Littlefield, R., Sellnow, T., **Wilson, B**., & Beauchamp, K. (under review). A Receiver-Based Approach to Effective Instructional Risk and Crisis Communication

3. Littlefield, R. S., Beauchamp, K., Lane, D., Sellnow, D. D., Sellnow, T. L., Venette, S., **Wilson, B.** (Accepted, 2014). Instructional Crisis Communication: Connecting Ethnicity and Sex in the Assessment of Receiver-Oriented Message. *Journal of Management and Strategy, 5* (3).

2. Cohen, E. L., **Wilson, B. A.**, Vanderpool, R. C., & Collins, T. (Accepted 2014). Barriers to patient-centered mammography among Appalachian Kentucky women. *Journal of Health Communication.*

1. Hickson III, M., Jones, M., Morse, M., **Wilson, B. A.** (2013). Foot in the door: A typology of salesmen. *Qualitative Research Reports in Communication, 14,* 35-43.

Publications

1. Wilson, B. A. (2013). Dispelling the myth, feminism is dead: An Analysis of *Spartacus: Vengeance*. In D. D. Sellnow (Ed.) *The Rhetorical Power of Popular Culture.* (2nd Ed.). Thousand Oaks, CA: SAGE.

Conference Proceedings

18. **Wilson, B. A.** & Young, L. A. (2014). *Gestational testing: Making sense of a down syndrome diagnosis.* Poster presented at the Biennial Kentucky Health Communication Conference, Lexington, KY.

17. **Wilson, B. A.** (2013). *Assessing the relationship: Perceived self-efficacy and risk knowledge on foodborne illness*. Paper presented at the 99th annual National Communication Association Conference, Washington, DC.

16. Littlefield, R. S., Lane, D. R., Beauchamp, K., Sellnow, D. D., Sellnow, T. L., **Wilson, B. A**., & Venette, S. J. (2013). *Instructional crisis communication: Connecting ethnicity and gender in the assessment of receiver-oriented message effectiveness.* Paper presented at the 99th annual National Communication Association Conference, Washington, DC.

15. **Wilson, B. A.**, Young, L. E., & Haarstad, N. (2013). *Communication, knowledge capture, management, and transfer: An examination of a failed MOOC.* Paper presented at the 91st Annual Kentucky Communication Association, Burkesville, KY.

14. Head, K. J., **Wilson, B. A.**, & Cohen, E. L. (2013). *An application of the message convergence framework to young women's HPV vaccination decisions.* American Public Health Association, Boston, MA.

13. Sellnow, D. D., Lane, D. R., Littlefield, R., Sellnow, T., **Wilson, B**., & Beauchamp, K. (2013). *An individual differences receiver-based examination of instructional crisis communication.* Paper presented at the 63rd Annual International Communication Association Conference, London, UK.

12. Cohen, E. L., **Wilson, B. A.**, & Vanderpool, R. C. (2013).*Barriers to patient-centered mammography among Appalachian Kentucky women.* Paper presented at the 63rd Annual International Communication Association Conference, London, UK.

11. Head, K. J., **Wilson, B. A.**, & Cohen, E. L. (2013). *An application of the message convergence framework to young women's HPV vaccination decisions.* Poster presented at the 141st meeting of the American Public Health Association, Boston, MA.

10. Wilson, B. A. (2013). *Behavioral intentions as an indicator of message effectiveness: A simulated case study.* Paper presented at the 83rd Annual Southern States Communication Association Conference, Louisville, KY.

9. Cohen, E. L., **Wilson, B. A.**, Vanderpool, R. C., & Collins, T. (2013). *Barriers to patient centered mammography among Appalachian Kentucky women.* Paper presented at the 2nd Biennial District of Columbia Health Communications Conference, Washington, D.C.

8. Head, K. J., **Wilson, B. A.**, & Cohen, E. L. (2013). *An application of the message convergence framework to young women's HPV vaccination decisions.* Poster presented at the 2nd Biennial District of Columbia Health Communications Conference, Washington, D.C.

7. Wilson, B. A. (2013). *Developing a theory: Compliance gaining to a socially mediated message in a health crisis context.* Paper presented at the 17th annual University of Kentucky graduate school symposium, Lexington, KY.

6. Cohen, E. L., **Wilson, B. A.**, & Vanderpool, R. C. (2013*). Identifying adherence barriers to screening mammography recommendations among Appalachian Kentucky women.* Poster presented at the 34rd Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Francisco, CA.

5. Wilson, B. A. (2012). *Dispelling the myth, feminism is dead: An analysis of Spartacus: Vengeance.* Paper presented at the Mid Atlantic Popular and American Cultural Association Conference, Pittsburgh, PA.

4. Wilson, B. A. (2012). *Evaluating Twitter as a medium for disseminating instructional messages in a crisis: The use of Twitter in the Fukushima Daiichi crisis.* Poster presented at the 98th annual National Communication Association Conference, Orlando, FL.

3. Cotton III, A. J., Iannarino, N. I., & **Wilson, B. A.** (2012*). Foodborne danger and medial expertise: How a daytime talk show can affect food policy.* Poster presented at the Biennial Conference for the National Centers for Food Protection and Defense, Chaska, MN.

2. Wilson, B. A. (2012). *Evaluating Twitter as a medium for disseminating instructional messages in a crisis: The use of Twitter in the Fukushima Daiichi crisis.* Poster presented at the Biennial Conference for the National Centers for Food Protection and Defense, Chaska, MN.

1. Wilson, B. A. (2012). *Instructional messages and self-efficacy: An evaluation of the use of Twitter in the Fukushima Daiichi crisis.* Paper presented at the 16th annual University of Kentucky graduate school symposium, Lexington, KY.

Certifications

Graduate Certificate: Risk Sciences	2013

Honors and Awards

Top Paper, Co-Author, Public Relations Division National Communication Association 99th Annual Conference	2013
College of Communication Graduate Teaching Excellence Award *Recipient*	2013
Top Student Paper, Applied Division, Southern States Communication Association 83rd Annual Conference	2013
Risk and Crisis Research Fellow	2011-2013
College of Communication Graduate Teaching Excellence Award *Nominee*	2012
B.A., Cum Laude, Birmingham-Southern College,	2009

Grant Work

National Center for Food Protection and Defense   2012-2014
Risk Theme Communication Coordinator
Research Assistant