

THE PERCEPTION OF RISK MESSAGES THROUGH FACEBOOK DURING SEVERE
WEATHER EVENTS

A Thesis
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By
Nigel Douglas Haarstad

In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF ARTS

Major Department:
Communication

May 2012

Fargo, ND

North Dakota State University
Graduate School

Title

The Perception of Risk Messages Through Facebook During Severe

Weather Events

By

Nigel Douglas Haarstad

The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

MASTER OF ARTS

SUPERVISORY COMMITTEE:

Robert Littlefield

Chair

Ross Collins

Carrie Anne Platt

Jessica Jensen

Approved:

05/14/2012

Date

Mark Meister

Department Chair

ABSTRACT

This study used computer-mediated focus groups to investigate how college students perceive risk messages about severe weather that are communicated through Facebook. The results of this study found that perceptions of risk were consistent with many factors outlined by the Risk Perception Model, developed by Covello, Peters, Wojtecki, & Hyde (2001). Despite this, communication using Facebook requires additional factors to be considered. The model should be amended to differentiate between the different levels of trust that influence perceptions on Facebook. The tone of the message becomes a factor separate from the previously established factors of risk perception. These findings stem from the perception among college students that Facebook is a platform meant for entertainment and socializing. These implications lead to many practical considerations that risk communicators can use to increase the perception of risk during severe-weather events in order to encourage individuals to take action to protect lives and property.

TABLE OF CONTENTS

ABSTRACT.....	iii
CHAPTER 1: INTRODUCTION.....	1
Significance.....	1
Rationale for Study	5
General Purpose of Study	6
Conclusion	7
CHAPTER 2: REVIEW OF LITERATURE.....	9
Risk and Crisis Communication	9
Crisis Stages.....	10
Precrisis.....	11
Crisis	12
Postcrisis	13
Weather Perceptions	15
Risk and Social Media	16
The Risk Perception Model	21
Conclusion	22
CHAPTER 3: METHODS.....	23
Research Design.....	23
Data Collection	25
Focus Groups	25
Sample and Recruitment.....	27
Instrument	30

Procedures	30
Data Analysis	32
Summary	33
CHAPTER 4: RESULTS	35
Usefulness	36
Convenience.....	36
Accuracy	37
Credibility	40
Credibility of Friends	41
Credibility of the Message	42
Socializing.....	43
Differences	44
Negativity.....	45
Personal Stake.....	46
Excitement	47
Dread.....	47
Entertainment.....	48
Confirming Perceptions	49
Confirming with Other Sources	49
Confirming with Facebook	50
Conclusion	51
CHAPTER 5: DISCUSSION.....	53
Theoretical Implications	53

Application of Model	53
Support for Current Model.....	54
Social Networks and Risk Perception.....	54
Congruent with Expectations	55
Layers of Trust.....	57
Practical Implications.....	59
Limitations and Future Research	65
Conclusion	66
REFERENCES	68
APPENDIX A: RISK PERCEPTION FACTORS	84
APPENDIX B: FOCUS GROUP QUESTIONS	85

CHAPTER 1: INTRODUCTION

Perhaps no other factor has done more to reduce losses due to severe weather over the past century than the ability to disseminate timely warnings to threatened communities (Lee, Meyer, & Bradlow, 2009). As communication technologies continue to rapidly innovate, information about potential risks is becoming much more accessible to the public (Veil, Buehner, & Palenchar, 2011). As the number and complexity of information sources continues to expand through the development of new products and services, officials must decide which methods are most effective in reaching the public. Before adopting a new communication technology, officials should understand how their audience will use the information presented through new platforms. For example, how do residents in threatened areas decide to gather information in advance of approaching storms? How do those choices affect their perception of risk? What does this communication platform offer that will be different or similar to other platforms in use by the public?

Understanding the answers to these questions is vital when adapting risk communication to new technologies or platforms. This study aims to use the Risk Perception Model outlined by Covello et al. (2001) to guide our understanding of the public's perception of risk through Facebook – one of the most widely used communication platforms. Understanding how the public perceives risk messages through a particular channel is vital to effectively communicating about that risk. The recent tragedy in Joplin, Missouri illustrates the need for further research regarding the public's perception of risk through various channels of communication.

Significance

On May 22, 2011, one of the deadliest tornadoes in United States history struck Joplin, Missouri, killing 159 people and injuring over 1,000. Like many severe storms in the United

States, this was a "warned" event, meaning that the National Weather Service had communicated critical information about the storm to the public through various means, including NOAA weather radio, emergency managers, and local media (NWS, 2011). Despite those warnings, the Joplin tornado was the first single tornado in the United States to result in over 100 fatalities since the Flint, Michigan, tornado of June 8, 1953. A review of the event conducted by the National Weather Service (NWS, 2011) found that a vast majority of Joplin residents did not immediately take protective action upon receiving the first indication of risk, usually an outdoor siren or television broadcast. Instead, most residents chose to seek out additional information before making the choice to take shelter. One of the additional sources people turned to was Facebook, which most television stations reported using, to varying degrees of success, to deliver and receive storm warnings and reports (NWS, 2011). In fact, a survey conducted for the American Red Cross shortly after the Joplin disaster found that, followed by television and local radio, the internet is the third most popular way for people to gather emergency information. The survey reported that 18 percent of both the general and the online population reported specifically using Facebook for that purpose (American Red Cross, 2011, August).

In September, 2011, four months after the Joplin disaster, local forecast offices of the National Weather Service began using Facebook as a means to communicate with the public (Pound, 2011, September 4). The National Weather Service intends to use these Facebook pages to communicate information about weather patterns without making Facebook a site people rely on for specific warnings. Some forecast offices, however, are using their Facebook pages to communicate up-to-the-minute information about severe storms (e.g., US National Weather Service, Grand Forks, North Dakota, 2011, August 1). At the same time, forecasters also hope that users will contribute storm reports to their local forecast office pages that can help inform

forecasters and other users of the scope and severity of severe weather (Pound, 2011, September 4).

Beyond the National Weather Service's initiative, broader trends in the use of social media warrant a study of Facebook's effectiveness as a platform to communicate messages about severe weather. During emergencies, spikes in web traffic indicate that social networks, such as Facebook, are becoming a commonly used resource (Scherp et al., 2009). Launched in February, 2004, Facebook is relatively new (Eldon, 2008, December 18). Nonetheless, it has the potential to reach a large, targeted audience. As of February 2012, 66% of online adults used social networking sites such as Facebook (Madden & Zickuhr, 2011). That constitutes over half of the United States' adult population, not just those who say they use the internet (Madden & Zickuhr, 2011). Among adults, 18 to 29-year-olds and those with some college education were the most active age group. 86% of that demographic reported that they regularly used social networking sites (Brenner, 2012). Furthermore, as of July 2011, Facebook had more than 800 million active users worldwide (Olivarez-Giles, 2011, September 22). Facebook, therefore, ought not to be ignored as a potential tool for risk and crisis communicators.

Natural disasters such as tornadoes inherently involve an element of risk, as they can severely threaten the well-being of individuals and entire communities (Department of Health and Human Services, 2011). According to Waymer and Heath (2007), natural disasters are naturally occurring events impacting property and people. Because they are acts of nature, tornadoes and other severe weather can be classified as accidental crises (Coombs, 1995). During any crisis, it is imperative that those involved or impacted, also known as stakeholders receive clear information about the crisis. Because severe weather events are often short-lived and hard to forecast, information – and the ability to effectively communicate it – is critical

because the situation may be rapidly evolving, and the future track of the storm is often unclear. When faced with this type of uncertainty, stakeholders look for information from credible sources to decide how the crisis will impact them which, in turn, influence how they respond to that risk (Seeger, Sellnow, & Ulmer, 2003).

Communication is necessary when organizations (such as the National Weather Service, local media, and emergency managers) seek to reduce stakeholder uncertainty and coordinate responses or actions (Seeger et al., 2003). Uncertainty and conflicting information can hinder decision-making. When faced with a decision, those at risk or in crisis may fail to act in a timely manner. Leading up to and during the crisis, clear, unambiguous messages can be critical to successfully responding to the situation, and indecision may prove dangerous or deadly, as it did in Joplin, Missouri. Seeger et al. (2003) argue that clear information regarding how to respond during a crisis is the key to mitigating negative consequences.

Risk is inherent in any organization (Coombs, 1999; Perrow, 1999; Schwartz, 2003). The complex and often imprecise nature of weather forecasting compounds this fact. As a result, government agencies and other organizations should be prepared to communicate effectively during those situations. An important step in such a process is to identify the factors associated with effective risk and crisis messages.

While the terms risk and crisis have been used interchangeably, they are distinct concepts. The majority of risk communication definitions describe it as an interactive and dynamic process containing specific elements of the threat, possible consequences, and measures of self-efficacy (Heath, 1994; National Research Council, 1989; Trettin & Musham, 2000). For example, Covello (1992) defines risk communication as “the exchange of information among interested parties about the nature, magnitude, significance, or control of risk” (p. 359). By

having access to all available data, one can make informed decisions as to how to effectively mitigate his or her own risk and elude a potential crisis.

The ultimate goal of risk communication is behavioral change through identification and reaction to a particular risk (Seeger, 2006). “Risk situations involve the use of communication to alter beliefs and thereby change behaviors” (Seeger, Sellnow, & Ulmer, 2003, p. 204). Risk communication must strike a balance between two opposing goals: to encourage proactive behavior using fear as a motivator while also avoiding undue anxiety and overreaction (Reynolds & Seeger, 2005; Seeger, et al., 2003). If attention is not paid to this balance, risk communication can contribute to or intensify a crisis, or the public may lose trust in those messages. Once a crisis occurs, communicators move from risk communication to crisis communication.

Similar to risk communication, the main objective of crisis communication is the reduction and containment of harm. Unlike risk communication, which ideally happens long before a crisis event occurs, crisis communication takes place during or immediately after a catastrophic event. Whereas risk communication focuses on mitigation and prevention, crisis communication seeks to contain and recover from the dangerous event (Sellnow, Ulmer, Seeger, & Littlefield, 2009).

Rationale for Study

Human behavior in response to warnings has been studied in the field of Emergency Management, but naturally focuses on concepts of interest to emergency managers more than it links to communication research. In the field of communication, much scholarly work has focused on crises faced by organizations or crises of a political nature. Natural hazards, however, have not received as much scrutiny from a crisis communication perspective (Sellnow, Seeger, & Ulmer, 2002). Many studies of risk communication relating to environmental risks or

public health are focused on the credibility of an organization or agency and reputation management (e.g., Coombs, 2007; Covello, 1997; Sandman & Lanard, 2010; Sellnow et al., 2009). Because natural disasters are not man-made, government agencies and officials are not typically seen as responsible (Waymer & Heath, 2007). Therefore, spokespersons for organizations responding to natural disasters play slightly different roles than those played by persons representing organizations considered responsible for a crisis. The focus of risk and crisis communication efforts during a natural disaster are to explain the situation, communicate vital information, and to encourage actions to mitigate harm. Spokespersons representing organizations facing blame do the same. However, they spend a significant amount of time protecting or restoring the organization's image (Benoit, 1997).

Because so many studies frame risk communication from a public relations standpoint, those studies that have focused on social media tend to focus on the effect of the channel on organizational credibility (e.g., Coombs, 2007; Covello, 1997; Sandman & Lanard, 2010; Sellnow et al., 2009). As the National Weather Service (2011) report on the Joplin tornado indicates, however, at issue was the public's perception of risk based on the various channels of communication they turned to, not necessarily the credibility of the National Weather Service or local news media . In a similar vein, recent studies have called for further study of how social media platforms impact risk messages and the public's perception of risk (Palen et al., 2007; Shankar, 2008; Veil, Buehner, & Palenchar, 2011).

General Purpose of Study

Thus, the aim of this study is to investigate how the use of Facebook impacts the perception of risk during severe weather events. In order to understand how risk messages are interpreted through Facebook, this study turns to the Risk Perception Model (Covello, Peters,

Wojtecki, & Hyde, 2001). This model (outlined in Appendix A) identifies factors that influence an audience's perception of risk and provides a model with which to understand the audience's responses. Covello and his colleagues at the Center for Risk Communication outline 15 factors they see as most important in the analysis of audience response. These factors, they assert, play a critical role in determining the levels of understanding, concern, fear, worry, and trust among stakeholders as a result of the communication (Walaski, 2011). Understanding these factors helps communicators craft messages that will achieve their objectives by changing attitudes or behaviors.

Research in risk and crisis communication has largely incorporated the use of case studies to gauge the effectiveness of messages. These case studies focus on specific scenarios, both real and fictional, to draw conclusions about best practices (Littlefield, 2005; McIntyre, 2005; Novak, 2005, NWS, 2011). While this approach has substantially contributed to the understanding of risk and crisis messages, it is not an ideal fit for this study, which focuses on a particular medium instead of a particular event. Thus, this study will employ focus groups to investigate a sample representative of users of the medium (i.e., Facebook).

Conclusion

The current chapter highlighted the importance of risk and crisis communication, specifically during a natural disaster. The growing use of Facebook as a channel of risk and crisis communication was addressed, which provided a rationale for further research of Facebook, in particular, as a channel of communication during severe weather events. Furthermore, this chapter addressed gaps in research, including the focus of risk and crisis communication on reputation management. Because organizations such as the National Weather Service and local media organizations are not responsible for severe weather,

spokespersons for organizations responding to natural disasters play different roles than those played by persons representing organizations considered responsible for a crisis. Because many studies in risk communication are framed from a public relations view, this study answers the call for further study of risk perceptions during severe weather events (Colten & Sumpter, 2009; Silver & Conrad, 2010). Understanding how these perceptions are formed is vital to understanding how to craft effective messages that will spur protective action.

Chapter two provides a review of literature, defining and discussing risk and crisis communication in more detail. Recent research on risk communication and social media, in general, is outlined, and gaps in research relating to social media, and Facebook in particular, are discussed. A description of the three phases of crisis is offered to provide context for this study. Studies of communication during severe weather events are outlined. These discussions culminate in a detailed discussion of the risk perception model, situated in the context of severe weather warnings. In addition, chapter two offers a specific research question to guide this study. Chapter three details the methodology used to complete this study. Chapter four reports the findings, illustrated by quotations and examples. The discussion of the results concludes the study in chapter five, offering implications and opportunities for further study.

CHAPTER 2: REVIEW OF LITERATURE

Organizations and scholars have conducted much research in an attempt to understand how people perceive the diverse risks they confront in their daily lives, as well as how and why experts and lay people disagree on the magnitude and qualities of risks (Sjöberg & Drottz-Sjöberg, 1994). From this process, overlapping theoretical approaches have been developed to describe risk perception (e.g., Covello, 2001; Fischhoff et al., 1978; Kasperson et al., 1988; Sandman, 2003, April 11; & Sjöberg, 1996). One approach, aptly named the Risk Perception Model, provides a comprehensive approach that can be used to analyze stakeholder perceptions of risk in a variety of situations (Covello et al., 2001). As introduced in chapter one, this study will use the Risk Perception Model to examine how college students perceive risk messages when they are communicated through Facebook. The present study draws on four areas of research: risk and crisis communication, previous research regarding the perception of weather, the use of social media in risk communication, and the Risk Perception Model.

Risk and Crisis Communication

An expanding area of study in the field of communication is the study of risk messages. According to Covello & Mumpower (1985), the concept of risk communication has its roots in the study of risk assessment. Contemporary risk communication research has placed a large focus on long-term environmental issues and public health issues (Seeger, Reynolds, & Sellnow, 2009) but has also focused on risks present in the food and chemical production industries (Plough & Krimsky, 1987; Sellnow et al., 2009). This area of study has grown to include terrorism-related risks (Palenchar, Heath, & Oberton, 2005; Reynolds & Seeger, 2005), as well as natural disasters (Sellnow et al., 2002; Venette, 2008).

Risk communication, according to Palenchar and Heath (2002), “addresses scientific evaluations of risks, the perceptions lay people have of them, and actions that are warranted in light of the degree of risk and people's tolerance of them” (p. 127). Sellnow, Ulmer, Seeger, and Littlefield (2009) contend that, “because risk communication is based on calculations and interpretations, most risky situations are replete with technical experts providing multiple messages that compete for acceptance” (p. 7). For example, during the early stages of natural disasters, conflicting messages among multiple government agencies, organizations, and individuals is common and, in many cases, expected (Coombs, 2007a). The public’s perception of risk may change with each stage of a particular crisis, necessitating different tactics when communicating with stakeholders. The ultimate goal is to achieve effective communication throughout each phase of a crisis. To understand the context in which risk and crisis messages are received and perceived, it is necessary to understand the various stages of a crisis.

Crisis Stages

In order to understand crises, researchers have created several models to explain their stages of development. While much of this work has been approached from an organizational communication perspective, the models contribute to our understanding of crises in a variety of contexts. These models are particularly useful when analyzing the components and characteristics of crises (Seeger et al., 1998). These models define the various stages or phases of a crisis, map out the process, and help organizational leaders develop accurate expectations (Seeger et al., 2003). The specific stages vary with each approach; however, the basics are consistent across many studies.

One of the earliest explanations comes from Turner’s (1976) six-stage model that included the time frame when, “events leading up to the disaster develop” (p. 381). Turner

(1976) described his model as, “the sequence of events associated with a failure of foresight” (p. 381). The stages of this model included the “notionally normal starting point,” the “incubation period,” the “precipitating event,” the “onset,” the “rescue and salvage-first stage adjustment,” and the “full cultural readjustment” (Turner, 1976, p. 381). This model describes crises from an organizational communication standpoint. Turner's model was useful because it helped organizations recognize patterns occurring prior to a disaster and, once identified, to monitor for the same pattern during future scenarios (Turner, 1976).

A later and simplified model outlines three separate stages of a crisis: pre-crisis, crisis, and post-crisis (Coombs, 1999; Seeger et al., 1998). This model is now seen as a “general analytic framework” to understand crises (Seeger et al., 2003, p. 97). This model takes a macro-level approach in an attempt to account for and encompass other developmental models (Coombs, 1999; Seeger et al., 1998). This broad approach allows for the generalization of the three phases, and is adaptable to a variety of specific crisis types (Seeger et al., 2003). As Seeger et al. argue (1998), “the relationship between communication and crisis development is grounded in the view of organizational communication as epistemic” (p. 237).

Development observations can serve as tools to assist crisis indicators, helping officials anticipate crisis related events, and enabling them to respond effectively and proactively (Seeger et al., 2003). Identifying and understanding the three stages of the crisis is key to choosing an appropriate and effective response. In order to illuminate the model’s contribution to effective risk communication, further explanation of each phase of the model is necessary.

Pre-crisis stage. The timeframe leading up to the trigger of a crisis event is known as the pre-crisis stage. This phase describes a “macro pre-crisis stage as the time of normal operation, preparation, and sensing before the onset of a trigger event” (Seeger, et al., 2003, p. 97).

Coombs (1999) identified three sub-phases of this precrisis stage: “signal detection, prevention, and crisis preparation” (p. 15). Even if organizations work to competently detect signals and engage in prevention and preparedness activities, certain crises are unavoidable, such as severe weather events.

Risk communication plays a necessary role in the precrisis stage. Here, organizations focus on influencing stakeholder behavior in order to avoid or mitigate the impact of a crisis situation (Sellnow et al., 2009). These precrisis relationships will eventually affect the organization in later stages of crisis, as they are critically linked with postcrisis communication effectiveness (Ulmer, 2001). Specifically, Ulmer (2001) identified the importance of “establishing strong communication channels and positive value positions with stakeholders long before a crisis hits” (p. 611). For the National Weather Service and local media organizations, these relationships translate into the establishment of credibility with the public. If members of the public have a perceived relationship with an organization or a particular spokesperson, they are more likely to have a positive view of that organization and, in turn, the organization’s message (Ulmer, 2001). Thus, establishing credibility during the pre-crisis stage can impact an organization's credibility during later stages of the crisis, affecting their ability to elicit action from the public.

Crisis stage. Crisis is the second stage in this model. Although it is the shortest stage, it is the most intense phase where disruption of regular activity occurs (Seeger et al., 2003). A crisis begins when a trigger event occurs or is sensed and continues until a sense of normalcy returns to the system (Coombs, 1999; Coombs, 2009; Seeger et al., 2003). A trigger, a term used to describe any disruptive event, can be defined simply as an issue with serious implications.

Three factors contribute to the determination of a crisis under this model: “perceived value of possible loss, the probability of loss, and time pressure” (Seeger et al., 2003, p. 176).

During the crisis itself, action is demanded of the organizations involved, even though the organizations might be experiencing a breakdown of their own systems (Seeger, et al., 2003). Applied to a severe weather scenario, this breakdown may be the added stress of near real-time forecasting, a disruption of communication channels due to power outages, or increased communication with stakeholders that burden the resources of the organization (NWS, 2009). Communication is the primary action expected from organizations involved in a crisis, such as the National Weather Service or local media, because these organizations are responsible for providing what Coombs (2009) refers to as, “instructing information” (p. 105). Instructing information is used to persuade the public that they are at risk and to provide them with information regarding how to reduce their exposure to a crisis in terms of probability or magnitude (Coombs, 2009). In addition, organizations might seek to reduce uncertainty for stakeholders by providing information to help them adjust to the crisis, including a summary of the crisis and the events surrounding it, as well as information regarding what is being done to attend to the crisis (Coombs, 2009). In the context of severe weather warnings, this may take the form of additional updates by forecasters, or by directing the public to additional information on a website or other source (Pound, 2011, September 4). Once the organization has effectively communicated crisis information necessary to stop or mitigate potential damage or harm, its attention inherently turns to focusing on the aftermath.

Postcrisis stage. Determining the defining moment at which point the crisis stage is ended and the postcrisis stage has begun is difficult (Coombs, 2009). However, when the crisis essentially is over, Coombs (1999) contends that organizations begin to focus on how to improve

their response if and when the crisis reoccurs. The majority of the research on this phase studies crises in which the organization was at fault, or crises that were triggered by human action (e.g., Brinson & Benoit, 1996; Coombs & Schmidt, 2000; Sellnow, Ulmer, & Snider, 1998). Seeger et al. (2003), for example, contend that effective postcrisis communication moves along a continuum, through three stages: “(1) salvaging legitimacy, (2) learning, and (3) healing” (p. 141). This approach assumes that legitimacy has been lost or negatively impacted, which is not necessarily the case for organizations involved in communicating about natural disasters.

Organizations involved in communicating about weather-related risks also do a great deal of communicating during the postcrisis stage. The National Weather Service, for example, often provides a summary of severe weather events shortly after they have occurred, in an effort to help the public understand the scope and severity of the incident (NWS, Grand Forks, n.d.). Local media serve a similar function, often communicating this type of information to the public through televised broadcasts or, recently, through social media. The National Weather Service also conducts assessments of their response to severe weather events in order to improve their response and to respond more effectively during future crises (NWS, 2011). Often, effective postcrisis communication permits an organization to, “emerge having learned important lessons, with improved risk management and with social legitimacy intact (Seeger et al., 2003, p. 141).

This three stage model of crisis has provided a consistent, flexible roadmap for researchers and organizations alike when faced with managing and understanding their crisis response. During each phase of a crisis, communicators face a new set of challenges. These challenges vary widely based on the nature of the crisis. Many crises can be attributed to the action or inaction of an organization. However, crises that develop from natural hazards present

a different set of challenges during each of the three phases. Thus, further examination of this line of weather-related research is necessary.

Weather Perceptions

Every day, the National Weather Service and various media outlets disseminate numerous weather forecasts to the public through various media. Members of the public obtain 300 billion or more forecasts each year with a total estimated production value of \$31.5 billion per year (Lazo, Morss, & Demuth, 2008). Except, perhaps, for current news events, there is probably no other type of information that is obtained on such a routine basis from such a variety of sources. It is quite possible that no other scientific information is accessed so frequently (Wilson, 2008). This demand for weather forecasts across a wide range of spatial and temporal scales, as well as the need to construct messages for a large and diverse population, equates to an enormous volume and an assortment of risk messages. While the demand for these forecasts, and their benefit to the public, is obvious, “the [meteorological] community does not have a clear overall picture of how members of the public obtain, perceive, use, and value weather forecasts” (Lazo, Morss, & Demuth, 2008, p. 785).

Research on aspects of these issues has been conducted for specific geographical areas (e.g., Saviers & Van Bussum, 1997; Lazo & Chestnut, 2002), for specific events or weather phenomena (e.g., Katz & Murphy, 1997; Anderson-Berry et al., 2004; Stewart et al., 2004; Call, 2005; Drobot, 2007; Hayden et al., 2007; Morss & Wahl, 2007; Zhang et al., 2007), or for certain demographics (e.g., CFI Group, 2005). Private sector marketing studies have likely also investigated these issues, although results from such studies are not publicly available. Other work has examined the needs of weather forecast users more generally and emphasized the importance of obtaining input from users (e.g., Pielke & Kimpel, 1997; Hooke, 2000; Pielke &

Carbone 2002; WMO 2003; Morss et al., 2005; 2008; National Resource Council, 2006). These previous efforts bring some elements of the picture into focus, but each contributes only a small view of the larger phenomenon.

Understanding the various sources from which people get their weather information helps officials evaluate the broad importance and accessibility of different sources, and provides insight into opportunities and limitations for developing effective content for the public. Understanding individual perceptions of weather-related communication provides an indication of the effectiveness of that communication (Lazo, Morss, & Demuth, 2008). Importantly, such knowledge can help identify deficiencies in the process of communicating risk messages to the public. Furthermore, building knowledge of perceptions throughout the three stages of crisis – creating end-to-end understanding – provides a more complete picture of how weather-related communication is received and interpreted.

Risk and Social Media

Technological advances are swiftly changing how crisis managers and scholars receive, manipulate, and distribute information to stakeholders or communities in crisis situations. Rapid evolution of mobile technologies, computers, the Internet, and digital video technologies are revolutionizing the way we connect with each other. A 2012 study by the Pew Research Center found that 66% of adults with access to the Internet are using blogs, social networking sites, online video, text messaging, and portable digital devices (Madden & Zickuhr, 2011). These new media platforms offer new opportunities for communication and global outreach in crisis situations (Wright & Hinson, 2009).

Research shows that on-site and online crisis response activities are becoming increasingly “simultaneous and intertwined” (Palen, Vieweg, Sutton, Liu, & Hughes, 2007, p.

2). While community members have always played an integral role in response and recovery efforts (Quarantelli, 1998; Scherp et al., 2009), social media is quickly making the community part of the immediate crisis communication response. For example, the social networking site Twitter was used to quickly share initial information and updates during the 2007 and 2008 California wildfires, 2008 Mumbai massacre, 2010 Haiti earthquake, and 2011 uprisings in North Africa and the Middle East (Beaumont, 2008; Lenhart, 2009; New America Media, 2011; Robinson, 2010; Smith, 2010; Sutton, Palen, & Shklovski, 2008). First-hand reporting from the public directly on scene provides simultaneous news, which is able to spread rapidly among social networks of friends and other contacts. During the California wildfires, for example, residents uploaded pictures of the fire, along with their location, to Twitter. In doing so, residents were able to report the fire's movement before journalists could reach the scene (Sutton et al., 2008).

Social media is, at its core, human communication. Communication through these networks possesses characteristics of participation, openness, conversation, community, and connectedness (Mayfield, 2006). New-media technology allows private individuals to become sources of information online, “sharing opinions, insights, experiences, and perspectives with others” (Marken, 2007, p.10). Users who review information are simultaneously able to contribute information, thereby providing the basis for user-generated media (Veil, Buehner, & Palenchar, 2011). The news of the crisis can be shared and be shared, quickly reaching millions of people without relying on traditional news media.

Despite these benefits, empowering the public to contribute crisis information in place of traditional media or spokespersons is not without its drawbacks. Other studies of weather-related crisis events (e.g., Silver & Conrad, 2010; National Weather Service, 2011) have concluded that

multiple voices interfere with the clarity and effectiveness of risk messages. As was evidenced during the Joplin tornado, individuals' varied perceptions and tolerance for risk were reflected in their actions and communication with others, such as family members. These competing messages contributed to their uncertainty and, in many cases, inaction (NWS, 2011).

Literature from the field of Emergency Management suggests that these multiple conversations are common when members of the public attempt to evaluate the impact of the disaster. This line of research indicates that individuals will use a wide variety of sources, if available, to satisfy their needs and to inform their actions during disaster situations (Taylor et al., 2005; Sorensen & Sorensen, 2006). Notably, individuals use these sources not only to gather information, but to verify information from other sources, and to distribute information to others (Sutton, Palen, & Shklovski, 2008).

Social media such as Facebook have the potential to provide *meaningful access* during crises. Meaningful access refers to “opportunities for interaction with key decision-makers and for acquiring the information necessary to make informed judgments about a risk issue” (Sellnow et al., 2009). While Facebook users may have the opportunity to communicate with forecasters or other expert sources of information, they will also likely encounter messages from other members of the public who have specific information about the crisis. Due to the accessible, interactive nature of Facebook, members of the public are more likely to be able to contribute sought-after information. This sheds a different light on the concept of meaningful access, and creates a situation where officials and spokespersons compete for attention with members of the public.

Effective risk communication devotes attention to creating and sustaining relationships (Sellnow et al., 2009). This is also the purpose of social media (Rand & Rodriguez, 2007).

Uncertainty inevitably causes stress for stakeholders (Coombs, 2007). Using social media, which allows direct sharing of their formation in a timely manner, can relieve uncertainty. Research after Hurricane Katrina suggests that interactive information is preferable to static information. Those who were affected by the disaster frequently visited interactive forums (Procopio & Procopio, 2007). They also reported positive experiences with those sources. Increasing the dialogue between the public and public officials has the potential to increase the reporting of critical information by giving the public an outlet to express their opinions. Maintaining these relationships is important because the public can serve as a source of information for the organization (Tinker, Dumlao, & McLaughlin, 2009).

Word-of-mouth news is tremendously influential and, in some instances, it is perceived as more trustworthy than mainstream media (Colley & Collier, 2009). Information distributed through mainstream news media may seem less personal and useful to local residents in times of disaster (Sutton et al., 2008). One factor of social media that may affect perceptions of risk is the ability of online communities to self-correct misinformation (Veil et al., 2011). During the H1N1 pandemic, the CDC encouraged the public to post their beliefs and concerns, even if they were counter to the CDC's science or recommendations (Reynolds, 2010). While this openness allowed several posts on the CDC's Facebook page about flu vaccines causing the flu and vaccines causing autism, within a couple posts the user community would counter the claims and even provide links to online articles dispelling the rumors and citing multiple sources, including the CDC. In the midst of the pandemic, The CDC's American Customer Satisfaction Index jumped from 74 to 82 (out of 100), and those who used social media gave the CDC higher satisfaction ratings and those who did not (Reynolds, 2010). Important to this study of risk perception is the fact that, "compared with a sampling of other federal agencies, CDC scored

highest for online participation, collaboration, and trust (Reynolds, 2010, p. 21). The use of social media allowed the CDC to establish self as a trusted resource, thereby enabling it to communicate effective messages.

In addition to establishing trust, a white paper presented by Beeline Labs (2009) suggested, “social media has the power to humanize business” (p. 3). Crises naturally create a need not only for information, but also for human conversation and compassion (Sutton et al., 2008). By design, social media connects people to others in a personal way. This human quality makes social media an attractive method of communication for people who have experienced a crisis. It also provides an ideal conduit for crisis communicators to show compassion, concern, and empathy. A caring, conversational voice is key to improving relationships with the public (Sweetser & Metzgar, 2007).

In a 2009 survey, 92% of media professionals surveyed believed that blogs and social media now influence mainstream news coverage (Solis, 2009, p. 24). In another survey, however, only 13% of public relations practitioners said that they had incorporated social media in their organizations crisis communication plans (Russell Herder & Ethos Business Law, 2009). Given social media’s wide user base, and its ability to facilitate rapid sharing of information, researchers have called for further investigation in order to effectively understand the use of these new technologies in crisis communication settings (Veil et al., 2011). Previous studies of social media in risk and crisis contacts have lumped Facebook in with radically different platforms, such as Twitter, Flickr, and wikis (Veil et al., 2011). Because of the unique capabilities discussed thus far, Facebook may influence risk perceptions differently than other social media platforms. In order to assess this, the current study turns to the risk perception model.

The Risk Perception Model

The risk perception model, outlined in Appendix A, was developed by Covello, Peters, Wojtecki, and Hyde (2001) at the Center for Risk Communication. This model identifies factors that influence an audience's perception of risk and provides for an analysis of the magnitude of that perception. Covello and his colleagues used this model to describe 15 of the factors they believe are most important in the analyzing and audience's level of concern and other strong emotions such as fear, worry, trust, and outrage (Covello et al., 2001). Understanding these factors, particularly how the audience perceives each of them, Can help communicators craft more effective messages. Thus, an organization is more likely to achieve their stated purpose and objective by successfully changing attitudes and behaviors (Walaski, 2011).

Because of the intense feelings that perceptions of risk and generate, risk communication research often refers to these characteristics as “outrage” factors (Sandman, 1989). Research indicates that an individual's perception of risk is based on the combination of Hazard, (or mortality) and outrage (Sandman, 1989). When present, outrage factors take on strong moral and/or emotional overtones, causing an individual to react emotionally, which in turn can significantly amplify levels of perceived risk. (Covello et al., 2001).

Research suggests that organizations should take action in specific ways to manage perceptions of risk (Coombs, 2007; Fischhoff, 1989; Johnson, 1993; Sellnow et al., 2009). First, Covello et al. (2001) assert the importance of collecting and evaluating empirical information obtained through surveys, focus groups, or interviews about stakeholder judgments of each of the risk perception factors (particularly trust, benefits, control, fairness, and dread). Sustained interaction and exchange of information with stakeholders about identified areas of concern are also necessary. To plan and organize effective risk communication strategies, understanding of

stakeholder perceptions and their levels of concern, worry, fear, hostility, stress, and outrage is necessary (Covello et al., 2001).

The Risk Perception Model is intended to evaluate stakeholder perceptions in any situation through any channel. Facebook is a particularly appropriate context for this analysis because it is a pervasive and relatively new tool for risk communicators. Furthermore, the previously discussed research indicates that the public's reliance on social media as a means to receive crisis information is increasing. Because college students, among other Digital Natives (Prezky, 2001), are the most active Facebook users (Wells, 2010, August 8th; Brenner, 2012) this study will focus on that demographic. In order to gain a rich, comprehensive understanding of the interaction between Facebook and risk perception, this study asks the following research question:

RQ1: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook?

Conclusion

This current chapter provided a discussion of literature relevant to understanding how perceptions are formed through Facebook during risk and crisis situations. The study of risk communication was introduced, with a focus on the stages of crises. This was followed by a discussion of the relevant research pertaining to the perception of whether related phenomena. This led to a discussion of recent research that merges social media and the perception of risk. Finally, the risk perception model was introduced as a means to evaluate the perception of risk as seen through Facebook. What follows in chapter three is a detailed description of the methods used to complete this study.

CHAPTER 3: METHODS

This study examined how risk messages are perceived when Facebook is used as the channel of communication. Analysis of stakeholder reactions to risk messages communicated through Facebook gives a better understanding of how risk messages are perceived through that pervasive medium. This study used computer-mediated focus groups to answer the following research question:

RQ: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook?

This study took place at the Group Decision Center on the campus of North Dakota State University. This location is ideal because of its propensity for many types of severe weather, including thunderstorms, tornadoes, floods, and winter weather such as blizzards. This study used focus groups to explore how risks related to severe weather are perceived through Facebook. Because perceptions are inherently subjective, this method allows participants to explain their perceptions of risk in their own voice. This section explores research design, procedures, instruments, and finally, analysis of data.

Research Design

This study used qualitative methods to investigate perceptions of risk through Facebook. Qualitative methods are particularly appropriate to answer this study's research question. Qualitative methods "seek answers to questions that stress *how* social experience is created and given meaning" (Denzin & Lincoln, 2003, p. 13). A major concern of qualitative research is to describe what is happening, or to answer the question "what is going on here?" (Gibbs, 2007, p. 4). This detailed description aids in understanding, and eventually analyzing, the setting being studied. In particular, qualitative methods provide a "thick description" of a situation or

phenomenon (Geertz, 1975). This term refers to research that “demonstrates the richness of what is happening in emphasizing the way that it involves people's intentions and strategies” (Gibbs, 2007, p. 4). Using a qualitative method provided the researcher with a better understanding of the participants’ perceptions.

Furthermore, when a user communicates about risk over Facebook, those meanings become shared phenomena. Unlike one person receiving a warning from television or radio, users have the opportunity to share their interpretation with others who view their posts. Because this study focused on that shared information, qualitative methods were particularly appropriate to answer the research question posed in this study.

Focus groups served as the data collection method for this study. This method was particularly appropriate because of its usefulness for analyzing the diversity of opinions on a topic (Lindlof & Taylor, 2011). Focus groups are defined as “small groups of people with particular characteristics convened for a focused discussion of a particular topic” (Hollander, 2004, p. 606). This method allowed multiple viewpoints to be gathered quickly, making a larger sample size feasible for this study.

Focus groups are also useful because they often produce rich data that are comprehensive and elaborative. The dialogic nature of focus groups can aid in recall and prompt participants to formulate answers in response to conversation (Fontana & Frey, 2003). This is particularly important because the topic of severe weather messages may seem abstract or complex to participants and, consequently, difficult to discuss in detail in an interview setting.

In this case, the most compelling reason for using focus groups was to realize the “group effect” (Carey, 1994). The focus group method takes advantage of the fact that, in guided discussions or ordinary conversation among group members, participants draw upon a shared set

of experiences. What occurs in this context is a kind of “chaining” or “cascading” effect in which each person's turn of the conversation links to, or forms in response to, the topics and ideas that came before it (Lindlof & Taylor, 2011). As Morgan (1998) explains, “the explicit use of the group interaction [produces] data and insights that would be less accessible without the interaction found in a group” (p.12). Focus groups, therefore, provided a clear advantage over interviews or written surveys insofar as the method may help participants formulate and articulate their views more thoroughly.

Data Collection

Focus Groups

Computer-mediated focus groups provided the means for data collection for this study. These focus groups were run at the Group Decision Center on campus, using software on a network of computers that allowed the meeting to be both simultaneous and anonymous. The software, known as “Think Tank” and developed by a company called GroupSystems, has been used by governments and Fortune 500 companies to facilitate meetings and focus groups (GroupSystems, n.d.). The software operated much like an online chat room, but was limited to those participants on a network of computers arranged in a single large conference room.

To maintain anonymity during the meeting, users’ comments were not identified by a screen name or other identifier. Rather, each comment was assigned a tracking number, first according to the question, then according to the order in which it was submitted to the group. For example, the fifth response to question 7 would appear as “7.5.” The first response to that comment would appear as “7.5.1” and so on. Thus, when exchanges are reported in the results, they are accompanied by these tracking numbers. This system also allowed the researcher to capture every idea, question and comment that occurred during the focus group into a well-

organized written transcript. It also allowed provided an organized, easy-to-follow discussion for the participants and the researcher.

A number of considerations made this method appropriate for data collection. First, because comments were reported exactly as they were typed by the participant, the voice of the participant was maintained with exacting detail. Focus groups transcribed by the researcher would not reflect the nuances in punctuation, grammar, and spelling used by the participants that added richness to the participants' comments. Computer-mediated focus groups were also appropriate because the sample were "digital natives" (Prensky, 2001) that are familiar with the technology used to conduct the focus groups. In addition, computer technology is also used to access Facebook, making the method consistent with the topic of interest in this study.

One concern associated with computer-mediated focus groups is that the method will not gather as many responses. This could potentially be influenced by participants with deficient typing skills. In order to counter this factor, the facilitator made a point to stay on a particular question until a moment after the last response was received. The facilitator also listened for the sound of typing during the focus group as an additional method to gauge whether anyone was still crafting a response.

A lack of data was not apparent in the current study, which gathered 2,502 individual responses, constituting 3,921 individual lines of data across six focus groups. Furthermore, previous research reports that conducting focus groups using a computer produces similar amounts of information compared to face-to-face methods (Underhill & Olmstead, 2003). Most important, the quality of the information obtained from computer-based focus groups is not significantly different from information obtained from face-to-face groups (Underhill & Olmstead, 2003). Additionally, previous research has found that, although responses are often

shorter, participants in computer-mediated focus groups contribute more individual responses than participants in face-to-face focus groups, allowing for a full range of opinions to be expressed (Reid & Reid, 2005). Thus, computer-mediated focus groups were deemed appropriate for this study.

Sample and Recruitment

Participants were recruited from Communication 110, an undergraduate course at North Dakota State University in Fargo. A recruitment letter was sent to the basic course director in charge of the classes from which participants were recruited. The basic course director then forwarded the recruitment letter to the various instructors so that they would distribute it to their classes, either via the learning management system used by the university or official university e-mail. Students indicated their intention to participate by signing their name and e-mail address on a sign-up sheet that was made available in the researcher's office during regular business hours. Students were contacted by e-mail 24 hours in advance of the focus group as a reminder to encourage attendance.

Having a physical sign-up sheet, as opposed to relying on e-mail communication, as well as sending email reminders, helped to ensure attendance. Lack of attendance is a common source of failure in focus group research (Morgan, 1995). Requiring participants to actively seek out a sign-up sheet reduced the opportunity for participants to sign up hastily or without care. While this tactic by no means guaranteed that each respondent would show up, meeting potential participants can increase their chances of attending the group as the researcher will not be seen as complete stranger. Meeting participants prior to the group also gave respondents an immediate opportunity to ask any questions they might have (Bloor, Frankland, Thomas, & Robson, 2001). Informed consent forms were given to the participants in person when they signed up for the

study. In addition to offering information about the nature of the study, these sheets served as a reminder to show up for the study. The time and date the participant chose was written on the informed consent form. These forms also contained the researcher's information so that participants were able to contact the researcher with any questions or give notice in advance if they were unable to attend a focus group.

Participants in this basic course are all currently enrolled college students. Based on the average demographics of undergraduate students and the researcher's observations of the participants it appeared that a majority of the participants were between the ages of 18 and 24. However, in order to maintain anonymity, demographic information was not obtained from the participants. Students had the opportunity to receive a small amount of class credit for participating in the focus group. If they chose not to participate in this research study, the students were offered opportunities to participate in other ongoing research studies for credit, or to complete alternative assignment.

Participants were recruited for approximately two weeks. Initially, it was difficult to recruit students because many other opportunities for research had been offered to the Communication 110 course. This led the researcher to offer a drawing for three \$15 gift cards available to any three students who were not receiving course credit for their participation. Ultimately these prizes went unclaimed, because every participant chose to receive course credit. Once it became apparent that this study was the last research opportunity that would be offered through Communication 110 for the semester, an abundance of eager students signed up.

While undergraduates enrolled in basic courses are often studied due to convenience sampling, this sample was specifically chosen because of the anticipated age and experiences of the participants. The students in this demographic are "digital natives" (Prensky, 2001). They

have likely spent most of their lives surrounded by and using computers, cell phones, the internet, video games, digital cameras, and other tools of the digital age. Moreover, these technologies are an integral part of their lives. Therefore, as Prensky (2001) explains, “Our students today are all ‘native speakers’ of the digital language of computers, video games and the Internet” (p. 1).

In addition, Facebook was originally created exclusively for college students (Bridget, 2006, September 19), and this demographic is still prominent on the site. Facebook is replacing other methods of communication for members of this demographic. Many college students, for example, learn about current events through Facebook in addition to interpersonal interactions. Some students even perceive that the majority of their communication, at times, happens through Facebook (DeBrosse, 2007, June 10). This information indicated that the sample selected for this study would be familiar with and, to a certain degree, reliant on Facebook as a channel of communication. This warrants the use of undergraduate students as the study's sample.

This study conducted focus groups with a target sample size of $N=64$ or to the point of saturation (Denzin & Lincoln, 2003). I expected to reach saturation after conducting approximately eight focus groups, but no new themes emerged after the sixth session. Each focus group consisted of approximately six to eight participants, which is typically seen as the optimum size for focus group discussion (Bloor et al., 2001). It was not necessary to adjust these numbers as necessary to reach the point of data saturation. In fact, two additional focus groups were run after reaching saturation since they had already been scheduled. These extra focus groups were used to search for negative cases. Furthermore, the researcher felt obligated to continue with the groups because students were relying on them for class credit. This resulted in a final sample size of $N=66$.

Instrument

The interview guide is attached as Appendix B. Covello et al.'s (2001) Risk Perception Model was used as an *a priori* guide to creating these questions. While the questions do not directly correspond to each of the elements in the risk perception model, they did lead to, and facilitate detailed discussions of, factors that influenced the perception of risk through Facebook. The researcher anticipated that similar themes would emerge from the questions chosen for this study. Consistent with the semi-structured interview style, follow-up questions were asked in addition to the formal interview protocol in order to encourage participation and detailed responses. While these questions were used to keep the discussion on track, they were also used to foster semi-structured discussions that are relaxed and informal so that much of the information shared would emerge from the natural flow of conversation (Lindlof & Taylor, 2011).

Procedures

The researcher, along with two trained facilitators from the Group Decision Center, ran the focus groups using the semi-structured interview protocol explained above. The focus groups took place in a large conference room specifically designed to facilitate computer-mediated meetings and focus groups. Here, students participated in the focus groups by typing their responses on a computer that has been provided. Participants were able to interact with each other by viewing and responding to each other's comments, similar to a spoken focus group. The researcher was able to interact with participants via computer, but was not able to see the participants throughout the study. This allowed the researcher to control the discussion while still maintaining the anonymity of individual participants' responses. The use of computer-mediated communication to conduct the focus groups should be consistent with the sample's familiarity

with technology. Thus, since the participants were chosen because their demographic uses Facebook and other digital technologies, they were, overall, able to communicate effectively through this medium. This also eliminated the need for audio recordings, thus ensuring the accurate representation of participant comments.

At the outset of each focus group, the facilitator welcomed everyone to the meeting and explained how to use the software that was used to facilitate the focus groups. The researcher then reminded the participants of their rights and provided a brief explanation of how the meeting would proceed. After this introductory period, the researcher withdrew to a separate area of the Group Decision Center so that he could guide the discussion without jeopardizing the anonymity of the participants' responses. Each focus group lasted approximately one hour to one hour and fifteen minutes, which is within the "normal" range for focus groups (Lindlof & Taylor, 2011) and allowed sufficient discussion.

The transcripts produced by the focus groups were given to the primary researcher via a jump drive. These documents were password protected and stored in two secure locations: on the researcher's password-protected computer, as well as in the researcher's e-mail, to which only the researcher has access. To further ensure confidentiality, names were never associated with the data in any materials related to the study. A copy of the transcriptions were printed and stored in a locked desk drawer, accessible only to the researcher. Sign-up sheets and transcriptions were kept separate from the data, and will be destroyed after the study is completed to uphold confidentiality.

The Group Decision Center was an ideal setting for these focus groups, as the technology used, as well as the aesthetics, were consistent with the broader university setting. Given the sample, this was a familiar setting for the students who will be participating. It was also

relatively accessible to participants who live on or near campus, which likely helped secure attendance (Bloor et al., 2001). The Group Decision Center, as opposed to a coffee shop or lounge area, was private and relatively free of distractions, allowing participants to focus on their responses.

Because of the amount of computer equipment in the room, refreshments were not provided, but participants were allowed to bring beverages into the room with them. As described above, participants also had the opportunity to earn credit for the introductory course from which they are recruited. The Department of Communication, which is in charge of this general education course, routinely uses the class as a sampling pool, and participants can earn a small portion of their score by participating in research projects such as the study.

Data Analysis

Text from the focus groups was analyzed using a qualitative system of open and axial coding. In open coding, the first step, the researcher searches for etic themes. Here, the researcher allows categories to emerge from the participants' own language. Open coding is used to identify and differentiate between concepts that emerge from participants' responses. Through open coding, the researcher is not looking for data that fit the set number or type of categories, nor is the researcher interested in how categories fit together. Rather, open coding is the process of developing inductive categories (Keyton, 2011).

After completing the process of open coding, data was then coded a second time, using axial coding, to collapse categories and search for etic themes (those imposed by the researcher). Axial coding is described by Keyton (2011) as "the process of linking categories in a meaningful way" (p. 312). In the process of axial coding, categories were combined or relabeled into fewer categories. These categories ultimately represented the themes that emerged by linking the

concepts discovered through open coding. Data from the first focus group were coded before the second focus group ran, in order to see if the questions were prompting adequate and topical discussion. Subsequent focus groups were coded as soon as possible, usually within a day of the meeting. Therefore, data analysis was conducted during and after the time frame in which focus groups were conducted. This process of open and axial coding, as well as data collection, continued until sufficient data had been gathered to account for variation or conceptual saturation, and to provide useful exemplars (Lindlof & Taylor, 2011).

Summary

This chapter detailed the methods which were be used to answer the research question:

RQ: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook?

This study employed qualitative methods because of their focus on how social experience is created and given meaning, which aligns with the focus of this study. Computer-mediated focus groups were employed as the data collection method. Focus groups provide numerous advantages when approaching this topic. First, the dialogic nature of focus groups can help participants formulate thorough responses and may aid in recall through the course of conversation. This is particularly appropriate because of the somewhat abstract topic. The use of group interaction during focus groups is also consistent in many ways with the process of communication on Facebook, where users also engage in communication with others.

The sample of participants was drawn from Communication 110 courses at North Dakota State University. This sample was chosen specifically due to the anticipated average age of the participants, which will likely be between the ages of 18 and 24. These students are “digital

natives” (Prensky, 2001), and are likely familiar with Facebook and other technology, which warrants the use of this sample.

The researcher, assisted by two facilitators from the Group Decision Center, moderated the focus groups using an informal interview protocol in order to elicit detailed responses and discussions. The text produced from these focus groups was analyzed using open and axial coding. This process of data collection and analysis was repeated until conceptual saturation of the data was reached, and continued for an addition two focus groups in order to enrich the data. These methods helped to illuminate how risk messages pertaining to severe weather are communicated and perceived through Facebook.

CHAPTER 4: RESULTS

This study sought to answer the question: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook? To understand how these messages are perceived, data was collected from focus groups. Participants in these focus groups were all college students enrolled in undergraduate courses in Communication. A total of 66 students participated in the study, which was divided into eight focus groups over the course of two weeks. A total of 2,502 individual responses were contributed during the focus group discussions, constituting 3,921 individual lines of data. In order to accurately represent the voice of each participant, the results are reported here without altering the text to correct for spelling, punctuation, or grammar.

Five categories emerged from the data collected during the study. These categories represented 82 percent of all data coded and analyzed through a process of open and axial coding. Six percent of the data related to a warm-up question designed to familiarize participants with the technology they would use to participate in a focus group. The remaining 12% of the data represented comments unrelated to the research question posed in the study. Conceptual saturation was evident after the sixth focus group. Because they had already been scheduled, two additional focus groups were run as a precaution to ensure the completeness of the data and search for negative cases.

This chapter will present participants' experiences and opinions regarding Facebook as a source for severe weather information. To that end, this chapter will discuss the five themes that emerged from the study. First, the issue of *usefulness* will be discussed, followed by *credibility*, *socializing*, *excitement* and, lastly, *confirming perceptions*. Because the themes were allowed to emerge from the data directly through a process of open and axial coding, the results gleaned

from the participants' responses do not directly parallel the Risk Perception Model outlined by Covello et al. (2001). However, many connections to this model became clear during analysis of the data, and will be discussed in depth in Chapter 5.

Usefulness

The first category to emerge from the data pertains to the perceived usefulness of Facebook as a source to learn about severe weather. Included in this theme were subcategories of convenience and accuracy. These subcategories emerged as one theme that explained why participants were comfortable using Facebook to communicate about severe weather. Although there was some disagreement along these lines, these facets of usefulness were portrayed in a positive light in every focus group. Notably, this is separate from the idea of credibility, which emerged as a separate category discussed later in this section.

Convenience

This subcategory included comments about the accessibility and convenience of Facebook as a source of information. Participants overwhelmingly agreed that they often see information pertaining to the weather on Facebook when severe weather is threatening their area. 86 individual comments attributed this fact to the amount of time the participants spend on Facebook. For example, one participant stated, "i think it faster and the first thing you do when you log onto your computer is check facebook." 26 other comments pointed out that Facebook follows them wherever they go because it can be used on smart phones. Furthermore, some emphasized the convenience of the source, as one participant states here: "If someone is always on Facebook, then yeah this is more convenient, and a lot of people always are on Facebook, so in a way this does add convenience rather than having to open up a new tab." While this participant was alone in expressing the importance of not having to open a new tab in their web

browser, participants agreed in 74 comments that Facebook was the source they were most familiar with to access information. For example, one participant stated, “I think what sticks out about fb is the fact that it is such a familiar place to millions of people and very easy to access as well.”

Participants in each focus group stated that, for better or worse, information about severe weather was unavoidable on Facebook. For example, one participant exclaimed, “there was a huge earthquake back home that obviously everyone felt and every single post was earthquake!!! well duh!” Among the others that agreed with the statement, one participant responded, “yeah, i guarantee[sic] right now there are at least 15 people who are complaining about A)the rain and B) the thunder waking them up this morning.” Some participants took in more positive view of this, explaining, for example, “You are exposed to it more on facebook and are more likely to remember that information.” Thus, it became apparent from the data that participants’ viewed Facebook as a convenient source through which they could become familiar with information about severe weather.

Accuracy

This subcategory included comments about the ways in which communication through Facebook could offer accurate information about severe weather. The amount of information about severe weather that participants had seen on Facebook led them to believe that Facebook is an accurate source for this type of information. Specifically, participants felt that the quantity of information available provided accuracy. One participant explained:

ya if theres 15 or so people commenting about it in your area its usually somewhat reliable, someone heard it form[sic] somewhere. 15 people dont just wake up and say, i'm gunna tell everyone theres a big storm today.

A participant from a separate focus group supported this observation, saying, “its quickest and everyone is always posting about storms if they are affecting your area.”

Six of the eight focus groups discussed how the accuracy of information on Facebook can be maintained because it is self-correcting. For example, refuting the idea that information could be exaggerated, one participant said, “it might but im not sure because others could just comment on it saying that they are being dramatic.” Throughout the study, other participants expressed the same sentiment. For example, another participant supported the idea that Facebook was accurate, saying, “You get to see many people's perspectives so it all balances out, I guess.”

Some participants even saw Facebook as a means to get more accurate information than television sources. In fact, many participants scoffed at the accuracy of television meteorologists. One participant declared, “its about the storms happening in this moment and not some guy saying a 20% chance bullcrap.” The following exchange is indicative of the overall disdain shown for meteorologists throughout the study:¹

3.5.4. fool me once shame on you. fool me twice shame on me. fool me 476920 times
your my weatherman

3.5.5. ^^agreed

3.5.6. Weathermen seem to always be much worse than the online sources

3.5.7. Yeah, I feel like soon, there won't be a need to TV news.

3.5.8. *for TV news

3.5.9. I totally agree with you both!

¹ The numbers displayed within each quoted exchange are retained from the original transcripts and were used to help organize the conversation. In this quotation, “3.5” means the fifth response to question three. “3.5.4” means the fourth reply to the fifth response, while “3.5.5” means the fifth reply to the fifth response, and so on.

Many participants latched on to the idea that the observations posted to Facebook about current weather were just as important as, or more important than, forecasts. While some disagreed, this common thread is exemplified by a participant who said, “when a storm hits and is very severe facebook friends will tell you more about a specific area, thus fb is better.”

Information on Facebook was also seen as accurate because it focused on weather occurring at that moment instead of forecasts. A participant illustrated this thought, saying, “plus they talk about the storm happening usually and not storms that are soon to come and wrong.” While there was discussion back and forth about the usefulness of forecasts versus current observations, everyone seemed to agree that Facebook was somewhat useful for getting current information that was accurate. They also reported having seen more observations of current severe weather than discussions of impending severe weather. Thus, the amount of information available, the self-correcting nature of that information, and its focus on current observations rather than forecasts led participants to agree that Facebook was largely a useful source for information about severe weather.

One factor that contributed to the perceived accuracy of information on Facebook was the timeliness of that information. For example, one participant said, “I don't like watching the news just for the weather. I have to wait for all the other segments to finish before I can get the weather.” Others agreed that Facebook allowed them to access information on their own schedule. One participant exclaimed, “because you know that it is actuall[sic] happening now. weather people do not know crap!”

Along that same line, many participants pointed to the fact that Facebook, as well as other social media sources such as Twitter, are constantly being updated. To this point, one participant noted, “Good point. With people constantly updating things new information is

always available.” Others noted that it was a quick way to get up to speed if they have missed what is being reported on television or other sources. One participant explained, “When people watch the news and see an upcoming issue, they will quickly spread the word to everybody else.”

These three concepts of convenience, accuracy, and timeliness were discussed overwhelmingly in a positive light throughout the study. Overall, these favorable opinions impacted their perception of the information. Especially notable is the idea that current observations play an important role in determining the risks of severe weather when the information is accessed through Facebook. Although the term was never used by participants, they seemed to be discussing the ability to triangulate information from multiple sources on Facebook. Participants seemed to describe the process of receiving multiple posts from different users in a timely fashion as a system that would check and balance itself. This macro-level feature, however, was distinctly separate from participants’ discussions of individual users’ posts.

Credibility

The second theme to emerge from the data concerned the credibility of severe weather information gained from Facebook. This category was divided into two subcategories pertaining to the credibility of particular friends and the credibility of particular messages. While participants decided that Facebook was a useful platform for information about severe weather, they were quite suspicious of individual friends’ credibility. Participants felt that many of their Facebook friends tended to exaggerate about severe weather. While participants agreed that they were still able to discern useful information from Facebook, they were quick to point out that information is often exaggerated. One participant exemplified this thought, explaining, “people

do go nuts. everything is hyped up more than it should be and always gets my hopes too high.” Numerous others noted their agreement, with statements such as, “that’s how storms on Facebook always end up, overemphasized.” This prominent theme directly contradicted the previously discussed theme of accuracy. Nonetheless, participants seemed to alternate between describing Facebook as an accurate source and a source filled with exaggerations.

Credibility of Friends

When asked why they thought information about severe weather was exaggerated, all eight groups concluded that the credibility of the information was linked to the credibility of their individual Facebook friends. One participant explained, “It usually doesn’t really affect how concerned I am. I’ve learned from experience that most of my facebook ‘friends’ are complete idiots, and everything they put on facebook should be taken with a grain of salt.” While about a dozen comments across five groups agreed with this quite pessimistic view, others described a more nuanced experience:

It can be better or worse depending upon the friend who posts it. Some friends will keep their bias out of the facts and just post it, while others will try to twist it and make it as dramatic as high school (followed by me un-friending them).

Nearly everyone agreed that exaggeration is common on Facebook. They were, however, confident that they would be able to evaluate whether or not a particular post was credible. One participant said, “Information from facebook is information you can base off of the persons character, because you generally know them.” In response to that statement, one participant said, “ya i ignore my dumb california cousins!” In a separate focus group, one participant said, “I think that if you think all facebook is is immaturity, you should take a look at who your friends with on there. Facebook isn’t all bad.”

These results indicate that the participants' perceptions of messages about severe weather were influenced by the perceived credibility of their individual Facebook friends. In fact, some participants argued that a post from a credible friend could be ideal. That participant said:

yes, but when your best friends talk about the weather on facebook it seems more real then when we hear it one the news, cause there is a chance the weather man/ woman is wrong and we tend to beliee[sic] what our friends say.

Participants in the other groups displayed the same sentiment, saying for example, "I think Facebook can be accurate, because if your best friend posts "man its a blizzard, we got 10 inches of snow" you can trust that hes not just aking[sic] that Up."

Credibility of the Message

This subcategory included comments about how pictures and links to other sources of information could counteract concerns about the credibility of individual Facebook friends. First, participants expressed a preference for pictures rather than status updates to learn about severe weather. Participants argued that it was easier to ascertain the credibility of the threat through pictures because it is harder to exaggerate through them. Echoing the sentiment, one participant explained, "I tend to like pictures better because than you believe someone isn't pulling your leg more." A user in a different focus group commented, "I would rather see a photo so I can see exactly what is happening, people blow there[sic] status out of proportion."

Participants also reported that pictures were more likely to impact their perception of severe weather risks through gaining their attention. To this end, one person said:

If i were to do this i would use cool pictures of the weather, if its nice or not nice outside. A picture or video to me, will grab my attention much more then a post which i am liable to scroll right past.

Others agreed, pointing out that, “Just text doesn't really get my attention, a photo or video with text describing the image/multimedia would be most helpful.”

Participants also noted that if a Facebook friend used their post to link to information from another source, this action would also counteract any perceived lack of credibility. For example, participants noted that Facebook could be used to share links directly to sources such as Weather.com, local media, the National Weather Service, or other Facebook pages operated by these and similar organizations. This indicated that participants saw linking to outside information as a way to bolster the credibility of the message.

While participants agreed that updates about severe weather were often exaggerated by their Facebook friends, they attributed the lack of credibility to their friends, not necessarily the platform. Thus, participants discussed a number of ways they could evaluate the credibility of any given post, including those about severe weather. This can be done by evaluating the credibility of that individual Facebook friend, or by seeking out pictures rather than status updates as proof. Through asking participants *why* exaggeration occurred, the next theme emerged: participants underscored the social motivations of Facebook users.

Socializing

The third theme to emerge from the study was that Facebook was a tool meant for socializing, not for finding information. This theme included discussions of the differences between Facebook and other sources, participants’ perception of negativity on Facebook, and how Facebook information is more important when there is a personal stake to the threat. Participants expressed the view that Facebook is distinct from ‘real’ sources because of its social nature. Numerous remarks revealed participants’ views that Facebook was distinct from the rest of the internet. This was indicated by statements such as, “I would have to say does it affect your

viewpoints of the weather if seen on facebook vs. the television or internet.” Other groups made this distinction, saying, “I wouldnt really see it as credible compared to the internet or the television” and “Many people will see the TV and internet to be more professional and credible. Even if our friend is quotinig[sic] one of those stations word for word, we will still go look up ourselves to see if what they were saying was correct.” This distinction between the Internet and Facebook was used by participants to explain why they felt information from Facebook was different from other sources.

Differences

When asked to explain why they felt Facebook was separate from other sources on the Internet, one user quickly responded, “Its all about attention and ‘likes.’” Others enthusiastically agreed with this sentiment, with statements such as, “drama is what facebook was made for” and, “Some people just want to be noticed, so they post anything.” Other users explicitly stated that Facebook was not meant for serious topics such as severe weather, but was only for socializing. In fact, participants seemed to favor keeping the two separate, as indicated by the following exchange:

5.1. Every time I have heard about weather on Facebook it has been friend-related. I do not care to 'like' any of the pages that provide live weather feeds.

5.1.1. I could see that "liking" those pages could get very bothersome especially in bad weather situations. I feel like they would end up like the warnings on tv and have a new one every minute

5.1.2. Yeah that would definitely get annoying and clog up the news feed, I see where you're coming from.

5.1.3. Agreed, I mostly read about personal life issues...

Yet another user stated, “I think weather and facebook shouldn't go together, there are plenty of other resources available to check weather.” These exchanges represent just a few of the many responses that indicated participants’ desire to keep Facebook separate from other sources.

Negativity

When talking about the attention-seeking that distinguishes Facebook from other sources, some pointed out that this behavior is sometimes taken to extremes. For example, one user lamented that, “...its not always right cause some like to dink around or lie to get on people's nerves.” A handful of other users reported that their friends might purposely mislead them for entertainment. “Those Facebook trolls will get you!” exclaimed a participant. According to the Oxford Dictionaries Online, *trolling* refers to “a provocative email or posting intended to incite an angry response” (Trolling, 2010). Thus, it was evident that mean-spirited social interactions were on the minds of some participants and influenced their perceptions of credibility.

While participants perceived this social aspect as the cause of exaggeration, they also noted that it can serve to limit people's communication about severe weather. Referring to winter weather, a participant noted that, “Sometimes they will post something about how they heard the "s-word" in the forecast, and everyone seems to blow up on him for saying that status!” Participants in each of the eight focus groups noted that they ignore information about severe weather on Facebook because those posts are usually negative. One participant explained this, saying, “I agree most of the time it is someone complaining. I always know not to go on facebook if there is a sudden drastic change in the weather because it will mostly be people complaining about it.” Still others said that negative posts seemed less credible, “If it sounds like they are complaining, I usually try to not take everything that they say too seriously.”

Personal Stake

The social nature of Facebook was portrayed in a positive light when participants discussed their family and loved ones. Participants in each focus group said that, although they would not necessarily be motivated to check Facebook for severe weather information for their own safety, they would likely use it to check on people important to them. This view was accounted for 35 individual responses across all six focus groups. The following exchange is representative of many responses that touch on this issue:

9.8. [I would be] more concerned because it is affecting someone that you know

9.8.1. I agree with this if it is somewhere that I have loved ones and it is severe that is when I become concerned other than that I care only about the weather that is going on in my local area which I can find out on my own.

A similar exchange took place in a separate focus group:

9.4. I guess if I can see the weather outside my window and I can see for myself that it is nothing crazy then no I don't become more concerned. But if it is from my hometown and I can't see it for myself and it's severe I may become concerned.

9.4.1. I agree. The thing about facebook it that you are friends with people living in all different places.

9.4.2 yes. I am concerned if severe weather is close to my family.

These responses indicate that the social nature of Facebook is a key attribute that influences how people perceive risk messages posted on the site. This caused some to discuss Facebook as being separate from the rest of the Internet. Others discussed how social factors could might discourage people from sharing severe weather information through the site.

Participants also expressed Facebook's utility for checking up on family members and their hometown.

Excitement

The fourth theme to emerge from the data encompasses the common sentiment among participants that Facebook is more entertaining than it is concerning. Communication about severe weather through Facebook was described 57 times using the terms such as “exciting” or “cool.” Less often, 34 times, Facebook posts about severe weather were described as concerning or frightening. Participants described how the different types of communication on Facebook versus other sources, such as the Emergency Alert System, influenced their levels of fear and excitement regarding severe weather messages.

Dread

Participants in three focus groups pointed out that Facebook was not as frightening as other sources of severe weather information. These comments accounted for 21 lines of data. Participants noted that they did not react to information the same way as they might if it were broadcast using the traditional Emergency Alert System they are familiar with from television or radio. Instead, they reported that Facebook grabs their attention differently:

3.13. public tv stations. it[sic] they're breaking away from normal programing, you know it's bad.

3.13.1. That voice on there used to scare me all of the time because I knew there was bad weather if it came on

3.13.2. Ya the loud like dial up tone used to scare the crap outta me when it came on tv

3.13.3. i hate the buzzing they use to get your attention!!

This exchange is particularly notable because it is the only time throughout the study when participants talk about being scared or even startled. When describing posts about severe weather on Facebook, participants often use the words *concerned*, *curious*, or *aware*, but never talked about having a fearful reaction to the information or its source.

Entertainment

Participants from all eight focus groups discussed posts about severe weather on Facebook as entertaining instead of concerning. They described looking for pictures of the aftermath, and enjoying the experience of watching people react online as weather impacted them. For example, one participant said, “I don’t think any of them are generally helpful, because by that point i’ve looked at like weather. com. They are more just interesting, and for entertainment.” The following exchange typifies this theme:

10.4. I would only check it before the storm to see how bad the storm is going to be and see what stupid posts i could read to amuse myself

10.4.1. I agree. And especially on snowstorms and blizzards, it's fun to look after and see what the people who exaggerated say when school isn't canceled after the severe weather.

Many participants were excited by the idea of seeing the damage after a storm. As one participant stated, “If there's something like a tornado though, I want to see the aftermath!” In a separate focus group, another participant exclaimed, “who cares for boring ‘its snowing’ updates, i want car accidents and buildings on fire [and] pics from my snow storms.” These statements indicated that Facebook users who participated in the study were entertained by watching the impact the storm had on others and viewed Facebook as a source for entertainment.

Confirming Perceptions

The fifth theme to emerge from the data related to the importance placed on confirming information with other sources. Notably, this simultaneously included the views that Facebook should be checked with other sources, and that other sources could be checked using Facebook. The results of this study indicate that college-age Facebook users place value in the ability to see multiple points of view regarding risk messages.

Confirming with Other Sources

Because the aforementioned concerns over credibility, many participants said that Facebook was often their first source of information, but not one they purposefully turned to, with the exception of checking on family. The following exchange exemplifies the distinction between interesting and concerning that emerged during the study:

9.1. not necessarily concerned, just curious most of the time

9.1.1. Curious is the exact word! I think that's the entire point for most of us to even post things to facebook. For more likes and to generate curiosity!

9.1.2. yes most definatly have to agree with you on this!

9.1.3. exactly

Some participants said that, at times, it was the only reason they learned about severe weather. As one participant stated, "I personally have had no intentions of checking the weather until i read something about it on facebook then it makes me want to find out." Through these exchanges and others, it became apparent that Facebook was often the source that piqued participants interest.

Participants described going to other sources to determine whether or not they should be concerned. One participant explained, "Definitely. If I see that someone else thinks the weather

is important enough to post I will look into it.” All but one of the focus groups came to this or similar conclusions. For example, another participant said, “I definitely agree with this. As soon as I hear people talking about the possibility of bad weather, I want to know also and I’ll look it up to see if it’s true.”

Participants identified a number of different sources they would use to confirm what they had heard on Facebook. Consistent with the previously reported separation between Facebook and the rest of the Internet, answers such as “The internet. Usually i check the radar” were quite common. More specifically, the most common answer was “Weather.com,” though participants from six of the eight focus groups simply replied that they would search for the term *weather* on Google. Other common responses included television, radio, and calling others. “I don't always think it is accurate but it makes me curious so then I call someone near that area” explained one participant. As these responses indicate, it became clear early in the study that participants always checked additional sources to ascertain the accuracy of what they had read on Facebook.

Confirming with Facebook

Participants also reported using Facebook to double check information they had learned from other sources. Even though participants felt the need to double check information on Facebook, they still felt that Facebook was useful to triangulate information from other sources. This theme is most common when discussing travel. For example, one student explained, “sometimes the weather people don't always know the exact conditions, lets say with the roads and if I know people who are traveling I will look towards their status to see what its like.” A separate discussion led one participant to explain:

I have a five hour drive so I always want to know what I'll be driving into. A bunch of my friends live in the cities which is along the way, so I figure it out based on what they're saying about it.

Others felt that Facebook provided more geographically relevant information, regardless of travel. For example, a participant explained, “facebook friends will tell you more about a specific area, thus fb is a good place to go if the news isn't saying much.” Another participant said, “all of my friends live in this area so I can just look on Facebook to see what they're saying about it.” While many praised Facebook's ability to be specific for certain locations, the inverse is also true; other participants felt that the geographic diversity of their Facebook friends was a benefit. Exemplifying this view, one participant stated, “You get to see many people's perspectives and many[sic] find out if the weather is different from what they're saying on tv.” Overall, it was clear that confirming perceptions was seen as important. This was true both for those who used Facebook to confirm other sources of information, and those who turned to other sources to confirm what they had read on Facebook.

Conclusion

This study sought to answer the research question: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook? Five themes emerged from the study. First, the issue of *usefulness* was discussed, followed by *credibility*, *socializing*, *excitement* and, lastly, *confirming perceptions*. Perceptions of credibility and accuracy of the message were either impeded or strengthened based on the personal relationship that the user has with the source of that information, whether the source is a friend, relative, or organization. While the timeliness and amount of information on Facebook increased

the perceived accuracy of the message, accuracy was impeded by many social aspects, including trolling, drama, and complaining.

Facebook is unique because it was originally created as a social networking site. As a result of this study, it became clear that the entertainment value of Facebook has a recognizable effect on how messages are perceived through Facebook by college students. Participants in this study reported that Facebook is seen as an entertainment source, and that they expected messages to be consistent with this purpose. To this end, a lack of dread and a focus on entertainment were linked because they were indicative the mindset that information on Facebook is less serious or threatening than other sources. Ultimately, it became apparent from this study that perceptions of trust, credibility, and salience of risk messages were contingent on whether such posts were seen as consistent with the purpose of Facebook as a platform for entertainment and social networking. The themes that emerged during analysis of the data build on the Risk Perception Model outlined by Covello et al. (2001). The specific theoretical and practical implications will be discussed in the following chapter, along with the limitations of the study and directions for future research.

CHAPTER 5: DISCUSSION

This study examined how college students perceived risks communicated through Facebook. By analyzing focus group discussions, this study sought to answer the research question: How do college students perceive risk messages pertaining to severe weather when they are communicated through Facebook? The major findings of this study stem from the perceived social nature of the platform. Specifically, the results of this study reveal that the perceived credibility and importance of risk messages are influenced by the social characteristics of Facebook. To explain these findings, this chapter will first explore the theoretical contribution of this study and the theoretical implications of the results, followed by a discussion of the practical implications for organizations that wish to communicate risks using Facebook. Finally, this chapter will present the limitations of the study and explore directions for future research.

Theoretical Implications

Application of Model

This study makes a theoretical contribution to the field of risk communication by extending the application of the Risk Perception Model. Previous research in risk communication has investigated risk perception primarily as it relates to various hazards (e.g., Cousin & Siegrist, 2010; Gutteling & Kuttschreuter, 2002; Renn, 2005). Furthermore, research in the field of Emergency Management has devoted much attention toward understanding how organizations can efficiently and effectively use social networking during emergencies and disasters (e.g., Jaeger et al., 2007; Paquette & Yates, 2011). Moving in a different direction, this study employs the Risk Perception Model to understand how risks are perceived through a particular medium. By focusing on Facebook, this study extends Covello's (2001) model to a popular social networking site that individuals and organizations increasingly turn to during emergencies and

disasters (American Red Cross, 2011, August). Thus, this study shows the potential for the Risk Perception Model to aid in understanding how risks are perceived differently through individual channels, in addition to its current application in studies of particular hazards.

Support for Current Model

In many respects, the Risk Perception Model adequately describes the factors that influence risk perception through Facebook. For example, participants reported that their familiarity with Facebook and the likelihood to see severe weather messages on Facebook aided their understanding of potential severe weather threats. This supports the use of *understanding* as a factor relevant to understanding risk perception. Participants also discussed the relative lack of fear or terror invoked by Facebook messages compared to messages from traditional sources associated with the Emergency Alert System, such as television or radio. This indicates that *dread* is still a relevant factor when discussing risk messages through Facebook. Moreover, participants reported paying close attention to risks that personally affected them or involved close friends and family. Thus, personal stake and victim identity emerged as important factors due to the social nature of Facebook, consistent with the existing model. This study, however, found college students' perception of risk through Facebook is influenced by other factors that should be incorporated into the model. These factors and their implications are discussed in the following pages.

Social Networks and Risk Perception

The results of this study show that social networks play an important role in the process of risk perception among college-age Facebook users. The role of these social networks is a key component in the process of risk perception. For example, there is an assumption with Covello's (2001) model that the individual will first encounter risk messages from an organization. This

study showed, however, that Facebook users often learn about the risk of severe weather from their social network on Facebook, which they may then confirm with other sources. Even those participants who would likely hear about severe weather from other sources reported that they would then check Facebook to confirm the nature and validity of the risk. Thus, for Facebook users, the social networks they are part of through that platform play an important role in users' evaluation of risk pertaining to severe weather.

Social networks on Facebook play a substantial role in the risk perception process among college-age Facebook users and needs to be taken into account. The reliance on these networks among college-age users to learn about or confirm information has the potential to mediate all other factors in the risk perception model. For example, participants in this study indicated that they often turn to other sources to learn about severe weather only if their curiosity is piqued through Facebook. If their social network downplays the severity of the weather in their updates, it could limit the Facebook user's motivation to seek out more information that might influence their perception of risk. Conversely, if an individual looks to Facebook to confirm their perception of risk from other sources, they may find that their Facebook friends, for whatever reason, exaggerate the risks. Clearly, social networks play an important mediating role in the perception of risk among college students on Facebook. These users tend to base their perception of risk (and their subsequent decisions) on their interactions with others in their social network. Further implications emerge from this demographic's reliance on social networks.

Congruent with Expectations

The results of this study indicate that college-age Facebook users have particular expectations about the tone of messages posted to Facebook. When these expectations are violated, it causes users to perceive the message negatively. This negative perception may cause

these users to ignore the message entirely or deem it less credible. Thus, when applied to Facebook, it is important to consider whether the message is congruent with the users expectations for that particular source.

The perception of risk through Facebook among college students is influenced by the perceived intent of each individual status update. The results of this study indicate that when the intent of the message is seen as incongruent with the purpose of the site, the message is perceived as less credible. Participants expressed the view that Facebook is a service meant for social endeavors and entertainment, not as an official channel used to communicate about serious topics. Although participants reported going to Facebook to confirm messages encountered through other sources, they explained that they do not see Facebook as an ideal source meant for such information. Notably, they often described Facebook as distinctly separate from other internet sources.

The results of this study indicate that this distinction stems from the social motivation for posting information to Facebook. On one hand, participants saw posts about severe weather as popularity contests, meant to draw attention to the user who posted the alarming report or noteworthy photo. On the other hand, participants reported that they may refrain from posting about severe weather (in this case blizzards and winter storms) because of the negative feedback they would receive for bringing up a topic that is unpopular among their social network. In a similar vein, posts seen as complaining are also seen as less credible by college students using Facebook, according to the results of this study. It is clear that there are many social factors that are considered when determining the credibility of an individual message on Facebook. Each of these determinations influences the risk perception process among college students using Facebook.

Furthermore, this study also suggests that the tone of the message is a separate and important factor in risk perception through Facebook. Participants indicated that they are more likely to ignore Facebook updates that were incongruent with their expectations for Facebook. This includes posts that are worded negatively or seen as “complaining.” They also described these posts as less credible than posts that were seen as being positive. This was true, according to participants, even if they thought the message was accurate. Again, this view seemed to stem from the idea that Facebook is distinct from other Internet sources because of its social nature. Likewise, participants clearly favored Facebook posts that were entertaining or perceived as having a positive tone. This might include pictures of damage or the storm's impact on others that are framed as entertainment. Thus, the data indicate that the tone of the message needs to be congruent with users' expectations for Facebook in order to be viewed as credible or noteworthy.

In this case, the tone of the message was described as a factor regardless of the identity of the Facebook user who posted the potentially offending or complaining message. Instead, participants indicated that even a post by a credible, identifiable victim could be ignored simply because the message was perceived as a complaint. It was evident from the study that, in large part, college-age Facebook users make determinations about these motivations based on the tone of the message. If the tone of the message was perceived as negative, or if it was seen as a ploy to increase one's popularity, the message was deemed as less credible and sometimes ignored. Thus, when applied to Facebook, it is important to consider whether the message is congruent with the user's expectations for that particular source.

Layers of Trust

Participants described the social motivations described above as core to the nature of Facebook. Therefore, on one level, Facebook users' perceptions of risk messages communicated

through this service hinged on the perceived credibility of Facebook as a platform meant for providing such information, which was low, overall, in this study. Data from this study indicated that this macro-level consideration is separate from users' evaluation of individual Facebook friends. On Facebook, this becomes separate from Covello's (2001) category of *trust in institutions*, because many institutions (credible or not) have a presence on Facebook whose credibility is separate from the perceived credibility of the platform. For example, even if the National Weather Service is seen as a trusted institution according to this model, its communication on Facebook might lack credibility due to the user's lack of trust in Facebook, itself. Allowing for a broader examination of trust credibility will allow the Risk Perception Model to more accurately explain this factor as it applies to Facebook and similar sources of information.

The results of the study add additional layers to the conceptualization of trust outlined by the Risk Perception Model. Participants reported that, when communicating through Facebook, a personal relationship with the source influences their perception of risk and the credibility of the message. In addition to the factor of *trust in institutions*, this study found that victim identity and trust in the channel of communication itself were considered by college-age Facebook users when evaluating risk messages. Although victim identity is discussed in the current model, the influence of victim identity illuminated by the study differs notably from the previous conceptualization of the term.

The victim identity category of the Risk Perception Model currently differentiates between risks that produce identifiable victims and risks that produce more abstract, or statistical, victims. While this type of victim identity is still important, there is a different element of victim identity that factors into perceptions of trust on Facebook. For example, if a

close friend or family member perceived a real threat, this changed the nature of how information was viewed. It was no longer viewed as entertainment, but was taken as a serious threat. This underscores how the perception of trust through Facebook is contingent one's proximity to other users in terms of their social circle or social network.

These results indicated that messages from one's inner social circle were trusted and perceived as more credible than updates from Facebook users who were merely acquaintances. One's status near the center of a user's social circle seems to supersede other factors influencing risk perception through Facebook. The results of this study, therefore, suggest a new dimension of trust is necessary to account for the way risk messages are communicated and evaluated among college-age Facebook users. This layer of trust should focus specifically on the perceived credibility of the individual and their credibility within a particular user's social network. Even if the model is extended to account for the perceived credibility of the platform, as this study suggests, it still does not account for the varied levels of trust Facebook users afford their individual friends. These determinations, according to the results of the study, were made independent of the process of determining trust in institutions or trust in Facebook as a platform for risk messages. Thus, in addition to *trust in institutions*, as well as the proposed factor of *trust in the platform*, trust in individual users must also be considered as a separate risk perception factor to adequately explain the perceptions of college students using Facebook.

Practical Implications

The results of the study suggest some practical implications for organizations and others who communicate about severe weather risks using Facebook. The first practical consideration that emerged from this study was the expectation among participants for timeliness through Facebook. These expectations among college-age Facebook users indicate that organizations

involved in warning the public about severe weather should use social media to quickly and consistently update about these risks. This should be done to maintain the perception of exigency and timeliness. Maintaining current information is consistent with users' expectations for information found on Facebook in general, and will help keep those messages congruent with users' expectations, which emerged as an important factor in this study.

Organizations must, however, simultaneously avoid "clogging the newsfeed" by updating too often, which participants reported as a barrier to their perception of source credibility. These contradictory, yet coexisting, viewpoints create a particular challenge for those involved in risk and crisis communication on Facebook. How can an organization update stakeholders about a rapidly updating crisis without overwhelming users? One approach may be to create one post at the beginning of a crisis, or at regular intervals throughout an event. These posts can then be updated by adding comments containing new information. This would mean, however, that Facebook users would likely have to seek out the information by scrolling down on their newsfeed on Facebook, which is less than ideal.

Another option is to use Facebook to establish a relationship with stakeholders instead of using the platform to provide regular updates. Taking this route, an organization may post educational (and perhaps entertaining) material aimed to raise awareness of the organization. By using these posts to inform or remind Facebook users of the organization's website, the posts still serve the purpose of promoting the organization's message, but that message will not necessarily penetrate to a wider audience. Thus, it is clear that there are unique challenges to effective risk and crisis communication associated with Facebook.

This study also suggests that the social nature of Facebook is key to users' evaluations of credibility and trust. Organizations who wish to communicate about severe weather risks using

Facebook should consider these factors in order to communicate effective risk messages. This study found that participants sometimes viewed Facebook is a less credible platform for risk messages compared to other sources. Clearly, this is yet another challenge associated with using this platform for risk and crisis communication. Any organization that uses Facebook to communicate should take steps to counter this perception.

While it may be impossible to convince users that Facebook is a credible source of information, the results of the study suggest that Facebook can be used as an intermediary between stakeholders and other credible sources. For example, organizations should use Facebook to consistently link to other sources, such as their official website, where users can get more information. This would allow the organization to associate their risk messages with the credibility of the organization outside of Facebook in addition to the particular information being communicated. This would allow organizations to utilize Facebook while mitigating the perception that the message lacks a degree of credibility because it has been communicated using Facebook.

College-aged Facebook users from this study reported that they primarily interact with individuals, not organizations, on Facebook. Although they are surely exposed to advertising through Facebook, they reported not wanting to follow or “like” pages that would report severe weather. The data supports the fact that, while participants still put trust in institutions such as Weather.com or the National Weather Service, these are not sources they regularly turn to on Facebook because of the perception that they will “clog up the newsfeed.” Organizations can overcome this barrier and take advantage of the social nature of Facebook by encouraging their core followers to interact with their organization on Facebook and spread its message. This would allow organizations to capitalize on the credibility that individual users associate with

their individual Facebook friends. For example, an organization could ask the user to use the share function on Facebook to duplicate message to their network of friends. Users should also be encouraged to “like” and comment on posts containing risk messages. Depending on an individual user's settings, this could cause that post to appear on their friends’ news feeds and in the ticker. This would increase visibility of the organization's message, and holds potential to expand its audience. Thus, it is important for organizations to embrace the social, individual nature of Facebook that is congruent with users’ expectations. To see an example of this implication, one can look to attempts by the National Weather Service to increase the reach of their weather warnings. As part of the organization’s initiative to use Facebook to reach stakeholders, the National Weather Service has launched a new public outreach initiative. This campaign, branded as *Weather Ready Nation*, asks people to, “...send a text, tweet or post a status update so your friends and family know” about the risk of severe weather to people who may not have heard the message (National Weather Service, 2012). There are surely a number of factors beyond the scope of this study that explain how perception translates to action, as the National Weather Service intends. This study does, however, indicate that the National Weather Service’s approach through its *Weather Ready Nation* campaign can be successful in increasing the perception of risk associated with its warnings. Specifically, this initiative will increase Facebook users’ exposure to risk messages about weather hazards and will associate those messages with identifiable members of the user’s social network. This has the potential to also increase the perceived credibility of those risk messages.

Even if an organization is able to increase the visibility of its message by encouraging its followers to spread a message on Facebook, this strategy is not without drawbacks. If the message is shared by someone who is deemed as having little credibility, that individual’s lack of

credibility may be associated with the organization's message. However, if the goal is simply to encourage Facebook users to seek out information about a risk, even a post lacking credibility may prompt users to confirm the information with another source, as the results of this study indicated. Thus, while confirming the potential of this campaign's current approach, the implications of this study also suggest that the National Weather Service should encourage users to include a link to their website in the messages they post as part of this campaign. This would help ensure the perception of credibility if the user is not seen as trustworthy by their peers. Thus, the implications of this study have realizable implications.

The tone used by the organization to communicate weather-related hazards must also be considered. This practical implication stems from participants' reported preference for positive, entertaining, and visual evidence rather than negatively-worded posts or status messages. The warrant for this is twofold. First, pictures are seen as more credible because they are harder to fabricate and are, therefore, seen as more concrete proof. This study also found that Facebook is seen as a source of entertainment, and participants often spoke of pictures as the primary source of entertainment that pertains to risk messages about severe weather. Thus, if an organization wishes to gain the attention and trust of its audience, it should use pictures to show the catastrophic potential of the hazard. These practical implications can help communicators increase the perception of risk among their stakeholders, which is key to encouraging action that could save lives and property.

At the same time, the question of tone presents a particular challenge for many organizations. Consider, for example: Is it in the best interest of the National Weather Service or the Department of Homeland Security to be "entertaining?" Even in the name of increased awareness, would crisis communication through entertainment ever be seen as a proper use of

taxpayer or shareholder dollars? In light of these questions, it may be preferable to avoid striving for the perfect Facebook message, in terms of tone, in favor of that approach more in line with the organization's traditional role. Striking the most effective balance presents a potential challenge to any organization communicating through Facebook.

Across all of the themes that emerged from the study, there was a clear distinction between the types of messages Facebook users sought out during each of the three phases of a crisis. There are also differences in the way participants reported seeking out such information. For example, during the precrisis stage, users reported passively encountering risk messages on Facebook. If these messages were perceived as credible, users reported that they would turn to another source for further information. During the crisis stage, participants reported actively seeking out information. During the post crisis stage, participants reported using Facebook primarily for entertainment purposes, such as looking at pictures of the storm's aftermath.

This pattern indicates that organizations communicating through Facebook should adopt particular strategies for each phase of the crisis in order to most effectively reach college-aged stakeholders. Since users report only passively seeking out information about risks during the precrisis stage, communicators may have to be more proactive in their efforts to reach stakeholders during this phase. Consistent with the findings of this study, communication should also make an effort to employ visual media in an effort to "stand out" on a user's Facebook wall. During the crisis stage, when users are more likely to actively seek out information, organizations should consider encouraging their users to share their posts with other individuals in an effort to reach a wider audience. At the same time, communicators during the crisis stage should be careful not to "clog the news feed" by posting too many updates. Finally, during the post crisis stage, organizations communicating about severe weather should consider attracting

users with entertaining pictures, video, or graphics of the aftermath. This could be accomplished, for example, by encouraging individual users to post their own reports or photos directly to the organizations Facebook page for others to see. Regardless of whether these suggestions apply to a particular situation, it is important to understand that college-age Facebook users report seeking out information differently during each phase of a crisis. Understanding and adapting to these patterns of use may help organizations overcome the many challenges associated with risk and crisis communication through Facebook.

Limitations and Future Research

The results of this study and limitations of the methodology suggest directions for future research. The scope of the study was limited by the sample. Although the size ($N=66$) was slightly larger than expected and easily allowed for saturation, the sample was only representative of a particular demographic group. All participants were college students enrolled at a state university. Future research on risk perception and social media could expand the scope of the study to include a variety of age groups and socioeconomic backgrounds in its sample.

Another potential limitation stems from the use of computer mediated focus groups as the method of data collection. College students were chosen for this study because they represent a demographic known as “digital natives” (Prensky, 2001). This term applies to recent generations that grew up with technology and are likely to be proficient with the Internet and other digital technologies. However, the results of the study suggest that some participants were at a disadvantage in the study because they had poor typing skills compared to other participants. This was evident in the transcripts produced by the focus groups, but was also detected by the varied rate at which responses were generated during the focus groups. Thus, certain voices were

potentially limited or overshadowed by others with superior technological skill. Future research could adopt different methods of data collection to offset this risk.

The results of the study also suggest that future research could employ the risk perception model to investigate how perceptions differ between various sources. This study focused on one source, Facebook, to understand how its particular characteristics influenced users' perceptions of risk messages. This study can serve as a guide to future research, taking a similar approach to understanding risk perception, but investigating one or more sources other than Facebook. This could help communication practitioners decide which sources are most appropriate for their message, or how to tailor their message to a particular source.

Conclusion

This study used the Risk Perception Model outlined by Covello et al. (2001) to add to our understanding of the public's perception of risk through Facebook – the most widely used social media platform today. Understanding how the public perceives risk messages through a particular channel is vital to effectively communicating about that risk. This is especially important since studies indicate that Facebook is often used during crises to communicate about potential risks (American Red Cross, 2011).

Using computer mediated focus groups, this study focused on how the characteristics of Facebook and its users influence the perception of risk messages relating to severe weather. Five central themes emerged from the study. First, the issue of *usefulness* was discussed, followed by *credibility*, *socializing*, *excitement* and, lastly, *confirming perceptions*. The themes that emerged during analysis of the data build on the Risk Perception Model outlined by Covello et al. (2001).

These results lead to several theoretical and practical implications. They suggest that the Risk Perception Model is a useful tool to understand risk perception on Facebook. However, the

model should be amended in this context to differentiate between the different levels or types of trust that influence perceptions on Facebook. Furthermore, when communicated through Facebook, the tone of the message becomes a factor of risk perception separate from the previously established factors. These findings result in practical implications for communication practitioners involved in risk communication. These implications have direct bearing on the field of risk communication because “Risk situations involve the use of communication to alter beliefs and thereby change behaviors” (Seeger, Sellnow, & Ulmer, 2003, p. 204). Future research suggests that this model could be used to study differences and similarities in risk perception across various social media platforms, which could lead to benefits and understanding the practical uses of Facebook and other social media resources during risk and crisis situations. Knowing the factors that influence risk perception among Facebook users will help risk communicators encourage people to act, potentially saving lives and property.

REFERENCES

- American Red Cross (2011, August). More Americans using social media and technology in emergencies: New American Red Cross survey finds high expectations on response organizations. *American Red Cross*. Retrieved from <http://www.redcross.org/portal/site/en/menuitem.94aae335470e233f6cf911df43181aa0/?vgnextoid=7a82d1efe68f1310VgnVCM10000089f0870aRCRD>.
- Anderson-Berry, L., Keenan, T., Bally, J., Pielke Jr, R., Leigh, R., & King, D. (2004). The societal, social, and economic impacts of the World Weather Research Programme. *Weather & Forecasting*, 19(1), 168-178.
- Beaumont, C. (2008). Mumbai attacks: Twitter and Flickr used to break news. *The Telegraph*. Retrieved from <http://www.telegraph.co.uk/news/worldnews/asia/india/3530640/Mumbai-attacks-Twitter-and-Flickr-used-to-break-news-Bombay-India.html>.
- Beeline Labs (2009). Emerging best practices: social media monitoring, engagement, and measurement. [White Paper]. Retrieved from <http://www.beelinelabs.com/downloads/social-media-monitoring-engagement>.
- Benoit, W. L. (1997). Image repair discourse and crisis communication. *Public Relations Review*, 23, 177 – 186. doi:10.1016/S0363-8111(97)90023-0
- Bloor, M., Frankland, J., Thomas, M., & Robson, K. (2001). *Focus groups in social research*. Thousand Oaks, CA: Sage.
- Brenner, J. (2012, May 31). Pew internet: social networking. *Pew Internet and American Life Project*. Retrieved from <http://pewinternet.org/About-Us/Our-Research/Use-Policy.aspx>
- Bridget, C. (2001, September 19). Facebook's new faces anger college students: Facebook.com's plans to expand beyond the college crowd angers some users. *McClatchy – Tribune*

- Business News*. Retrieved from <http://proxy.library.ndsu.edu/login?url=http://search.proquest.com.proxy.library.ndsu.edu/docview/463313501?accountid=6766>
- Brinson, S. L., & Benoit, W. L. (1996). Attempting to restore a public image: Dow Corning and the breast implant crisis. *Communication Quarterly*, 44, 29-41.
doi:10.1080/01463379609369998
- Call, D., (2005) Rethinking snowstorms as "snow events": A regional case study from upstate New York. *Bulletin of the American Meteorological Society*, 86, 1783-1793.
doi:10.1175/BAMS-86-12-1783
- Carey, M. A. (1994). The group effect in focus groups: Planning, implementing and interpreting focus group research. In J. Morse (Ed.), *Critical issues in qualitative research methods* (pp. 225-241). Thousand Oaks, CA: Sage.
- CFI Group, 2005: National Weather Service customer satisfaction survey: General public. Report to the National Oceanic and Atmospheric Administration. Retrieved from http://www.nws.noaa.gov/com/files/NWS_Public_survey050608.pdf
- Colley, K. L. and Collier, A. (2009). An overlooked social media tool? Making a case for wikis. *Public Relations Strategist*, 34-35.
- Colten, C. E., & Sumpter, A. R. (2009) Social memory and resilience in New Orleans. *Natural Hazards*, 48, 355-364. doi: 10.1007/s11069-008-9267-x
- Coombs, W. T. (1995). Choosing the right words. The development of guidelines for the selection of the "Appropriate" crisis-response strategies. *Management Communication Quarterly*, 8(4), 447-476. doi:10.1177/0893318995008004003
- Coombs, W. T. (1999a). *Ongoing crisis communication. Planning, managing, and responding*. Thousand Oaks, CA: Sage.

- Coombs, W. T. (1999b). Information and compassion in crisis responses: A test of their effects. *Journal of Public Relations Research, 11*(2), 125-142.
doi:10.1207/s1532754xjpr1102_02
- Coombs, W. T. (2007a). *Ongoing crisis communication: Planning, managing, and responding*. Thousand Oaks, CA: Sage.
- Coombs, W. T. (2007b). Protecting organizational reputations during the crisis: the development and application of situational crisis communication theory. *Corporate Reputation Review, 10*, 163-176. doi:10.1057/palgrave.crr.1550049
- Coombs, W. T. (2009). Conceptualizing crisis communication. In R. L. Heath, & H. D. O'Hair (Eds.), *Handbook of risk and crisis communication* (pp. 99-118). New York, NY: Routledge.
- Coombs, W. T., & Schmidt, L. (2000). An empirical analysis of image restoration: Texaco's racism crisis. *Journal of Public Relations Research, 12*(2), 163-178.
doi:10.1207/S1532754XJPRR1202_2
- Cousin, M., & Siegrist, M. (2010). Risk perception of mobile communication: a mental models approach. *Journal Of Risk Research, 13*(5), 599-620. doi:10.1080/13669870903236751
- Covello, V. T., & Mumpower, J. (1985). Risk analysis and risk management: An historical perspective. *Risk Analysis, 5*(2), 103-119. doi:10.1111/j.1539-6924.1985.tb00159.x
- Covello, V., Peters, R., Wojtecki, J., & Hyde, R. (2001). Risk communication, the West Nile virus epidemic, and bioterrorism: Responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 78*(2). 382-291.
doi:10.1093/jurban/78.2.382

Debrosse, J. (2007, June 10). Facebook becoming primary way college students communicate.

Dayton Daily News. p. A9.

Denzin, N. K., & Lincoln, Y. S. (2003). *Collecting and interpreting qualitative materials*.

Thousand Oaks, CA: Sage.

Department of Health and Human Services. (2011). Tornado preparedness. Retrieved from

<http://www.phe.gov/emergency/naturaldisasters/Pages/tornado.aspx>

Drobot, S. D. (2007). Evaluation of winter storm warnings: A case study of the Colorado Front

Range December 20-21, 2006, winter storm. (Quick Response Research Report 192).

Retrieved from the University of Colorado Natural Hazards Center website,

<http://www.colorado.edu/hazards/research/qr/qr192/qr192.html>.

Eldon, E. (2008, December 18). 2008 growth puts Facebook in better position to make money.

VentureBeat. Retrieved November 1, 2011 from

<http://www.venturebeat.com/2008/12/18/2008-growth-puts-facebook-in-better-position-to-make-money/>

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. and Combs, B. (1978) How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits,

Policy Sciences 9,127–52. doi:10.1007/BF00143739

Fischhoff, B. (1989). Helping the public make health risk decisions. In V. T. Covello, D.B.

McCallum, & M. T. Pavlova (Eds.). *Effective Risk Communication: the Role and*

Responsibility of Government and Nongovernment Organizations. (pp. 111-116). New

York, NY: Plenum Press.

- Fontana, A., & Frey, J. H. (2003). The interview: From structured questions to negotiated text. In N. K. Denzin & Y. S. Lincoln (Eds.), *Collecting and interpreting qualitative materials*. (pp.61-106). Thousand Oaks, CA: Sage.
- Geertz, C. (1975). Thick description: Toward an interpretive theory of culture. In C. Geertz (Ed.), *The Interpretation of Cultures*.(pp. 3-30). London: Hutchinson.
- Gibbs, G. (2007). *Analyzing qualitative data*. Thousand Oaks, CA: Sage.
- GroupSystems (n.d.). Think Tank. Retrieved from <http://www.groupsystems.com/>
- Gutteling, J. M., & Kuttischreuter, M. (2002). The role of expertise in risk communication: laypeople's and expert's perception of the millennium bug risk in The Netherlands. *Journal of Risk Research*, 5(1), 35-47. doi:10.1080/13669870010029639
- Hayden, M., Drobot, S. D., Radil, S., Benight, C., & Gruntfest, E. C. (2007). Information sources for flash flood and tornado warnings in Denver, CO and Austin, TX. *Environmental Hazards*, 7, 211-219. doi:10.1016/j.envhaz.2007.07.001
- Heath, R. L. (1994). Environmental risk communication: Cases and practices along the Texas Gulf coast. In B. R. Burelson (Ed.), *Communication Yearbook 18*, (pp. 225-277). Newbury Park, CA: Sage.
- Hollander, J. A. (2004). The social contexts of focus groups. *Journal of Contemporary Ethnography*, 33, 602-637. doi:10.1177/0891241604266988
- Hooke, W. H., & Pielke, R. (2000). Short-term weather prediction; an orchestra in need of a conductor. In D. Sarewitz, R. A. Pielke Jr., and R. Byerly Jr., (Eds.). *Prediction: Science, Decision-Making, and the Future of Nature*. (pp. 61-83). Washington, DC: Island Press.

- Jaeger, P. T., Shneiderman, B., Fleischmann, K. R., Preece, J., Qu, Y., & Fei Wu, P. (2007). Community response grids: E-government, social networks, and effective emergency management. *Telecommunications Policy*, 31, 592-604. doi:10.1016/j.telpol.2007.07.008
- Johnson, B. B. (1993). "The mental model" meets "the planning process": wrestling with risk communication research and practice. *Risk Analysis*, 13(1). 5-8. doi:10.1111/j.1539-6924.1993.tb00719.x
- Kasperson, R.E., Renn, O., Slovic, P., Kasperson, J.X. and Emani, S. (1989) Social amplification of risk: the media and public response, in R.G. Post (ed), *Waste Management 1989*, 131-135.
- Katz, R. W., & Murphy, A. H. (1997). *Economic value of weather and climate forecasts*. Cambridge: Cambridge University Press.
- Keyton, J. (2011). *Communication research: Asking questions, finding answers*. New York, NY: McGraw-Hill
- Lazo, J. K., & Chestnut, L. G. (2002). Economic value of current and improved weather forecasts in the U.S. household sector. *NOAA Office of Policy and Planning, U.S. National Oceanic and Atmospheric Administration*. Retrieved from <http://www.economics.noaa.gov/library/library.html>.
- Lazo, J. K., Morss, R. E., & Demuth, J. L. (2009). 300 billion served: Sources, perceptions, uses, and values of weather forecasts. *Bulletin of the American Meteorological Society*, 90(6), 785-798. doi:10.1175/2008BAMS2604.1
- Lee, K. K., Meyer, R. J., & Bradlow, E. T. (2009). Analyzing risk response dynamics on the web: The case of Hurricane Katrina. *Risk Analysis*, 29(12). 1779-1792. doi:10.1111/j.1539-6924.2009.01304.x

- Lenhart, P. (2009). *Twitterpated: Mobile Americans increasingly take to Tweeting*. Pew Research Center. Retrieved from <http://www.pewresearch.org/pubs/1117/twitter-tweet-users-demographics>.
- Lindlof, T. R., & Taylor, B. C. (2011). *Qualitative communication research methods*. Thousand Oaks, CA: Sage.
- Littlefield, R. S. (2005). Jack in the Box: Lessons learned by accepting responsibility. In T. L. Sellnow & R. S. Littlefield (Eds.), *Lessons learned about protecting America's food supply: Case studies in crisis communication* (pp. 33-46). Fargo, ND: North Dakota Institute for Regional Studies.
- Madden, M., & Zickuhr, K. (2011, August 26). 65% of online adults use social networking sites. *Pew Internet & American Life Project*. Retrieved from <http://pewinternet.org/Reports/2011/Social-Networking-Sites.aspx>
- Marken, G. A. (2007). Social media... The hunted can become the hunter. *Public Relations Quarterly*, 52(4), 9-12.
- Mayfield, A. (2006). What is social media? *Spannerworks*. Retrieved from http://www.spannerworks.com/fileadmin/uploads/eBooks/What_is_social_media.pdf.
- McIntyre, J. J. (2005). Social responsibility: Lessons learned from Schwan's salmonella crisis. In T. L. Sellnow & R. S. Littlefield (Eds.), *Lessons learned about protecting America's food supply: Case studies in crisis communication* (pp. 33-46). Fargo, ND: North Dakota Institute for Regional Studies.
- Morgan, D. (1995). Why things (sometimes) go wrong in focus groups. *Qualitative Health Research*, 5(4), 516-523. doi:10.1177/104973239500500411
- Morgan, D. (1998) *The focus group guidebook*. Thousand Oaks, CA: Sage.

- Morss, R., & Wahl, E. (2007). An ethical analysis of hydrometeorological prediction and decision making: The case of the 1997 Red River flood. *Environmental Hazards: Human And Policy Dimensions*, 7(4), 342-352. doi:10.1016/j.envhaz.2007.09.004
- Morss, R. E., Wilhelmi, O. V., Downton, M. W., & Grunfest, E. (2005). Flood risk, uncertainty, and scientific information for decision making: Lessons from an interdisciplinary project. *Bulletin of the American Meteorological Society*, 86(11), 1593-1601. doi:10.1175/BAMS-86-11-1593
- National Research Council, Committee on Risk Perception and Communication. (1989). *Improving risk communication*. Washington, DC: National Academy Press.
- National Resource Council. (2006). *Completing the Forecast: Characterizing and Communicating Uncertainty for Better Decisions Using Weather and Climate Forecasts*. Washington, DC: National Academies Press.
- New America Media. (2011). Social media made Tunisian uprising possible. *New America Media*. Retrieved from <http://newamericamedia.org/2011/01/social-media-made-tunisian-uprising-possible.php>.
- Novak, J. M. (2005). Crisis plans and interagency coordination: Lessons learned from tainted strawberries in the school lunch program. In T. L. Sellnow & R. S. Littlefield (Eds.), *Lessons learned about protecting America's food supply: Case studies in crisis communication* (pp. 33-46). Fargo, ND: North Dakota Institute for Regional Studies.
- NWS, Grand Forks. (n.d.). News archive [Web page].
Http://www.crh.noaa.gov/news/display_cmsarchive.php?wfo=fgf
- NWS (2009). *Service Assessment: Super Tuesday tornado outbreak of February 5-6, 2008*. Silver Spring, MD: Department of commerce. Retrieved from

- http://www.nws.noaa.gov/os/assessments/pdfs/super_Tuesday.pdf.
- NWS. (2011). *Service assessment: Joplin, Missouri, Tornado*. Silver Spring, MD: Department of Commerce. Retrieved from http://www.nws.noaa.gov/os/assessments/pdfs/Joplin_tornado.pdf
- Olivarez-Giles, N. (2011, September 22). Facebook f8: Redesigning and hitting 800 million users. *Los Angeles Times*. Retrieved November 1, 2011, from <http://www.latimesblog.latimes.com/technology/2011/09/facebook-f8-media-features.html>.
- Palen, L., Vieweg, s., Sutton, J., Liu, S. B., & Hughes, A. (2007). *Crisis Informatics: Studying Crisis in a Networked World*, Third International Conference on e-Social Science, Ann Arbor, MI: Retrieved from <http://ess.si.umich.edu/papers/paper172.pdf>.
- Palenchar, M. J., Heath, R. L., & Oberton, E. M. (2005). Terrorism and industrial chemical production: A new era of risk communication. *Communication Research Reports*, 22(1), 59-67. doi:10.1080/00036810500059886
- Paquette, S., & Yates, D. (2011). Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal of Information Management*, 31, 6 – 13. doi:10.1016/j.ijinfomgt.2010.10.001
- Perrow, C. (1999). *Normal accidents: Living with high-risk technologies*. Princeton, NJ: Princeton University Press.
- Pielke, R. A., & Carbone, R. E. (2002). Weather impacts, forecasts, and policy: An integrated perspective. *Bulletin of the American Meteorological Society*, 83, 393-403. doi:10.1175/1520-0477(2002)083<0393:WIFAP>2.3.CO;2
- Pielke, R. A., & Kimpel, J. (1997). Societal aspects of weather: report of the sixth prospectus

- development team. *Bulletin of the American Meteorological Society*, 78, 867-876.
doi:10.1175/1520-0477(1997)078<0255:ATRQAS>2.0.CO;2
- Plough, A., & Krinsky, S. (1987). The emergence of risk communication studies: Social and political context. *Science, Technology, and Human Values*, 12, 4-10.
- Pound, M. (2011, September 4). National Weather Service begins Facebook experiment. *McClatchy-Tribune Business News*. Retrieved from
<http://search.proquest.com/docview/877466024?accountid=6766>.
- Prensky, M. (2001). Digital natives, digital immigrants part 1. *On The Horizon*, 9(5). 1-6. doi:
10.1108/10748120110424816
- Procopio, C. H. & Procopio, S. T. (2007). Do you know what it means to miss New Orleans? Internet communication, geographic community, and social capital in crisis. *Journal of Applied Communication Research*, 35(1). 67-87. doi:10.1080/00909880601065722
- Quarantelli, E. L. (1998). *What is a disaster? Perspectives on the Question*. London: Routledge.
- Rand, P. M., & Rodriguez, g. (2007). Relating to the public: The evolving role of public relations in the age of social media. Council of Public Relations Firms, New York. Retrieved from
http://www.prfirms.org/_data/n_0001/resources/live/CPRF%20Social%20Media%20White%20Paper%20FINAL.pdf.
- Reid, D. J., & Reid, F. M. (2005). Online focus groups: An in-depth comparison of computer-mediated and conventional focus group discussions. *International Journal Of Market Research*, 47(2), 131-162.
- Renn, O. O. (2005). Risk perception and communication: Lessons for the Food and Food Packaging Industry. *Food Additives & Contaminants*, 22(10), 1061-1071.
doi:10.1080/02652030500227792

- Reynolds, B. J. (2010). Building trust through social media. *Marketing Health Services, 30*(2), 18-21. doi:10.1057/jt.2010.1
- Reynolds, B., & Seeger, M. W. (2005). Crisis and emergency risk communication as an integrative model. *Journal of Health Communication, 10*, 43-55.
doi:10.1080/10810730590904571
- Robinson, E. (2010, January 13). Following the earthquake in Haiti on Twitter. *Washington Post*. Retrieved from http://voices.washingtonpost.com/postpartisan/2010/01/following_the_earthquake_in_ha.html.
- Russell Herder & Ethos Business Law (2009). *Social Media: Embracing the Opportunity, Averting the Risks*. [White paper]. Retrieved from http://www.russellherder.com/SocialMediaResearch/TCHRA_Resources/RHP_089_WhitePaper.pdf.
- Sandman, P. M. (1989). Hazard versus outrage in the public perception of risk. In V. T. Covello, D. B. McCallum, & M. T. Pavlova (Eds.). *Effective Risk Communication: the Role and Responsibility of Government and Nongovernmental Organizations*. (pp. 49-45). New York: Plenum Press.
- Sandman, P. (2003, April 11). Four kinds of risk communication. [Web log post]. Retrieved from <http://www.petersandman.com/col/4kind-1.htm>.
- Sandman, P. M., & Lanard, J. (2003, May 6). SARS communication: What Singapore is doing right. *The (Singapore) Straits Times*.
- Saviers, A. M., & Van Bussum, L. J. (2008). Juneau public questionnaire: Results, analysis, and conclusions. *NOAA Technical Memorandum*. Retrieved from <http://pajk.arh.noaa.gov/info/articles/survey/intro.htm>
- Scherp, A., Schwagereit, F., Ireson, N., Lanfranchi, V., Papadopoulos, S., Kritikos, A.,

- Kopatsiaris, Y. and Smrs, P. (2009). *Leveraging Web 2.0 communities in professional organizations*. Paper presented at the W3C Workshop on the Future of Social Networking, Barcelona, Spain. Retrieved from <http://www.w3.org/2009/09/msnws/papers/ScherpEtAl-LeveragingWeb2Communities.pdf>
- Schwartz, P. (2006). Best practices in crisis communication: An expert panel process. *Journal of Applied Communication Research*, 34(3), 232-244.
- Seeger, M. W., Reynolds, B., & Sellnow, T. L. (2009). Crisis and emergency risk communication in health contexts: Applying the CDC model to pandemic influenza. In R. L. Heath & H. D. O'Hair (Eds.), *Handbook of risk and crisis communication* (pp. 493-506). New York, NY: Routledge.
- Seeger, M. W., Sellnow, T. L., and Ulmer, R. R. (1998). Communication, organization, and crisis. In M. Roloff (Ed.), *Communication yearbook 21* (pp. 231-275). Florence, KY: Routledge.
- Sellnow, T. L., Seeger, M. W., and Ulmer, R. R. (2002). Chaos theory, informational needs, and natural disasters. *Journal of Applied Communication Research*, 30(4), 269-292.
doi:10.1080/00909880216599
- Seeger, M. W., Sellnow, T. L., and Ulmer, R. R. (2003). *Communication and organizational crisis*. Westport, CT: Praeger.
- Sellnow, T. L., Ulmer, R.R., Seeger, M.W., & Littlefield, R.S. (2009). *Effective risk communication: A message-centered approach*. New York, NY: Springer.
- Sellnow, T. L., Ulmer, R. R., and Snider, M. (1998). The compatibility of corrective action in organizational crisis communication. *Communication Quarterly*, 46(1), 60-74.
doi:10.1080/01463379809370084

- Silver, A., & Conrad, C. (2010). Public perception of and response to severe weather warnings in Nova Scotia, Canada. *Meteorological Applications*, 17: 173-179. doi: 10.1002/met.198
- Sjöberg, L. and Drottz-Sjöberg, B.-M. (1994) *Risk Perception of Nuclear Waste: Experts and the Public.*, Rhizikon: Risk Research Report No. 16, Centre for Risk Research, Stockholm School of Economics.
- Sjöberg, L. (1996a) A discussion of the limitations of the psychometric and cultural theory approaches to risk perception. *Radiation Protection Dosimetry*, 68, 219.
- Smith, A. (2010). *Government online: The internet gives citizens new paths to government services and information.* Pew Internet & American Life Project, Washington, DC.
- Solis, B. (2009). *The State of PR, Marketing, and Communications: You are the Future.* Retrieved from <http://www.briansolis.com/2009/06/state-of-pr-marketing-and/>.
- Sorenson, J. H. & Sorenson, B. V. 2006. Community processes: Warning and evacuation. In H. Rodriguez, E. L. Quarantelli & R. R. Dynes (Eds.) *Handbook of Disaster Research*, 183-199. New York: Springer.
- Stewart, T. R., Pielke, R., & Nath, R. (2004). Understanding user decision making and the value of improved precipitation forecasts: Lessons from a case study. *Bulletin of the American Meteorological Society*, 85, 223-235. doi:10.1175/BAMS-85-2-223
- Sutton, J., Palen, L., & Shklovski, I. (2008). Backchannels on the front lines: Emergent uses of social media in the 2007 Southern California wildfires. Proceedings of the 5th International ISCRAM Conference. Washington, DC. 1-9.
- Sweetser, K. D., & Metzgar, E. (2007). Communicating during a crisis: use of blogs as a relationship management tool. *Public Relations Review*, 33. 340-342. doi:10.1016/j.pubrev.2007.05.016

- Taylor, J. G., Gillette, S. C., Hodgson, R. W. & Downing, J. K. (2005). Communicating with Wildland Interface Communities During Wildfire. Open File report 2005-1061, Fort Collins, Colorado: U.S. Geological Survey, Fort Collins Science Center.
- Tinker, T. L., Dumlao, M. & McLaughlin, G. (2009). Effective social media strategies during times of crisis: learning from the CDC, HHS, FEMA, the American Red Cross and NPR. *Public Relations Strategist*, 15(3), 25-39.
- Trettin, L., & Musham, C. (2000). Is trust a realistic goal of environmental risk communications? *Environment and Behavior*, 32(3), 410 – 426. doi:10.1177/00139160021972595
- Trolling. (2010, April). In *Oxford Dictionaries Online*. Retrieved from <http://oxforddictionaries.com/definition/troll--2>
- Turner, B. (1976). The organizational and interorganizational development of disasters. *Administrative Science Quarterly*, 21, 378-397. doi:10.2307/2391850
- Ulmer, R. R. (2001). Effective crisis management through established stakeholder relationships. *Management Communication Quarterly*, 14(4), 590-615. doi:10.1177/08933189011444003
- Underhill, C., & Olmsted, M. G. (2003). An Experimental Comparison of Computer-Mediated and Face-to-Face Focus Groups. *Social Science Computer Review*, 21(4), 506. doi:10.1177/0894439303256541
- US National Weather Service Grand Forks North Dakota. (2011, August 1). Extended warnings a bit southeast to include Wahpeton-Barnesville-Fergus Falls for wind potential. strongest core likely to impact Walcott-Christine-Wolverton-Abercrombie through 435 am and then Wahp-Breck around 445-450 am. [Facebook post]. Retrieved from <http://www.facebook.com/US.NationalWeatherService.GrandForks.gov/posts/154271057>

983337.

- Veil, S. R., Buehner, T., & Palenchar, M. J. (2011). A work-in-process literature review: incorporating social media in risk and crisis communication. *Journal of Contingencies and Crisis Management*, 19(2), 110-122. doi: 10.1111/j.1468-5973-2011.00639.x
- Venette, s. (2008). Risk as an inherent element in the study of crisis communication. *Southern Communication Journal*, 73(3), 197-210. doi:10.1080/10417940802219686
- Walaski, P. (2011). *Risk and crisis communications: Methods and messages*. Hoboken, NJ: John Wiley & Sons.
- Waymer, D., & Heath, R. L. (2007). Emergent agents: The forgotten publics in crisis communication and issues management research. *Journal of Applied Communication Research*, 35(1), 88-108. doi:10.1080/00909880601065730
- Wells, R. (2010, August 8). 41.6% of the U.S. population has a Facebook account. *Social Media Today*. Retrieved from <http://www.socialmediatoday.com/index.php?q=roywells1/158020/416-us-population-has-facebook-account>.
- Wilson, K., (2008). Television weathercasters as science communicators. *Public Understanding of Science*, 17(1), 73-87. doi:10.1177/0963662506065557
- Wilson, R., & Crouch, E. (1987). Risk assessment and comparisons: an introduction. *Science*. 267-270. doi:10.1126/science.3563505
- WMO (World Meteorological Organization). (2003). Socio-economic benefits of meteorological and hydrological products and services. *WMO Bulletin*, 52, 354-359.
- Wright, D. K., & Hinson, M.D. (2009). Examining how public relations practitioners actually are using social media. *Public Relations Journal*, 3(3), 2-32.
- Zhang, F., Morss, R. E., Sippel, J. A., Beckman, T. K., Clements, N. C., Hampshire, N. L., & ...

Winkley, S. D. (2007). An in-person survey investigating public perceptions of and responses to hurricane Rita forecasts along the Texas Coast. *Weather & Forecasting*, 22(6), 1177-1190. doi:10.1175/2007WAF2006118.1

APPENDIX A: RISK PERCEPTION FACTORS

<i>Voluntariness</i>	Risks perceived as involuntary or imposed are less readily accepted and are perceived as greater than risks perceived to be voluntary.
<i>Controllability</i>	Risks perceived as under the control of others are less readily accepted and are perceived as greater than risks perceived to be under the control of the individual.
<i>Familiarity</i>	Risks perceived as unfamiliar are less readily accepted and are perceived as greater than risks perceived to be familiar.
<i>Equity</i>	Risks perceived as unevenly and inequitably distributed are less readily accepted than risks perceived as equitably shared.
<i>Benefits</i>	Risks perceived to have unclear or questionable benefits are less readily accepted and are perceived as greater than risks perceived to have clear benefits.
<i>Understanding</i>	Risks perceived as poorly understood are less readily accepted and are perceived as greater than risks perceived to have clearly understood impacts.
<i>Uncertainty</i>	Risks perceived as relatively unknown or that have highly uncertain dimensions are less readily accepted than risks that are relatively known to science.
<i>Dread</i>	Risks that evoke fear, terror, or anxiety are less readily accepted and are perceived as greater than risks that do not arouse such feelings or emotions.
<i>Trust in institutions</i>	Risks associated with institutions or organizations lacking in trust and credibility are less readily accepted and are perceived as greater than risks associated with trustworthy and credible institutions and organizations.
<i>Reversibility</i>	Risks perceived to have potentially irreversible adverse effects are less readily accepted and are perceived as greater than risks perceived to have reversible adverse effects.
<i>Personal stake</i>	Risks perceived as placing people personally and directly at risk are less readily accepted than risks that do not.
<i>Ethical/moral nature</i>	Risks perceived as ethically objectionable or morally wrong are less readily accepted and are perceived as greater than risks not perceived as ethically objectionable or morally wrong.
<i>Human vs. natural origin</i>	Risks perceived as generated by human action are less readily accepted and are perceived as greater than risks perceived as caused by nature or “acts of God.”
<i>Victim identity</i>	Risks that produce identifiable victims are less readily accepted and are perceived as greater than risks that produce statistical victims.
<i>Catastrophic potential</i>	Risks that produce fatalities, injuries, and illness grouped spatially and temporally are less readily accepted and are perceived as greater than risks that have random, scattered effects.

Note: Adapted from Covello, V., Peters, R., Wojtecki, J., & Hyde, R. (2001).

APPENDIX B: FOCUS GROUP QUESTIONS

1. What is your ideal vacation?
2. What would make you seek out information about the weather?
3. Are there particular sources you turn to?
4. Have you ever read about severe weather on Facebook?
 - a. Describe how you learned about it – was it from a friend or an organization?
 - b. Was it a picture or a status update? A video?
 - c. Is one type of Facebook post better than others? Why or why not?
5. What makes information from Facebook different from other sources?
6. Is it better or worse than those other sources? Why?
7. When you see a post about the weather on Facebook, does it generally make you more concerned about the weather or less concerned? Why?
8. What would you do if you saw two posts about severe weather that contradicted each other? How would you decide which one to believe?
9. When are you most likely to use Facebook to learn about severe weather – before, during, or after the storm? Why?