ABSTRACT

Title of Document: FLOODED WITH INFORMATION FROM SOCIAL MEDIA: EFFECTS OF DISASTER INFORMATION SOURCE AND VISUALS ON VIEWERS' COGNITIVE, AFFECTIVE, AND BEHAVIORAL RESPONSES

Julia Daisy Fraustino, Doctor of Philosophy, 2016

Directed By: Associate Professor Brooke Fisher Liu, Department of Communication

While a variety of crisis types loom as real risks for organizations and communities, and the media landscape continues to evolve, research is needed to help explain and predict how people respond to various kinds of crisis and disaster information. For example, despite the rising prevalence of digital and mobile media centered on still and moving visuals, and stark increases in Americans' use of visual-based platforms for seeking and sharing disaster information, relatively little is known about how the presence or absence of disaster visuals online might prompt or deter resilience-related feelings, thoughts, and/or behaviors. Yet, with such insights, governmental and other organizational entities as well as communities themselves

may best help individuals and communities prepare for, cope with, and recover from adverse events.

Thus, this work uses the theoretical lens of the social-mediated crisis communication model (SMCC) coupled with the limited capacity model of motivated mediated message processing (LC4MP) to explore effects of disaster information source and visuals on viewers' resilience-related responses to an extreme flooding scenario. Results from two experiments are reported. First a preliminary 2 (*disaster information source*: organization/US National Weather Service vs. news media/*USA Today*) x 2 (*disaster visuals:* no visual podcast vs. moving visual video) factorial between-subjects online experiment with a convenience sample of university students probes effects of crisis source and visuals on a variety of cognitive, affective, and behavioral outcomes. A second between-subjects online experiment manipulating still and moving visual pace in online videos (no visual vs. still, slow-pace visual vs. still, medium-pace visual vs. still, fast-pace visual vs. moving, slow-pace visual vs. moving, medium-pace visual vs. moving, fast-pace visual) with a convenience sample recruited from Amazon's Mechanical Turk (mTurk) similarly probes a variety of potentially resilience-related cognitive, affective, and behavioral outcomes. The role of biological sex as a quasi-experimental variable is also investigated in both studies.

Various implications for community resilience and recommendations for risk and disaster communicators are explored. Implications for theory building and future research are also examined. Resulting modifications of the SMCC model (i.e., removing "message strategy" and adding the new category of "message content elements" under organizational considerations) are proposed.

FLOODED WITH INFORMATION FROM SOCIAL MEDIA: EFFECTS OF DISASTER INFORMATION SOURCE AND VISUALS ON VIEWERS' COGNITIVE, AFFECTIVE, AND BEHAVIORAL RESPONSES

By

Julia Daisy Fraustino

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2016

Advisory Committee:
Professor Brooke Fisher Liu, Chair
Professor Elizabeth Toth
Professor Erich Sommerfelt
Professor Lindsey Anderson
Professor Laura Dugan, Dean's Representative

Acknowledgements

This research was supported by the Office of University Programs Science and Technology Directorate of the U.S. Department of Homeland Security through the Center for the Study of Terrorism and Behavior (CSTAB – Center Lead) Grant made to the START Consortium (Grant # 2012-ST-61-CS0001). The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Department of Homeland Security or START.

Sincere thanks to my advisor, Dr. Brooke Fisher Liu, who is a constant source of inspiration, collaboration, support, and friendship; my committee members, Dr. Elizabeth Toth, Dr. Erich Sommerfeldt, Dr. Lindsey Anderson, and Dr. Laura Dugan, each of whom played a special role in shaping me into the scholar I am and strive to be; mentors who have nurtured and/or continue to nurture me on this path, such as Dr. Daniel Haggerty, Dr. Mike Schmierbach, Dr. Colleen Connolly-Ahern, Dr. Denise Bortree, Dr. Mary Beth Oliver, and Dr. Yan Jin, among others; the many colleagues across AEJMC, NCA, and ICA, especially within the Public Relations Divisions, who welcomed me with open arms into our tightknit community; and most of all my husband, father, siblings, and amazing friends who provided the deepest and most valuable care and encouragement a person could ask for (you know who you are!). I feel blessed and grateful for you all.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Crises and disasters are urgent, often dangerous, and prompt uncertainty (Coombs, 2015; Sellnow & Seeger, 2013; Palenchar, 2010). Bountiful scientific and anecdotal evidence reveals crises can violate organization-public relationships, tarnish organizational reputation – sometimes irrevocably – and cause widespread human and material damages that are difficult to overcome. For example, in the early 1990s, *Harper* reported on athletic apparel company Nike's exploitation of overseas factory workers, launching sweatshop protests by concerned citizens and prompting the company's own CEO to admit "the Nike product has become synonymous with slave wages, forced overtime, and arbitrary abuse" (Fairchild, 2014, para. 3). In addition to suffering initial monetary declines, the company continues to contend with this reputational harm decades later. In 2013, the nation's second largest discount retailer, Target, took a deep reputational and financial hit – the latter estimated at $1 billion – when a hacker breached its data, compromising identities (and possibly trust) of nearly 100 million customers (Fairchild, 2014). And the nation's largest discount retailer, Walmart, came under literal and figurative fire the year prior when an overseas garment factory from which it sourced some of its goods burned down, claiming the lives of more than 1,000 workers and prompting outrage on the part of publics who perceived the organization mishandled their behavior and communication about the situation (Fairchild, 2014).

Such negative events and ramifications are not confined to human error and maleficence. In 2010, an extreme earthquake struck Haiti, leaving 1.5 million people

without shelter. Nearly five years and billions of dollars of international relief effort later, Haiti remained home to half of the world's cholera cases, along with pervasive poverty, homelessness, and massive physical destruction (*New York Times* Editorial Board, 2014). In a U.S.-based instance in early spring 2016, flash flooding engulfed many areas of Alabama, Arkansas, Louisiana, Mississippi, and Tennessee, claiming several lives and impacting thousands as residents watched homes, debris, and even alligators float down submerged streets (Associated Press, 2016). Given crises' and disasters' detrimental possible outcomes for organizations and publics as demonstrated by these and countless other examples, it is important for research to explain, predict, and provide guidance for effective and ethical communication surrounding crises, especially with the ultimate goal of enhancing ability to bounce forward and recover – that is, resilience (e.g., Ganor & Ben-Leavy, 2003; Houston, Spialek, Cox, Greenwood, & First, 2015b; Paton & Johnston, 2001).

Crisis resilience, especially within the particular crisis type of disasters (e.g., natural disasters such as hurricanes or person-made disasters such as terrorist attacks), is an important phenomenon with under-researched implications for public relations. Resilience can be thought of as a process (as opposed to an outcome) that links an ability to engage in adaptation before and during an extreme negative event to a positive trajectory of functional recovery afterward (e.g., Adger, 2000; Bruneau et al., 2003). Researchers have explained resilience can entail (a) physical components, such as abilities to create or restore built and natural environments, and (b) social components, such as abilities to create or restore social and economic environments (e.g., Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). To build and

leverage these components, communication is crucial (Houston et al., 2015). Indeed, emerging research confirms that how crisis- and disaster-responding organizations such as government agencies, nongovernmental organizations, businesses, and the news media construct and distribute related information, as well as how that information flows through mass and interpersonal channels to and between individuals and groups thereafter, can have direct and indirect influences on community members' cognitive, affective, and behavioral responses – and thus, potentially, community resilience (e.g., Austin, Liu, & Jin, 2012; 2014; Jin, Fraustino, & Liu, 2016; Liu, Fraustino, & Jin, 2015a; Liu, Fraustino, & Jin, 2015b; Liu, Jin, & Austin, 2013; Schultz, Utz, & Göritz, 2011; Stephens, Barrett, & Mahometa, 2013).

For resilience, especially community resilience, connectivity and relationships are thus essential (e.g., Paton & Johnston, 2001; Pfefferbaum et al., 2008). During crises, relationships are tested or violated (Coombs, 2015). It follows, then, that serving as the "strategic communication process of building mutually beneficial relationships between organizations and their publics" (PRSA, n.d.), the public relations function is highly suited to managing crises and facilitating (or, in a darker light, detracting from) resiliency. Therefore, it is not surprising that public relations scholars have put forth perhaps the most concerted effort in the arena of advancing knowledge about crisis communication (Avery, Lariscy, Kim, & Hocke, 2010; Sommerfeldt, Paquette, Janoske, & Ma, 2013; Toth, 2010), albeit without a primary focus on resiliency. Crisis communication theory and applied scholarly research in public relations has overwhelmingly focused on how organizations can save face and repair tarnished images (e.g., image repair theory; Benoit, 1997), prevent reputational

harm and mitigate threats to perceived legitimacy (e.g., situational crisis communication theory; Coombs, 2007), and help themselves learn and survive with stakeholders intact (e.g., discourse of renewal theory; Ulmer, Seeger, & Sellnow, 2007). That is, this line of scholarship has predominantly concerned itself with organizational crises and keeping the business afloat in the face of a negative, jarring event. In response, several scholars recently have critiqued such veins of scholarship for an apparent "managerial" bias and called for more multivocal approaches to the study and implementation of crisis communication (e.g., Avery et al., 2010; Heath, 2010; Fraustino & Liu, in press; Liu and Fraustino, 2014). Such approaches—which consider myriad thoughts, feelings, wants, and needs of various individuals and groups rather than solely or dominantly of an organization experiencing an adverse event that could impact reputation—can allow for understanding about how diverse message senders and receivers create, distribute, and interpret crisis information. Ultimately, such knowledge can lead to communication decisions that are both ethical and effective, such as focusing on resiliency through enhancing individuals' and publics' coping capacities, information seeking and sharing, and efficacy to take appropriate protective actions for themselves and others. Although the current work is not situated to take on this challenge in full force, it nonetheless sets the stage for shifting traditional crisis communication outcome orientations in a more publics-oriented direction.

While the media landscape evolves and a variety of crisis types loom as real risks for organizations and communities, research is needed to help explain and predict how people cognitively, affectively, and communicatively/behaviorally

respond to various kinds of crisis information. With such information, governmental and other organizational entities as well as communities themselves can best help publics prepare for, cope with, and recover from adverse events. A relevant theoretical foundation for such goals can be found in the social-mediated crisis communication model (SMCC), which explains the transmission of crisis-related information before, during, and after crises via traditional media, social media, and word-of-mouth communication. (e.g., Liu, Jin, & Austin, 2013; Liu, Jin, Austin, & Janoske, 2012).

The SMCC model consists of two parts that describe (a) how publics seek, share, and interpret crisis information communicated among each other, individuals, organizations, and news media; and (b) how organizations can leverage knowledge of this information processing and flow to respond effectively to publics. Yet, as the model is broad and conceptual, it is important for scholars to more closely examine some of the specific factors that impact responses to crisis information, especially within the first part of the model. Although other theoretical frameworks are available for researching the effects of crisis information form, source, and message content elements (e.g., the networked crisis communication [NCC] model [e.g., Utz et al., 2013] or information communication technology [ICT] succession theory [e.g., Stephens, 2007), SMCC is the most appropriate existing framework for current purposes. SMCC gives the most comprehensive examination of the various organizations and publics who communicate to and with each other surrounding crises, accounting for myriad communication features that impact information flow

and responses. More information about the SMCC model knowledge base and gaps will be discussed in Chapter 2.

Despite SMCC being perhaps the most thorough model of crisis communication, it exhibits key gaps that are generally true of the crisis communication literature as a whole (cf., Liu & Fraustino, 2014). For the purposes of this work, one such gap is that although the SMCC model includes many types of communication and communicators, it nonetheless holds the organization at its center, thus far constraining the kinds of outcomes much of its research has examined (i.e., reputational, monetary). Another gap is that the model is largely descriptive rather than predictive, limiting the ability of the model to provide projected outcomes for scientifically guided decision-making on the part of emergency communicators. And more specifically, SMCC does not incorporate the potential that media/message elements, such as crisis visuals, likely impact the way individuals react to crises. As research and anecdotal evidence continue to point to people's increases in digital media consumption both routinely and during crises (e.g., Boulianne, 2015; Briones, Kuch, Liu, & Jin, 2011; Keim & Joni, 2010; Merchant & Elmer, 2011; Yate & Pacquette, 2011;), especially including visual-based platforms (e.g., Fraustino, 2014; Graham, Avery, & Park, 2015; Stewart & Wilson, 2016), theory can and should develop insight into these processes and effects. This project seeks in part to develop such insights.

Further, research has shown that the source (i.e., the entity distributing a message) of crisis messages can play important roles in message receivers' responses to the organization and the crisis. For instance, previous research has found that the

sources and forms (i.e., channel or medium) from which experiment participants received hypothetical crisis information in some circumstances impacted their crisis-related emotions, perceived credibility of information, and likelihood to take some recommended actions (e.g., Freberg, 2012; Liu et al., 2015a; Liu et al., 2015b; Schultz, Utz, & Göritz, 2011). While there is evidence that there are conditions under which the source alone of identical information may impact audiences' reactions to that information, much of this evidence is relatively new and it is far from wholly inclusive in the realm of crisis communication. More work is needed to explain and predict audiences' and publics' array of likelihoods to think, feel, and act in relation to crisis information, especially in ways that might pertain to protecting or rebuilding physical and social environments (i.e., resilience). One such area for inquiry pertains to the effects of information source. Another such area pertains to message content elements, such as inclusion of various types of visuals.

Unlike the growing scholarship mounting on the effects of crisis information source, crisis scholars have examined crisis visuals or visual-based platforms from a public relations perspective to a lesser extent (e.g., Coombs & Holladay, 2011; Fraustino, 2014; Guidry, Messner, Jin, & Medina-Messner, in press; Veil, Sellnow, & Petrun, 2012; Walton, Seitz, & Ragsdale, 2012; Wigley & Zhang, 2011), as will be expanded upon in a later discussion. Mass media scholars, on the other hand, have long explored visuals' effects on viewers, often from journalistic standpoints, such as how news visuals can prime stereotyping (e.g., Abraham & Appiah, 2006), linking the inclusion of photographs in press and television news stories to viewers' perceptions about the severity of the issue discussed in the story (e.g., Gibson &

Zillmann, 1999), or investigating journalistic ethics and viewers' policy attitudes in relation to the graphicness of war news photos (e.g., McKinley & Fahmy, 2011; Pfau et al., 2006). However, crisis scholars have yet to incorporate research-grounded understanding of visuals into crisis communication theories and models such as SMCC. As popularity of platforms centered on still and moving visuals, such as Instagram, Pinterist, Flickr, Vimeo, and YouTube, increases (Duggan & Smith, 2013; O'Donoghue, 2015), crisis research needs to incorporate visuals and visual-based tools, particularly given that people may turn to visual applications with specific crisis- or disaster-related motivations (e.g., Guskin, 2011; Pew Research Center, 2012).

A model that may provide needed insight into audiences' processing of crisis-related visuals is the limited capacity model for motivated mediated message processing (LC4MP) (e.g., Lang, 1995, 2000, 2006; Lang, Potter, & Bolls, 1999; Potter, 2006; Potter, Lang, & Bolls, 2008; Yegiyan & Lang, 2010; Zhou, 2005). The model explains and predicts receivers' restricted capabilities to cognitively process the mediated messages that they actively engage with (e.g., Lang, 2000). As will be discussed in greater breadth and depth in Chapter 2, the LC4MP provides complementary and specific predictive and explanatory capacities related to the processing of visual media not yet accounted for by the SMCC and not yet broached by wider public relations perspectives in the literature.

Thus, using SMCC constructs as a framework coupled with the LC4MP, this dissertation undertakes online experiments with convenience samples of (1) college students and (2) the online labor market Amazon Mechanical Turk (Mturk). The

experiments test effects of disaster information source and/or disaster visuals on participants' reported cognitive, affective, and intended communicative/behavioral responses to the disaster information that might contribute to resilience. That is, this work merges media effects and other mass communication scholarship with public relations and crisis communication foundations to examine and expand SMCC with an eye toward resiliency. It builds directly on the author's past SMCC and related crisis communication work (e.g., Fraustino, 2014; Fraustino, Liu, & Jin, 2014; Fraustino & Liu, in press; Fraustino, Liu, & Jin, in press; Liu & Fraustino, 2014; Liu, Fraustino, & Jin, 2015a, 2015b) to partially replicate previous findings, as is important for building scientific knowledge (Easley, Madden, & Dunn, 2000; Lamal, 1990) while producing several novel contributions to the public relations crisis communication literature.

To sum up at this introductory point, this project uses the theoretical lenses of SMCC and LC4MP to probe how crisis information sources and visuals affect audiences' cognitive, affective, and behavioral responses to a hypothetical natural disaster based on real-world extreme flooding events. In doing so, this research aims to produce five main contributions to the knowledge base. First, this research adds to understanding about how the source of crisis information impacts recipients' responses to crisis messages. Investigations of information source will partially replicate prior work, which has found limited source effects (e.g., Liu et al., 2015a), and determine whether the addition of a new factor (i.e., various types of message visuals) interacts with message source to produce varied audience responses. Second, this research contributes new information about how crisis visuals impact recipients'

responses to crisis communication. This is a particularly important goal, as although visuals are often studied in journalism and mass communication, crisis visuals are not often examined by crisis scholars and are widely unaccounted for in crisis theory. Third, this research refines the SMCC model by introducing a new factor (i.e., visuals) and by providing evidence upon which to base future predictions in the first part of the model, which to date has been largely descriptive. Fourth, this research leverages public relations' co-creational perspectives to focus on resilience-based crisis outcomes, such audience thoughts, feelings, and behaviors that are related to physical and psychological coping and aiding oneself and others in recovery. This supplements dominant outcomes in the current public relations and crisis communication literature that are based on organizational crisis concerns such as reputation. And fifth, this work integrates extensively researched perspectives from media effects and mass communication theory into public relations and crisis scholarship, especially the LC4MP, which has yet to take root in public relations and crisis communication despite its relevance to both the traditional and digital/social media forms commonly used for crises communication.

Particularly, this work's contributions toward building understanding from a public relations perspective of the effects of crisis visuals on individuals' and publics' responses should be underscored, as this area is severely lacking scientific evidence. This endeavor builds crisis communication theory, especially in refining and expanding the SMCC model, while also providing practical implications to help inform emergency management efforts and policy decisions. Before detailing the experimental design (Chapter 3), results (Chapter 4), and discussion and conclusions

(Chapter 5), first it is necessary to expand on the key theoretical frameworks and variables of interest to this work that drive several hypotheses and research questions. The latter will be addressed in Chapter 2.

Chapter 2: Literature Review

Overview of Purpose

This project seeks to identify how crisis information source and visual message elements impact message receivers' cognitive, affective, and communicative/behavioral responses to information about an urgent flooding event. To that end, first an overview of introductory material demonstrating the value of such an endeavor is provided. Following that, some background and key terms are introduced. Next the main theoretical foundations (i.e., the social-mediated crisis communication model and the limited capacity model for motivated mediated message processing) are discussed. Then more detailed information is provided about particular independent variables (i.e., crisis information source and visuals) and dependent variables (i.e., cognitive, affective, and behavioral outcomes) of interest to the current work. With the theoretical grounding and concepts examined separately from deeper dives into specific variables of interest to the current work, presentation of the hypotheses and research questions is reserved for the end of this literature review once all concepts have been covered and can be combined for predictions and questioned relationships.

Since launches of social media sites such as Facebook, Twitter, and Instagram between 2004 and 2010, public relations professionals have increasingly reported that digital and social media have altered the practice of public relations (e.g., Wright & Hinson, 2009, 2013). By extension, evolving digital and social media have altered the practice of crisis communication (e.g., Baron & Philbin, 2009; Veil, Buehner, &

Palenchar, 2011; White, 2011). And public relations practitioners can gain a seat at the dominant coalition when management perceives them to have handled crises effectively (Liu & Pompper, 2012). Research has shown that social and mobile media engagement grows during crises as people seek and share information and pursue support (e.g., Fraustino et al., in press; Hughes & Palen, 2009; Liu et al., 2015a; Lachlan, Spence, Lin, & Del Greco, 2014; Veil et al., 2011). News reports reveal that social and mobile media provide such immediacy that individuals now often gather crisis news and updates from family and friends online before professional news media reports are released (e.g., Gilgoff & Lee, 2013). In fact, in what one journalist and researcher called the "Twitter effect" (Bruno, 2011), indicating the pervasive impact of social media on the traditional news generating process, journalists are now able to live-report breaking crisis news coverage without even having a reporter on the scene simply by monitoring and aggregating user-generated content online, especially via Twitter. On the downside, though, the Twitter effect may open up opportunities for widespread misinformation when, for example, trustworthy news organizations run incorrect Twitter-based breaking news, as was witnessed during the Boston Marathon bombings of 2013 (Carr, 2013).

Along with altering the speed and scene of crisis information gathering and sharing, social media have opened up new possibilities (for better and worse) for crisis emergency response from emergency communicators and responders as well. In the context of natural disasters, for instance, individuals increasingly expect emergency communicators and responders to constantly monitor and jointly respond to social media posts – and with high expectations for promptness. For example, the

American Red Cross (2010) found that more than three-quarters of its survey respondents reported they would expect emergency responders to arrive on the scene within just one hour of sending a request for help via social media—and those expectations may have become even more pronounced with the further rise of social media in the years that followed. However, there may be a discord between publics' expectations and emergency responders' and communicators' practices, as a National Emergency Management Association sponsored survey found emergency management agencies that use social media are dominantly using these tools for one-way information pushing rather than response and conversations (Su, Wardell, & Thorkildsen, 2013). Compounding complexities of communicating immediately in digital and mobile realm, as Reynolds (2006) warned: Risk, crisis, and disaster messages must be dispersed "speedily enough to satisfy a population savvy in gathering information but apt to respond emotionally in crisis decision making" (p. 251).

From another angle, when individuals' expectations for organizations' informational and behavioral responses are not met, they can now turn to social media to form groups that fill information and material voids. Many news stories along with burgeoning crisis scholarship have begun to show how grassroots communities may rise to take control of crisis narratives or even leap into protective actions. Some such individuals and groups may help fulfill renewal-based and resilience-related needs during the perceived absence of adequate organizational crisis and disaster responses. This was evident following Hurricane Katrina when geographically dispersed communities came together in mutual support online (Procopio & Procopio, 2007);

when “voluntweeters” convened in cyberspace to organize and enact on-the-ground efforts during an ongoing natural disaster (Starbird & Palen, 2011); and when community members took recovery into their own hands during a chemical spill that contaminated municipal water supplies in West Virginia’s Elk River in 2014 (Fraustino & Kennedy, under review). Other such individuals and groups may fill crisis information voids with rumor and speculation (e.g., Coombs, 2015), much to communication managers’ chagrin. This rumor and speculation may turn to outright fabrication, such as altered crisis photographs and videos that may spread to thousands of people within minutes, especially if picked up and run by credible traditional media sources as was seen during Hurricane Sandy in 2012 (e.g., Bennett-Smith, 2012). However, it is worth noting that many of these studies and news reports are not experimental so do not explore causal mechanisms or point to scientifically significant differences in effects of different sources and content elements such as visuals, as will be done in the current work.

Nevertheless, it is evident that crisis communication that matches organizational and public expectations and facilitates recovery is important. During crises, publics seek “information to determine whether the crisis will affect them, how they should think, and what they should do” (Seeger, Sellnow, & Ulmer, 2003, p. 71). Such information seeking and sharing may happen via traditional media, social media, and/or online and offline word-of-mouth communication, as is shown by the SMCC model (e.g., Liu, Jin, Austin, & Janoske, 2012; Liu, Jin, Briones, & Kuch, 2012). Fittingly, there is a large body of scholarship in crisis communication and management, especially in public relations, to serve as guidance for those responsible

for developing crisis-related messages and strategies (for a small sampling from several perspectives, see: Arpan & Pompper, 2003; Benoit, 1997; Coombs, 2007, 2015; Covello, 2003; Heath, 2010; Palenchar, 2010; Seeger, 2006; Sohn & Lariscy, 2014; Sturges, 1994; Ulmer et al., 2007; Veil et al., 2011). What is lesser known is how crisis information flows between organizations and publics and among publics themselves in today's rapidly changing media environment – and how this information can provide guidelines to public relations/affairs practitioners and others in charge of effective emergency communication.

Coombs (2014) deemed this nebulous intersection of organizational and public communication across multiple media platforms a "bleeding edge" of crisis communication knowledge, explaining that the "bleeding edge is a term from technology that indicates something is still a high risk of being unreliable because it has not been fully tested" (p. 2). And, as the majority of crisis communication research focuses on organizational reputation-related concerns and the ability for organizations to survive as opposed to the wellbeing of individuals and communities (see Heath, 2010 and Liu & Fraustino, 2014 for similar arguments), what is even lesser known—but also highly important—is how various communication factors can foster message recipients' responses that might contribute to outcomes such as resilience.

Therefore, as noted in the first chapter, the purpose of this work is to begin to fill in such knowledge gaps and perhaps begin to coagulate parts of that "bleeding edge" in the context of the crisis type of disaster, more specifically the natural

disaster type of extreme flooding, one of the most pervasive hazards in the United States (Ready.Gov, n.d.). So, to set the stage, background and definitions are next.

Background and Key Terms

Before moving on to review relevant literature that speaks to the variables of interest in this study, it is important to first define terms and situate this study within its scholarly perspectives and guiding assumptions. As noted above, this work seeks to examine the effects of information source and visuals on crisis message recipients' various cognitive, affective, and behavioral outcomes potentially related to resilience. Thus, this section will first define crises, disasters, risks, and issues as well as social media; it will then define public relations, discuss management and audience/publics perspectives to public relations and crisis communication, and close by defining and discussing resilience.

Crises, Risks, Issues, and Disasters

To understand the role of communication surrounding crises it is first necessary to define what a crisis is and differentiate it from similar terms. Although there is no common stance in the academic literature that clearly creates boundaries between and among the concepts of crises, risks, issues, and disasters, some distinctions can be made. Many ideas are apparent across the literature to define what constitutes a crisis, but there is no consensus on a single definition. In fact, Heath and Millar (2004) discussed about 20 such existing conceptualizations of crisis, with a few main areas of focus being, for example, that something is a crisis if: it requires organizational efforts that extend beyond what is normal; it causes stakeholder stress;

it violates laws, ethics, or expectations; or it originates from a major organizational mistake or misdeed, especially those resulting in historical turning points for the organization. As Heath (2010) and Heath and Millar (2004) noted, these areas of concentration as well as the focus of most other notions of crises (e.g., Coombs, 2015; Fearn-Banks, 2010) share a couple of common themes: locus of control and accountability. That is, as Heath (2010) explained, most crisis definitions encompass at least some aspect of "whether the organization knew, appreciated, planned, and appropriately enacted sufficient control over operations to prevent, mitigate, respond, and learn from a crisis" (p. 3).

These notions hint at or overtly exhibit an emphasis on the organization, more particularly on its reputation. Organizational reputation has often been a primary concern in crisis management research in our field, as many have noted (e.g., Coombs, 2015; Heath, 2010; Liu & Fraustino, 2014). As Coombs (2015) defined, a crisis "is the perception of an unpredictable event that threatens important expectancies of *stakeholders*… and can seriously impact an *organization's* performance and generate negative outcomes" (Coombs, 2015, p. 3, emphasis added). This oft-cited definition clearly takes an organizational perspective, noting that a crisis event is happening when stakeholders (i.e., the people whom the organization has identified as holding the ability to impact or influence the organization, or whom the organization can impact) perceive that the organization has not lived up to expectations of some important type, causing negative results for the organization (e.g., reputational harm).

Likewise, an emergency communication manual published by the U.S. Department of Health and Human Services Center for Disease Control and Prevention outlined crisis characteristics, those being that a crisis "occurs unexpectedly," it "may not be in the organization's control," it "requires an immediate response," and it "may cause harm to the organization's reputation, image, or viability" (Reynolds & Seeger, 2012, p. 6). From a scholarly research perspective, especially in public relations, crises are often conceived as organization based, with research predominately examining how organizations can effectively communicate about crises to and with publics. So, for example, the Tylenol tampering scare that arguably launched the public relations subfield of crisis communication in the 1980s (Palenchar, 2010) was a crisis for Johnson & Johnson and its stakeholders. Yet the crisis type of disasters, which are less focused on in public relations, especially from publics-centered standpoints (Liu & Fraustino, 2014), gives a different perspective. The crisis type of disasters can be thought of as "information creation, seeking, and/or sharing among individuals, organizations, and the media surrounding an event involving largely damaging violations of publics' expectations" (Liu et al., 2015b, p. 3). Disasters from this perspective include both natural and manmade catastrophic events. Given the focus on organizational crises perhaps to the diminishment of the disaster crisis-type, it is not surprising that in dominant crisis theories (e.g., Benoit, 1997; Coombs, 2007), organizational image and legitimacy are often primary concerns, to the extent that crisis scholars have criticized this literature for its "managerial bias" (Heath, 2010, p. 7; Liu & Fraustino, 2014). A managerial bias,

however, does not imply or necessitate unethical one-way communication, spin-doctoring, or propaganda, it is worth emphasizing.

Crises are similar to but can be distinguished from risks and issues. As has begun to be established above, crises are loosely understood as stakeholders' perceptions of unpredictable events that violate expectancies and clench the threat of negative outcomes for the organization and potentially its publics; the disaster crisis-type deals with events that reach beyond a community's ability to immediately handle and recover from. Within this framework, there are several additional crisis types with various typologies. Early on, Lerbinger (1997) identified a few crisis types: natural disasters, man-made disasters, technological crises, crises of confrontation, crises of malevolence toward an organization, organizational-based misdeeds, workplace violence, or even crises based on rumors. Coombs (2007, 2015) expanded on notions of crisis types within the situational crisis communication theory framework, clustering types of crises based on the amount of blame stakeholders would be likely to place on an organization for the event, with clusters including (1) victim, such as natural disasters and rumors; (2) accidental, such as technical errors, and (3) preventable, such as organizational misdeeds or managerial misconduct.

Given these conceptualizations, it is important to reiterate how traumatic or negative events that are not organization-focused yet threaten and harm large publics, for instance an influenza pandemic, can be categorized. One may argue that such instances may be categorized as the crisis type of disasters. In other words, under the umbrella of general crises, organizational crises in particular are organization-based adverse events (or perceptions of such events), whereas disasters are community-

based adverse events. That is, disasters may be considered community-centric, such as when natural (e.g., hurricanes) or person-made (e.g., bombings) events overcome a community's ability to adequately respond and protect itself. Coombs (2015) explained that "disasters are events that are sudden, seriously disrupt routines of systems, require new courses of action to cope with the disruption, and pose a danger to values and social goals" (p. 3). So, for example, the 2012 Hurricane Sandy, which caused widespread power outages and structural damage along the East coast (Trotta & Barbara, 2012), was a disaster affecting U.S. communities.

However, a seemingly simple distinction between organizational crises and disaster-related crises may blur when disasters cause organizational crisis. For example, the line is likely crossed from disaster to crisis if hurricane victims turn their attention away from solely the community effects of the storm instead to a utility provider that customers perceive is not upholding expectations for service provision in the aftermath (i.e., an organizational crisis of the disaster variety, which falls under the crisis cluster of "victim" as described in Coombs' terms above). That is, people may shift focus on the (community-based) disaster crisis-type toward how an organization (mis)manages the disaster, resulting in the traditional organization-based crisis (Coombs, 2015). This blurry line along with abundant colloquial references to most severe adverse events as "crises" may lead some to discard any crisis-disaster distinction. Yet, as researchers have theorized and research has begun to show that people and organizations often respond differently on the basis of crisis type, such as organization-based crises and community-based disasters (e.g., Coombs, 2007, 2015), it may remain theoretically and conceptually helpful to maintain a distinction between

and among crisis types ranging from organizational crises to disasters, until such a time that a more accurate typology of crisis/disaster types is constructed and the concepts may be better merged.

Risks can be delineated from crises, despite that crises and risks may be easy to conflate as they both contend with harm or loss. Yet as discussed above, crises deal with stakeholders' violated expectations surrounding a situation with looming negative outcomes for an organization and potentially its stakeholders (in the context of organization-based crises) or for a community and its publics (in the context of a disaster-based crisis). In contrast, risk refers to a generally *possible* and more or less *probable* harm or loss. That is, according to Coombs (2010), "risk represents the potential to inflict harm or, more generally, the potential exposure to loss" (p. 56). This potential can be directed toward the community or the organization. In other words, risks are possible hazards that hold the potential to manifest into crises (Heath, 2010; Palenchar, 2010).

Likewise, issues, too, may be delineated from crises. Issues are contested ideas/policies that can prompt or sustain crises (Coombs, 2010, 2015; Heath, 2010). Heath and Palenchar (2009) defined an issue as a "contestable point, a difference of opinion regarding fact, value, or policy, the resolution of which has consequences for the organization's strategic plan and future success or failure" (p. 93). That is, risks and issues can evolve into organizational crises when they gain enough momentum, and disasters can spawn organizational crises when stakeholders or publics shift attention to how an organization handled disaster-related decisions. Thus, with some noted fuzziness, nonetheless crises (including the crisis type of disasters), risks, and

issues can be understood as conceptually distinct. And, as has been mentioned above, for better and worse, social and digital media have changed the environment of crisis, disaster, risk, and issues communication.

Social Media

As might be expected, the rise of social, digital, and mobile media has changed the communication landscape, especially for crisis, risk, and issues communication and management (Chewning, 2014). Although most people have certain tools or application that might come to mind when they think of the term "social media," it, too, is a contested area in terms of reaching definitional consensus in academic scholarship. There has yet to be published a definitive piece that explicates the concept of social media in a universally agreeable manner. Instead vague definitions, if any at all, are provided by researchers investigating social-mediated communication phenomena.

For example, Westerman, Spence, and Van Der Heide (2014) explained that social media are "a general category of channels and applications that highlight collaboration and working together to create and distribute content" and "are built upon a fundamental characteristic of Web 2.0: they are sites for harnessing collective intelligence" (p. 172). Graham and Avery (2013) claimed that "social media tools can improve interactivity between a government and the public" (p. 1)—but the authors broadly said "social media encompass anything that uses the Internet to facilitate conversations and most often take the form of social networking sites, blogs, and Wikis" (p. 3). Edwards (2011) categorized various media types based on the business functions they might serve for advertising, offering five categories of media, which

provide: (1) information-sharing and interaction, including networks, wikis, multimedia sharing, bookmarking, virtual worlds, and rating; (2) news and activities updates; (3) location-based services; (4) social gaming; and (5) social couponing. Aside from broadly vague definitions or industry-specific typologies of social media, many researchers in and outside of the communication field who conduct social media studies do not define the term (e.g., Pempek, Yermolayeva, Calvert, 2009; Sosik & Bazarova, 2014); perhaps they assume an implied and shared understanding that platforms being studied – oftentimes Facebook, Twitter, or blogs – are social media without requiring an explicit connection.

Thus, considering a variety of broad definitions available in the literature, aggregating them, and expanding on them slightly, Fraustino, Liu, & Jin (2012) asserted that social media are "interactive digital tools that feature content users may generate, manipulate, or influence" and that such media "are conducive to timely, interactive communication and foster dialogue and content exchange among message consumers and creators" (p. 7). They went on to contrast social media and traditional media, highlighting that traditional media foster one-way information dissemination without opportunity for interaction and feedback, whereas social media "can create opportunities for two-way dialogue and interaction among organizations, the public, and individuals" (Fraustino et al., 2012, p. 7; Fraustino, Liu, & Jin, in press). As the media environment has expanded with new tools and applications, possible lines between social, online, new, and traditional media have continued to blur. For example, sources once entirely associated with traditional media forms (e.g., newspapers) have adapted to also maintain spaces within the social media sphere.

Such entities now include in their repertoires, for instance, traditional one-way information dissemination in their print stories but also share those stories online on their own websites and via social media, engaging in varying levels of conversation with readers and enabling readers to engage with each other about topics and issues.

Given the two-way communicative and communal features social media allow, it makes sense that Americans have reported primarily using social media for keeping track of and staying connected with their families and friends (Austin, Liu, & Jin, 2012; Duggan & Smith, 2013). Social networking sites continue to maintain the largest share of users—in fact, of all U.S. adults online, 71% reported using Facebook as of 2013, 63% of which reported using the site daily (Duggan & Smith, 2013). In 2015, 65% of *all* American adults reported using social media, up from a mere 7% a decade prior. In addition, social media use data has revealed rapid increases in reported use of visual-based media such as Instagram among U.S. online adults (Duggan & Smith, 2013; Perrin, 2015). Up to 78% of online American adults have downloaded videos or watched them on a video-sharing site like YouTube (Purcell, 2013). Yet, social media usage extends far beyond keeping in touch with high school buddies and geographically dispersed relatives. As the nonpartisan think-tank noted when documenting massive shifts in social media use from 2005-2015 (Perrin, 2015, para. 1)

> Pew Research reports have documented in great detail how the rise of social media has affected such things as work, politics and political deliberation, communications patterns around the globe, as well as the way people get and

share information about health, civic life, news consumption, communities… and even people's level of stress.

Social media and crises. In addition to the yearly increases in individuals' routine social media use (Duggan & Smith, 2013; Nielsen, 2011; Perrin, 2015), researchers have begun to uncover shifts in frequency and motivations for social media use by publics during crises and disasters. As disasters unfold, people may turn to the immediacy and community interaction of social media to gain real-time updates, connect on a human level with others, cope with trauma through shared humor, or gather together to take collective action (e.g., Choudhary, Hendrix, Lee, & Lia, 2012; Procopio & Procopio, 2007; Starbird & Palen, 2011; Stephens & Malone, 2009). As people continue to turn to social platforms to fulfill crisis-related needs, and social media open up venues for crisis responses not only from organizations and traditional news media but also publics (Chewning, 2014; Liu & Fraustino, 2014; Fraustino & Kennedy, under review), it is important for research to determine what effects these media may have on users' responses.

Yet, as Liu and Fraustino (2014) explained, research on crisis communication has not yet caught up with the opportunities social media provide for organizations and publics. They grouped existing crisis communication theory into three conceptual categories: (1) image-making theories, which revolve around how organizations can build and repair reputations; (2) complexity-understanding theories, which revolve around how organizations and publics can make sense of adverse events; and (3) resilience-generating theories, which revolve around how organizations and publics can survive and learn from crises. They argued that these theories have not yet been

fully tested for possible adaptions based on the rise of social media, as most were generated prior to the online age or were based on other theories created prior to technological advancements. Further, existing crisis communication theories made explicitly with social media in mind (e.g., SMCC model, NCC model) remain new and as such are still lacking sufficient empirical evidence. More research, such as the research presented here, is needed to expand knowledge in these areas.

Despite the lag between theory development and incorporation of the changing social mediated communication environment, burgeoning research is beginning to show that the source through which crisis or disaster information is conveyed itself can impact the way people process, feel about, think about, and act upon messages, both those traditionally as well as digitally/socially presented (e.g., Austin et al., 2012; Schultz et al., 2011; Liu, Austin, & Jin, 2011; Liu, Jin, & Austin, 2013). However, this mounting evidence is nevertheless minimal, sometimes conflicting, and has yet to provide a set of findings that can allow confident explanations and predictions. And, despite rapid increases in consumption of picture- and video-based social media platforms, especially for crisis information retrieval and dissemination by organizations and publics, there is scant scholarship to shed light on the effects visuals may have on the way people process, feel about, think about, and act upon crisis messages (e.g., Coombs & Holladay, 2011; Fraustino, 2014). These assertions are fleshed out further with additional supporting literature in subsequent sections of this review. First, though, understanding communication surrounding public relations, management, and publics is essential to the foundations of this work.

Public Relations, Management, and Publics

Crisis communication and management research that builds theory and enhances practical understanding of the flow of crisis information, especially on social media, is important for understanding the new crisis communication landscape. However, a large portion of research in this area is built on case study methodology, particularly focusing on how single organizations (mis)manage crisis message strategy, with a goal of determining how organizations can experience the least amount of reputational harm (Heath, 2010). Crisis communication scholarship, especially in public relations, has yet to fully explore multivocal responses from diverse social actors, despite that these are main features of both social media as well as modern conceptions of public relations (Sommerfeldt, 2013). Social media have opened up opportunities for multiple crisis narratives not only from organizations and news media but also publics, communities, and individuals (Chewning, 2014). Yet, how and why audiences think, feel, and act surrounding crisis and disaster information has instead been subjugated under organization-oriented research that (a) has dominantly focused on outcomes such as organizational reputation, image, and perceived legitimacy concerns and (b) has yet to fully investigate and incorporate social media (Avery, et al., 2010; Chewning, 2014; Heath, 2010; Liu & Fraustino, 2014). In response, in addition to SMCC and NCC research, other scholars have recently focused on message-convergence frameworks for understanding how people seek and make sense of risk and crisis information from different forms (i.e., channels) and multiple, sometimes conflicting, sources (e.g., Anthony, Sellnow, & Millner, 2013).

As was noted in the previous chapter, crisis communication, although a distinct and interdisciplinary scholarly area, is often approached from public relations standpoints and is among the most popular areas of public relations scholarship (Sommerfeldt et al., 2013; Toth, 2010). Crises spur uncertainty (Heath, 2010; Palenchar, 2010) and can prompt a diverse host of organizational and individual repercussions ranging from reputational damage to legal action to personal injuries (Coombs, 2015). It makes sense, then, that scholars seek to find ways to ethically and effectively navigate such negative events through communication. But, as noted above, dominant crisis communication theories focus on organizational image and reputation concerns to the minimization of publics-oriented concerns (cf., Chewning, 2014; Heath, 2010; Liu & Fraustino, 2014). Perhaps this organizational orientation to crisis literature stems in part from the tradition of public relation's strategic management camp, which defines public relations as "a unique management function that helps an organization interact with the social and political components of its environment" in order to fulfill organizational goals (Grunig, Grunig, & Dozier, 2006, p. 55). In accordance with this perspective, early crisis research concerned itself with categorizing how audiences, stakeholders, and publics might react to various crisis types and organizational responses so that the organization could take control and frame the crisis story so as to best prevent tarnishing its image (e.g., Benoit, 1997). Such organization-focused perspectives may be considered crisis managerial-oriented perspectives (Fraustino & Liu, in press).

While scholars have sought to enrich understanding of the multifaceted roles of public relations beyond contributing to for-profit bottom lines, organizational

strategic management perspectives rooted in market-based concerns have made room for co-creational perspectives (Botan & Taylor, 2004). Co-creational perspectives view the function of public relations as facilitating shared meaning between organizations and publics (i.e., those who perceive a problem and combine efforts to address it – e.g., Grunig, Grunig, & Dozier, 2006) or even more broadly between organizations and audiences (i.e., message recipients). As an international group of respected public relations scholars put it, it is "important to stress that not only corporations, but also activist organizations and social and citizen movements, use strategic communication to reach their goals" (Hallahan, Holtzhausen, van Ruler, Verčič, & Sriramesh, 2007, p. 4). Accordingly, one contemporary definition of public relations places it as the meaning-making and relationship-building function by social actors (Sommerfeldt, 2013).

Given these ideas, publics- and audience-oriented approaches to crisis communication research can be considered those that focus on genuinely incorporating message receivers' thoughts, feelings, and behaviors into organizational decision-making and communication through various interpersonal and media strategies and tactics both inside and outside of organizations. That is, instead of organizations solely attempting to persuade in ways that reflect the image-related concerns of the organization above and beyond care for or impact on audiences, publics-oriented approaches respect the needs of the organization where relevant (including image-related needs) while at the same time considering the wellbeing and interests of those receiving crisis information. To be clear, audiences are any broad receivers of information, whereas publics are groups of individuals who recognize an

issue and gather to make changes related to that issue (Grunig et al., 2006; Rawlins, 2006) Managerial and audience/publics approaches are not mutually exclusive. Both audience- and publics-oriented approaches, however, are particularly relevant to understanding how to enhance individual and community resilience, which by definition necessitates concentration beyond immediate reputation-based organizational concerns.

Crisis and Disaster Resilience

As many have noted, resilience, when related to people and their environments, is a captivating metaphor drawn from physics and mathematics (e.g., Bonnano, 2004; Bonanno, Galea, Bucciarelli, & Vlahov, 2007; Holling, 1973; Norris et al., 2008). As Norris and colleagues (2008, p. 127) explained: "a resilient material, for example, bends and bounces back, rather than breaks, when it is stressed." In other words, from a natural sciences perspective, resilience has to do with how quickly material or matter reaches homeostasis. Scholars in social sciences, ecological sciences, and systems and disaster sociology have applied resilience notions to processes surrounding natural disasters (e.g., earthquakes, tsunamis, floods, famines, health epidemics) and person-made or technological disasters (e.g., terrorist attacks, chemical spills, explosions, industrial errors) in attempting to prepare for, respond to, and recover from such adverse events as quickly and with as little damage as possible (e.g., Boon, Cotrell, King, Stevenson, & Millar, 2012). This conceptualization of resilience has recently begun to be applied in communication research, such as in an organizational context (e.g., Buzzanell, 2010; Buzzanell, Shenoy, Remke, & Lucas, 2009) and, perhaps more directly relevant to the current

study, through the work of Houston and colleagues (2015b). The latter proposed a literature-based framework asserting the centrality of communication in disaster resilience, offering four components essential to resilience: communication systems and resources, community relationships, strategic communication processes, and community attributes. However, the concept of resilience as an outcome of crisis communication has yet to take firm root from a public relations perspective.

In disaster sociology, researchers have measured resiliency differently, often with differences attributable to examinations occurring at the individual, community, or ecological systems levels of measurement (Boon et al., 2012). Such researchers have brought to light two related components: (1) *recovery*, meaning how quickly and effectively people and organizations attain homeostasis (psychologically, physiologically, and socially) following a crisis – which in turn impacts community resilience; and (2) *sustainability*, meaning how capable and active people and organizations are to forge ahead in the midst of a crisis (Boon et al., 2012; Bonanno, 2004). Others have parsed out other individual-level resiliency and coping factors, such as perceived commitment, perceived control, self-efficacy, social support, and personal warmth and caring (Antonovsky, 1987; Norris et al., 2008; Cowen, Wyman, Work, & Iker, 1995). Individual-level resilience strongly contributes to social and community resilience (Bonanno, 2004; Norris et al., 2008), especially from an ecological systems perspective (e.g., Boon et al., 2012; Bronfenbrenner, 1989, 2005). As Boon and colleagues (2012) contended, this works both ways: "Community (social) resilience is clearly related to population and its stability. *As such, it is also linked to individual resilience*" (p. 387, emphasis in original).

Bonanno (2004) asserted that resilience includes individuals' abilities to support physical and psychological wellbeing in the face of adversity. Some have argued that resiliency must also encompass community aspects in addition to individual factors. Thus, others have asserted individual and community level definitions and indicators of resilience, such as Norris and colleagues' (2008, p. 133) contention that individuals demonstrate resilience when they adapt to adverse events while exhibiting: (a) no evidence of psychopathology; (b) engagement in healthy behaviors; (c) adherence to expected roles, including at work, school, and home; and (d) good quality of life. This view sees resilience much like its physics metaphor – the faster an individual assumes pre-crisis levels of functioning, the more he/she can be considered resilient.

Although not explicitly connected to resilience, these resilience-focused ideas align with part of Coombs' (2007, 2015) situational crisis communication theory's (SCCT), which is arguably public relations' most evoked crisis communication theory (An & Cheng, 2010; Liu & Fraustino, 2014). That is, SCCT's primary ethical guideline is to first and foremost protect stakeholders' wellbeing by providing instructing information, which helps them physically cope, and adjusting information, which helps them psychologically cope, when exposed to crises. Yet these important first steps are the least explicated and examined of the theory's constructs; the SCCT research record dominantly focuses on determining where attributions of responsibility fall and aligning appropriate organizational message strategies to mitigate reputational harm in the face of publics' blame attributions. A focus on resiliency might not only expand publics-oriented outcomes focused on individual

and community wellbeing as additions to the public relations research arsenal but also help inform underdeveloped portions of otherwise meaningful crisis theories such as SCCT and SMCC.

Given the background and definitions above, the following argument can be constructed thus far. Public relations is a strategic communication function that seeks to build mutually beneficial relationships. Accordingly, public relations scholars are a major source of crisis communication research, which makes sense, as crises and disasters disrupt expectations and strain or break relationships. Social media have opened up new opportunities for multivocal approaches to public relations and crisis communication (although not without critique, such as rumor and misinformation opportunities and lack of access to these tools for some). Yet crisis communication theory from public relations perspectives thus far has not fully incorporated social media, and it has dominantly focused on an organization's reputational concerns rather than individuals' and communities' resiliency and coping capabilities. Resilience has been examined outside of public relations from sociological and ecological perspectives, but public relations is uniquely suited to tie together social media research, crisis communication research, and publics-oriented approaches to enhance knowledge about ethical and effective communication that promotes and facilitates resiliency. With the groundwork for these ideas established, this work can now move on to reviewing literature related to the theories, models, and variables of interest herein.

Key Theoretical Frameworks and Variables

Having set baseline definitions and situated this work broadly in the arena of crisis communication, public relations, social/digital media, and resilience, it is next essential to outline the theoretical frameworks guiding the construction of this research. As noted in the first chapter, the social-mediated crisis communication model (SMCC) is the primary theoretical lens. SMCC literature will be supplemented by examinations of the limited capacity model of motivated mediated message processing (LC4MP), which in some instances provides greater predictive power and can theoretically contribute adaptations to the SMCC in the realm of crisis message content effects. These perspectives will be followed up with reviews of literature relevant to the independent variables (i.e., crisis information source and crisis visuals) and dependent variables (i.e., various cognitive, affective, and behavioral responses to crisis information that are potentially relevant to resiliency as conceived of above) that are of interest to this work.

Social-mediated Crisis Communication (SMCC) Model

The primary lens for this work is the SMCC model, which is one of the first and is perhaps the most comprehensive theoretical framework to explain the interactions between an organization, key publics, social media, traditional media, online word-of-mouth, and offline word-of-mouth communication surrounding crises (Austin et al., 2012; Jin & Liu, 2010; Jin et al., 2014; Liu et al., 2011; Liu et al., 2013; Liu et al., 2015a; Liu et al., 2015b; Liu, Jin, Austin, & Janoske, 2012; Liu, Jin, Briones, & Kuch, 2012). The model gives guidance to organizations conducting crisis and issues management in an evolving multi-media environment. Integrating social

media, traditional media, and word-of-mouth communication, it depicts crisis communication flow among organizations, various media, and publics. This model is especially relevant as Internet, digital media, and social media consumption rises (Duggan & Smith, 2013; Perrin, 2015), scholars implore for stronger theory development in crisis and social media research (An & Cheng, 2010; Avery et al., 2010; Kent, 2010; Liu & Fraustino, 2014), and researchers question the ability of traditional mass media theory to adequately explain and predict today's increasingly complex media environment (Austin, Fraustino, Jin, & Liu, in press; Chaffee & Metzger, 2001).

As was noted in Chapter 1, other theoretical frameworks are available for researching the effects of crisis information source and message content elements. For example, the networked crisis communication (NCC) model (e.g., Utz et al., 2013), information communication technology (ICT) succession theory (e.g., Stephens, 2007), and situational crisis communication theory (SCCT) (e.g., Coombs, 2007, 2015) are relevant popular or emerging theories that attend to some of the variables of interest to this work. However, SMCC is the most appropriate existing framework for current purposes. SMCC gives the most comprehensive examination of the various organizations and publics who communicate to and with each other surrounding crises, accounting for myriad communication features that impact information flow and responses. Further, it is the framework most open to including publics-oriented resilience-based outcomes to organizational and community crisis communication (as opposed to monetary and reputational managerial-oriented concerns), as is a goal of this research. As noted earlier, while organizational reputation- and money-based

concerns are valid, a focus on these outcomes to the exclusion or minimization of public-wellbeing-based outcomes such as resilience is a weakness of the public relations crisis communication literature (Heath, 2010; Liu & Fraustino, 2014).

Specifically, the SMCC model puts forth two parts designed to explain and/or predict (1) how publics seek, create, and/or distribute crisis information, and how a variety of form, source, and message factors impact that information seeking, creating, and distribution; and (2) how the organization experiencing a crisis can use knowledge from the first step to respond effectively to publics (e.g., Liu, Jin, Austin, & Janoske, 2012). The model's first part contends that, in addition to the organization and traditional news media, three key publics provide crisis information to others: (a) *influential social media content creators*, who use social media to communicate crisis information; (b) *social media followers*, who gather and post creators' crisis information content online, sharing it with others both online and offline; and (c) *social media inactives*, who acquire crisis information from traditional media and also by communicating via word-of-mouth with both the social media content creators and followers. These three publics may seek and/or share crisis information with/from their own members, other publics, organizations, and various media outlets. This description of the recursive interplay among various sources of information provides insights for crisis communicators to identify and measure online influencers as part of regular environmental scanning before, during, and after crises (see Jin & Liu, 2010; Liu, Jin, Austin, & Janoske, 2012; Liu, Jin, Briones, & Kuch, 2012) and potentially to leverage social networks to contribute to crisis communication efforts.

The SMCC model, based on the initial blog-mediated crisis communication model (Jin & Liu, 2010), is a burgeoning theory, with slightly more than five years having passed since its inception in the published scholarly literature. Yet, despite the SMCC model's infancy, work has posited, tested, and extended several relevant constructs or drawn upon them (e.g., Austin et al., 2012; Freberg, Saling, Vidoloff, & Eosco, 2013; Houston et al., 2015a; Jin & Liu, 2010; Jin et al. 2014; Liu et al., 2015a; Liu et al., 2015b; Liu, Jin, Austin, & Janoske, 2012; Liu, Jin, Briones, & Kuch, 2012; Pang, Hassan, & Chong, 2014; Wan, Koh, Ong, & Pang, 2015; Xiao, Huang, & Wu, 2015). As Liu, Jin, Austin, and Janoske (2012, p. 261) summarized, early in the model's development, research pointed to five areas posited to impact the flow of information among organizations, media outlets, and publics: (1) *crisis origin* (i.e., who/what caused the crisis – internal vs. external), (2) *crisis type* (i.e., how the crisis took form and the related extent of perceived organizational blameworthiness), (3) *organizational infrastructure* (i.e., the extent to which organization-wide response is warranted – centralized vs. localized), (4) *crisis message strategy* (i.e., crisis communication content), and (5) *crisis message form* (i.e., the communication channel used to distribute the message – social media, traditional media, or WOM). Since then, scholarship has emerged to flesh out and provide empirical evidence for this list, some of which will be briefly overviewed next and others of which will be reviewed in literature related to crisis information source in a subsequent section.

Broadly, examinations of SMCC constructs in the published and presented scholarship to date have focused on how information form (i.e., channel or medium), source (i.e., the entity distributing the message), message characteristics (e.g.,

message frames, message strategy elements), and information context impact a variety of cognitive, affective, and intended behavioral responses (Austin et al., 2012; Jin & Liu, 2010; Jin et al., 2014; Liu, Austin, & Jin, 2011; Liu, Jin, & Austin, 2013; Liu et al., 2015a; Liu et al., 2015b). SMCC studies have been conceptual and theoretical (e.g., Liu et al., 2012) as well as empirical, with the latter usually implementing quantitative experiments (e.g., Jin et al., in press; Liu et al., 2015a; Liu et al., 2015b), qualitative interviews (e.g., Liu, Jin, Briones, & Janoske, 2012), or mixes of the two. This body of scholarship as a whole has investigated crisis information flow in the context of for-profit organizations, non-profit organizations, and government and has examined how crisis information form, information source, crisis type, and past experiences with a similar crisis can impact publics-oriented outcomes such as reported involvement in the situation, perceived information credibility, perceived information complexity, myriad discrete crisis-related emotions, and intentions to take a variety of protective actions, in addition to perhaps more organization-oriented outcomes such as attributions of crisis responsibility (e.g., Austin et al., 2012; Jin et al., 2014; Liu et al., 2011; Liu et al., 2013).

In general, SMCC model studies' results have highlighted the takeaway that no particular form or source consistently outperforms others in terms of generating positive responses for the organization, individual, or community. However, nuanced statistically significant differences among some outcome variables in relation to some predictor variables have inconsistently emerged in SMCC and related crisis research (e.g., Fraustino et al., 2014; Jin et al., 2014; Liu et al., 2013; Liu et al., 2015a; Liu et al., 2015b). For example, in an SMCC-based experiment, participants who received

initial hypothetical crisis information about either a manmade or a natural disaster via a Facebook post reported higher levels of anger than did those who received the information via Twitter or a website post (Liu et al., 2015b). Other work tangential to SMCC has begun to find effects of form and source on the public's responses to corporate-based crises as well. For example, another experiment's participants blamed the organization for a hypothetical product failure crisis less when they received the same crisis messages via social media as opposed to traditional media (Schultz, Utz, & Göritz, 2011). Related to source in particular, a variable of interest to the current work, as Liu, Fraustino, and Jin (2015a) pointed out, in their SMCC model experiment, they found "significant main effects of disaster information form and source, but no single form and source combination consistently predicted behavioral intentions" (p. 44).

Such sparse and inconclusive findings point to the importance of incorporating a richer understanding of the multiple communication possibilities and realities of the modern media landscape and the necessity for additional research to help paint a reliable picture that can confirm or disconfirm existing theory and provide confidence in scientific evidence-based guidelines to practitioners. This is particularly necessary in the realm of crisis resiliency, which has key implications for societal wellbeing; and it must include greater focus not only on forms and source of information but also on the impact of message content elements such as visuals. The LC4MP may provide theoretical grounding for exploration of the latter, discussed next; and further exploration of SMCC variables that are principally relevant to the current work will be revisited in subsequent sections.

Limited Capacity Model of Motivated Mediated Message Processing (LC4MP)

To explain and predict individuals' processing of and responses to media, Lang (1995, 2000) created the limited capacity model of motivated mediated message processing (LC4MP). The LC4MP explains and predicts receivers' restricted capabilities to cognitively process the mediated messages they actively engage with (e.g., Lang, 2000). With more than two decades of research building this model, a rich record of knowledge has assembled to support and refine its tenets (e.g., Lang, 1990, 1989, 1995, 2000, 2006; Lang, Bolls, Potter & Kawahara, 1999; Lang, Chung, Lee, Schwartz, & Shin, 2005; Lang, Dhillon, & Dong, 1995; Lang, Geiger, Strickwerda, & Sumner, 1993; Lang, Newhagen, & Reeves, 1996; Lang, Park, Sanders-Jackson, Wilson, & Wang, 2007; Lang, Potter, & Bolls, 1999; Lang, Sanders-Jackson, Wang, & Rubenking, 2013; Lang, Schwartz, Chung, & Lee, 2004; Lang, Chung, Lee, Schwartz, & Shin, 2005; Lang, Schwartz, Chung, & Lee, 2004; Lang, Zhou, Scwartz, Bolls, & Potter, 2000). LC4MP, as a general information-processing theory, provides an explanatory and predictive mechanism for how certain message characteristics facilitate or detract from knowledge outcomes (i.e., attending to, processing, storing, and retrieving information in the message) and, in turn, other cognitive and behavioral outcomes related to the message (e.g., attitudes and actions). The theory has predominantly been tested in television news and health communication contexts, but it is positioned to help fill gaps in crisis theory – particularly those discussed above relative to the SMCC model, which currently does not account for media and message content elements (e.g., visuals) and is more explanatory than predictive. Although LC4MP constructs primarily have been

examined in relation to television broadcasting and to a lesser extent online health messaging, research has begun to expand to reflect other online spheres, such as examining online bullying messages on Facebook (Alhabash, McAlister, Hagerstrom, Quilliam, Rifon, & Richards, 2013) or visuals within in-game social network advertising (Terlutter & Capella, 2013) and even in-game videogame advertising (Dardis, Schmierbach, Lee, Fraustino, Bellur, Brooks, & Johnson, 2015).

Rooted in cognitive psychology, the LC4MP conceptual framework is based on two assumptions: (1) people process information, which is to say that they "perceive stimuli, turn them into mental representations, do mental work on those representations, and reproduce them in the same or in an altered form" (Lang, 2000, p. 47); and (2) people do not have infinite resources, or in other words they have "limited capacity," to do so. The model asserts there are three iterative sub-processes people engage when processing information: encoding, storage, and retrieval – with two related mechanisms: orienting behavior and resource allocation. That is, what message recipients take away (e.g., remember) from viewing a message is based on how much of the message they encoded in the first place, how well they stored that encoded information, and ultimately how much of that stored material they are able to mentally retrieve.

These processing stages vary as a function of orienting to the message and allocating resources to it. People may orient their responses to both form and content message features. Indeed, research has shown that people do in fact orient to structural components of television, such as the cuts and movements of commercials or news broadcasts (e.g., Lang, 1992; Lang et al., 1999; Reeves et al., 1985).

Research also has shown that people can orient on the basis of content as well, particularly negative emotional content in video images (e.g., Lang et al., 1996; Lang et al., 1999), as will be explored further after delving deeper into what is meant by "cognitive resources."

The LC4MP is sophisticated and practical in its explanation of cognitive resources, especially pertaining to mediated messages with multiple cues. It builds on the stance that humans are "cognitive misers" (Fiske & Taylor, 2013), asserting that in general people only exert cognitive effort where necessary, seeking mental shortcuts and ways to save their resources. These cognitive resources can be thought of in terms of (a) total resources, (b) allocated resources, (c) required resources, (d) remaining resources, and (e) available resources (Lang, 1995, 2000; Lang, Chung, Lee, & Zhao, 2005). Total resources are all resources possibly able to be drawn from, whereas allocated resources are those actually applied to a particular cognitive processing task. Required resources are the necessary amount for the particular processing task. Subtracting required resources from total resources yields the remaining resources; and, likewise, subtracting required resources from allocated resources yields the available resources (these latter two calculations might produce the same result, but it is unlikely so due to cognitive miserliness). Although people reserve their cognitive resources, they will exert more effort where necessary. For example, research consistently has demonstrated that people exert greater effort to attend to television in comparison to plain text (e.g., Lang, 2000; Lang et al., 1995). And the LC4MP suggests that when messages elicit emotion, that emotional

experience prompts the message receiver to allocate cognitive resources to encoding and storage (Lang, 2000).

It is worth noting here that encoding, storage, and retrieval refer to more than simple "recording" of the message. That is, these processes are more than simply creating a memory of the message itself. These processes include manipulating cognitive constructs such as attitudes and behavioral intentions in response to the message. That is, all cognitive processes (not just seeing and remembering a mediated message) have a limited capacity, and thus any mental processes related (or unrelated) to using the message information to form or change attitudes and plan behavior will be affected by the amount of information in the message and the degree to which the message requires cognitive resources simply to view and understand the message. Therefore, formal and affective features of a crisis message can impact its efficacy for mobilizing responses, including those essential for resiliency.

Related to this processing effort, the LC4MP has hypothesized and demonstrated that mental tasks rest on a continuum ranging from automatic processes (which require little effort) to controlled processes (which require allocating cognitive resources). LC4MP researchers have confirmed that visual information, primarily from broadcast television messages, is dominantly automatically processed, whereas the audio components of such messages are constrained by resources through controlled processing. Adding visual components such as increased pace, which can be achieved, for example, by increasing the number of editing cuts or movements in a visual (e.g., Lang et al., 1999), can enhance a viewer’s orienting to the message and thus encoding of both audio and visual components (note that encoding can be

measured by subsequent recognition of the message, such as through multiple choice questions).

Adding greater orienting visual features alone is unlikely to overload the processing system and may even serve to increase recognition, though, as visuals are relatively automatically processed (Lang et al., 1999). Taken at face value, this might lead to the assumption that the addition of visual cues to online crisis information could lead to audiences better orienting to, encoding, and thus recognizing or recalling crisis messages. Yet, important for crisis communicators but not fully tapped by the literature, increasing structural features such as visual pacing—along with arousal—*does* contribute to overload. In a setting such as a crisis, the level of arousal produced by the message is likely to be inherently moderate by nature, and visuals of an extreme event such as a devastating flood may solidify or increase arousal. Thus, in a crisis setting, increased orienting cues such as greater pace of visual cuts/edits might decrease message recognition in ways that the same types of visual cues would not in a neutral or positive context. This idea has both theoretical implications for SMCC and LC4MP and practical implications for crisis communicators creating or sharing videos, podcasts, and radio spots to reach audiences with potentially lifesaving crisis information. That is, although research shows that individuals may pay greater attention to visual and audio cues as well as emotional content, under some circumstances these features may result in reduced memory of parts of the messages (Lang, Bolls, Potter, & Kawahara, 1999; Lang, Dhillon, & Dong, 1995). And this corroborates related assertions from risk and health scholars, such as the notion that when individuals experience stress, as when exposed

to a probable or manifested risk, their ability to process and remember risk-related messages is substantially reduced (Covello, 2010). Exploring this further is important for shedding light on visual crisis communication online.

To reiterate and flesh this out further: Lang et al. (1999) found, in accordance with the LC4MP theory, that moderate pacing[1] alone is not likely to induce cognitive overload. That is, moderate pacing alone merely increased resource allocation to messages through use of automatic processing in addition to controlled processing. Yet, when moderate pacing was paired with an arousing message, message recipients experienced a limitation of resources for encoding the message, and therefore message recognition decreased. In prior research thus far, arousal has been manipulated by choosing stimuli from existing broadcast archives, and coders rated the content's arousal levels; researchers then chose from those existing broadcast clips those rated low, medium, or high in arousal as needed. In the current work, (a) using a message scenario related to a naturally arousing event, an extreme flooding disaster crisis-type, coupled with (b) creating professional videos to precisely and consistently manipulate levels of pacing and types of visuals while keeping audio content constant across treatments can begin to fill gaps in prior research and produce meaningful results for crisis theory and practice. Of course, more details about these ideas' impact on the current experiment's design will be handled in the next chapter.

[1] In prior research, pacing has been operationalized as the frequency of scene changes or cuts in a message (e.g., Hibbs, Bolls, & Lang, 1995; Lang et al., 1999). For a specific example, Lang et al. (1999) created pace levels such that for each 30-second video message, slow-paced messages had 0-1 changes, medium-paced messages had 4-6 changes, and fast messages had 11 or more changes. This will be revisited in Chapter 3: Methods.

Yet, research has yet to determine whether videos of still photos will produce differing levels of message recognition than will moving videos of the same event, particularly in a disaster or crisis setting. Tenets of LC4MP as outlined above provide theoretical justification for why still and moving images will be processed differently (i.e., moving images entail fluctuating visual information, and motion itself is an orienting cue, therefore moving images hold the potential to both trigger allocation and to require additional resources for processing—and even more so for arousing content such as crisis news). Hence, the current work bridges the minimal crisis communication research on visuals thus far, which have primarily examined still photos in isolation, with the LC4MP and related television research that has examined moving video from television commercials and broadcasts. It is important for research to determine scientifically where the optimal level of orienting-inducing visual cues rests, wherein viewers maximally orient to the material but before they enter into cognitive overload and therefore can devote fewer resources to fully encoding (and thus recognizing, recalling, and acting on) messages. That is, without adequately encoding, processing, and storing messages, people's attitudes and behavioral intentions are likely to be less impacted by the messages. So, especially in a crisis setting where thinking, feeling, and acting in ways that promote safety for oneself and others is crucial for recovery, crisis research and theory should illuminate the processes that will optimally gain message recipients' attention without overtaxing their resources. Further, this line of research needs to be expanded to account for the crucial roles digital and social media (e.g., online video seeking/sharing, online picture seeking/sharing) play during crises, to supplement

knowledge about newspapers and television broadcasts that have been the past subjects of most previous studies testing LC4MP hypotheses.

In overview, the LC4MP research record poses stark implications for the public relations crisis communication in a visual-based media environment. Existing crisis communication theory does not fully account for the changing media landscape and is particularly silent on the effects of visuals, especially various levels of moving visuals, on individuals' responses to crisis messages. The LC4MP suggests that people may allocate processing differently on the basis of both form and content, such as visual and audio cues as well as negative or emotional messages, the latter of which is likely apparent in most breaking crisis information. Thus, research manipulating visual cues, such as is the case with the current work, provides insights into the threshold at which crisis message receivers no longer have enough resources to fully allocate processing at the encoding stage – and therefore will demonstrate lower ability to recognize the message content. Audiences not recognizing or recalling content such as what preventative or protective actions to take, or where to seek and share crisis updates, could have pervasive ramifications for individual and community wellbeing.

With main theoretical underpinnings (i.e., SMCC model, LC4MP) now addressed, expanding on literature in relation to this work's examined variables, and the related hypotheses and research questions stemming from that literature, is now possible.

Impact of Crisis Information Source

As noted previously, research shows that the form (i.e., the channel through which a message is conveyed) and the source (i.e., the entity distributing a message) of a crisis message can play important roles in publics' responses to the organization and the crisis. Indeed, the SMCC model posits form and source are two key factors that influence publics' acceptance of organizational crisis messages and a variety of other outcomes such as likelihood to seek additional information from organizational, traditional and social media, and interpersonal forms and sources (e.g., Liu, Jin, Austin, & Janoske, 2012). As such, recent research has begun to probe these ideas further, but as a new area, the research record shows mixed results.

Crisis information form and source are often examined together, rarely demonstrating individual main effects but sometimes exhibiting joint impact on various outcomes. However, Austin et al. (2012) used a mixed method approach to examine publics' use of social media, traditional media, and word-of-mouth communication for crisis information seeking and sharing. The team conducted in-depth interviews with 22 college students and leveraged interview results to construct a 3 (form: social media vs. traditional media vs. word-of-mouth) x 2 (source: third-party vs. organization) within-subjects factorial design online experiment with a sample of 162 college students. They implemented the SMCC model as a theoretical lens through which to investigate publics' communication during crises and factors impacting that communication. Amidst myriad findings, source emerged as an important factor in participants' message acceptance, such that in some cases third-party sources were evaluated more positively than organizational sources. Form also

emerged as a causal factor contributing to varying participant responses to the crisis information. For example, related to information seeking, participants who received crisis information via social media were more likely to report intentions to seek additional crisis information via word-of-mouth than were those who received the same crisis information via traditional media.

Similarly, Liu, Fraustino, and Jin (2015b) conducted a 3 x 4 x 2 (source x form x disaster type) experiment with a sample of college students. For information *sources*, they looked at local or national government versus local or national news media; for information *forms*, they tested social media (Facebook and Twitter) versus traditional media (static website post. They found that the sources and forms from which student participants in the experiment received hypothetical crisis information in some circumstances impacted their crisis-related emotions, perceived credibility of information, and likelihood to take some recommended actions.

The first SMCC study to examine publics' likelihood to take protective actions, that work (i.e., Liu et al., 2015b) also found participants were more likely to evacuate the area as instructed by government officials when they received crisis information from a Facebook post rather than a Tweet, although no significant differences in behavioral intentions emerged related solely to the information source. Importantly, their data also revealed that females across the board were more likely than males to intend to take each of five protective actions were they to find themselves in a similar disaster, underscoring the importance of considering demographic variables such as biological sex and/or gender as predictors of potentially lifesaving behaviors publics might (or might not) take as a result to crisis information exposure (cf., Jin et al.,

2016)—an idea that will be discussed at greater length in the section biological sex below.

Additional research is beginning to emerge to support claims that the form and message content features used for crisis communication can affect its impact, including among non-U.S. samples. In testing the networked crisis communication (NCC) model—an alternate model to the SMCC that focuses more exclusively on organizational communication and organization-centric outcomes as briefly mentioned in earlier—Shultz, Utz, and Göritz (2011) conducted a 3 x 3 factorial design online experiment using a panel sample of 1,677 adults in Germany. The experiment manipulated form (newspaper vs. blog vs. Twitter) and message (information vs. apology strategy vs. sympathy strategy) related to a fictional luxury brand automotive recall crisis. Their work sought to uncover whether form and message variables affected organizational reputation, secondary crisis communication (e.g., posting or sharing a message), and secondary crisis reactions/ communication (e.g., reputation assessments and behavioral intentions such as to boycott or protest). Analysis revealed that crisis information form had a direct effect on all three outcome variables, while message strategy had a direct effect only on secondary crisis reactions. In that experiment as well as a similar one building on the NCC model in the context of the Fukushima Daiichi nuclear disaster (Utz, Schultz, & Glocka, 2013), participants blamed the organization for the crisis less when they received the crisis messages via social media as opposed to traditional media. However, this model has not yet proposed, incorporated, or tested publics-oriented outcomes such as resilience-related responses such as emotional or physical coping (cf. conative coping

or cognitive coping, respectively; Jin, 2007; Jin et al., 2016; Jin, Pang, & Cameron, 2012) or likelihood to take actions to protect oneself or others. Further, it has not examined whether the information source alone could result in differing outcomes regardless of message consistency across treatments. Instead, it has focused dominantly on organizational messaging producing differing audience responses as a result of medium/form or other content, again with outcomes related to potential ramifications for the business. Although this research stream is fruitful and provides valuable insights, it is not as suited to the current work's mission as is the SMCC and a publics-oriented approach.

However, some research from public relations perspectives on crisis and risk communication message source has begun to include examinations of crisis communication's resilience-related outcomes such as likelihood to take protective actions. For instance, Freberg (2012) conducted a national sample experiment using the context of a hypothetical food contamination crisis. She found source exerted a main effect on publics' likelihood to comply with recommended protective actions. Specifically, for instance, participants who received the crisis information from an organizational source, in this case the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services, reported significantly stronger intentions to take protective actions than did those who received the crisis information from a user-generated source, in this case a blog post shared on Facebook. Freberg (2012) also found significant differences in intended behavioral responses based on participants' gender, similar to Liu et al., (2005a) and Jin et al. (2016) referenced above.

In sum, in crisis and disaster contexts there are wide and varied main and interaction effects of information source, form, and content elements (usually message strategy) on several cognitive, affective, and behavioral outcomes evident in the literature. However, much of these examinations focus on the form manipulation to the minimization of examinations of source, perhaps as a result of managerial-oriented rather than publics-oriented perspectives taken by much of crisis communication research. And despite recent concerted efforts at building the SMCC and NCC models, there is not yet enough research to construct a full and coherent narrative or to make confident predictions. More research such as what the current work undertakes is needed to explain and predict publics' responses to crisis information – perhaps particularly focusing on thoughts, feelings, and behaviors that will enhance individual and societal resilience.

Impact of Crisis Visuals

Whereas there is burgeoning literature in the areas of information source and form, scholarship in crisis communication and management and social media has remained notably quiet on the possible impacts of crisis visuals. Coombs and Holladay (2011) claimed that as "organizations increasingly move to web-based information and other online media, they should consider the effects of visuals" (p. 119). Online visual media use is consistently and rapidly on the rise (DeBroff, 2015; Duggan & Smith, 2013), especially during crises and disasters. Although media scholars have long examined visual effects, often from journalistic standpoints, crisis scholars have yet to incorporate an understanding of visuals into social-mediated crisis communication theories and models such as NCC or SMCC from a public

relations standpoint, except for a yet unpublished refereed conference paper (Fraustino, 2014) – and with minimal exceptions for individual studies that are exploratory and not experimental so cannot make causal or claims (e.g., Guidry et al., in press; Westerman, 2014) and/or do not account for new or social media (e.g., Lachlan et al., 2010).

A notable exception to the dearth of literature on visuals in crisis management scholarship, Coombs and Holladay (2011) conducted an experiment manipulating crisis visuals (no visual, neutral visual, and victim visual) in the context of two organizational product harm crises. They found minimal effects of visuals on participants' attributions of responsibility for the crisis to the organization and their crisis-blame-related emotions. However, this research was conducted based on for-profit, product-producing organizations as opposed to not-for-profit or government institutions. Further, this research looked at organizational outcomes rather than publics-based, resilience-generating outcomes such as taking crisis-related protective actions or engaging in physical or emotional coping. It could be that visuals' effects are present on varying outcomes (e.g., taking protective actions, coping) and in varying scenarios (e.g., a natural disaster rather than an organizational crisis) not examined in Coombs and Holladay's (2011) work.

Indeed, to that end, Fraustino (2014) conducted an experiment with a sample of 590 university students with the intention to probe some resilience-related outcomes. The experiment manipulated crisis information source (news media vs. organization), crisis information form (social media/Twitter vs. social media/Facebook vs. traditional media) and crisis visual (crisis photo vs. no crisis

photo) in the context of a university game day riot with possible gunshots fired. The research used the SMCC model to explore the effects of form, source, and visuals on participants' cognitive responses (perceived information credibility, perceived crisis severity, and perceived information complexity), affective responses (five discrete negative crisis-related emotions), and behavioral responses (seven protective actions). Analysis revealed that despite younger adults' reputations as digital natives who grew up with Internet access and new technology, participants deemed the traditional media form as more credible than either of the social media forms for the same crisis information. Interestingly, results also revealed that those exposed to the crisis information containing a crisis visual rated the information as significantly less credible than information without a crisis visual. The researcher did not probe this effect or its underlying mechanisms; given the lack of explanation, replicating this finding is particularly important. If it is indeed the case that inclusion of crisis visuals in some instances may reduce perceived credibility of the information, this has ramifications for crisis communicators seeking to aid publics' wellbeing surrounding adverse events.

Certainly, visuals have been found in communication research to impact media viewers' message reception in an array of ways, such as priming stereotyping (e.g., Abraham & Appiah, 2006) or learning from news stories (e.g., Graber, 1990). Also, photographs have been demonstrated to draw viewers' attention to news articles and story content (Zillmann, Knobloch, & Yu, 2001). And inclusion of photographs in press and television news stories has also been linked to viewers' perceptions about the severity of the related issue (Gibson & Zillmann, 1999) as well as to episodic

framing that can influence perceptions of responsibility for the issue (Iyengar, 1991). Visuals now accompany crisis messages perhaps even more often than in decades prior, particularly in social media where there exist entire platforms dedicated solely to pictures and visuals (e.g., Flickr, Pinterest, Vine, YouTube). Thus, it is highly plausible that inclusion of a crisis visual(s) could impact viewers' responses to crisis messages. This area needs research to inform crisis theory and practice – it is no doubt part of the "bleeding edge" to which Coombs referred (2014), as theory has not caught up with practice. Crisis visuals abound, and people seek, share, and respond to them; we need empirical, systematic investigations to determine how and to what effects.

Further, as Liu, Fraustino, and Jin (2015b) put it, "a primary limitation of crisis communication scholarship is the lack of well-developed and well-tested outcomes beyond attribution of responsibility" (p. 16). Investigating additional outcomes, especially those potentially related to resiliency, is needed. Turning now to some such cognitive, affective, and behavioral responses to crisis communication outside of those that could possibly hurt a business' or organization's reputation or bottom line, and instead could help individuals and communities prepare for and recover from disaster events, is warranted.

Cognitive Responses to Crisis Information

As noted above, there are a variety of ways people cognitively respond to messages. There are several types of responses that can be of particular value to this work, those being: perceived credibility of the information, perceived severity of the disaster, perceived complexity of the information, perceived involvement with the

disaster information, and self-efficacy to take positive steps to address the crisis. Literature surrounding these crisis outcomes will be summarized next.

Credibility. News consumption via online and digital media is on the rise across America, with 88% of millennials in particular now reporting they obtain news from Facebook (American Press Institute, 2015; Mitchell, 2014). However, although research has found in some cases readers generally deem some online media such as blogs credible (Johnson & Kaye, 2004; 2009), research has found that other online media such as microblogs (e.g., Twitter) might not enjoy the same high credibility perceptions. For example, Schmierbach and Oeldorf-Hirsch (2012) conducted two experiments that collectively showed that, in the context of a healthcare issue and wind-power issue respectively, student participants judged stories posted on Twitter as less credible than when the stories were posted on a national newspaper website or traditional blog. Similarly, Austin et al. (2012) found interview participants deemed crisis information from traditional media more credible than from social media. And this corroborates industry research showing traditional media, TV in particular, still constitute the most trustworthy news information forms (Shearman, 2014). Accordingly, Fraustino (2014) found experiment participants rated crisis information from traditional media as more credible than either of two social media forms—and that they also rated information without a crisis visual as more credible than the same information with a crisis visual, as will be presented with a hypothesis below.

Similarly, credibility perceptions of sources vary. Despite government in general receiving a decreasing trust assessment by the U.S. public, according to Edelman's 2013 Annual Trust Barometer survey, Anthony, Sellnow, and Millner

(2013) found in focus groups with U.S. adults discussing food contamination, overall governmental regulatory agencies such as the Centers for Disease Control and Prevention (CDC) and the FDA were considered credible sources of information. However, some participants in Anthony et al.'s (2013) research did express strong unlikelihood to trust information from any federal government sources. While some researchers have found that government agencies are the most preferred sources of credible disaster information (e.g., Wogalter, 2006), others have found that publics believe official sources are slower, more outdated, and less accurate than other unofficial sources (e.g., Palen, Vieweg, Liu, & Hughes, 2009), while still others have found no main effects of source on perceptions of crisis information credibility (e.g., Liu et al., 2015b). Overall, if publics deem crisis information as more (or less) credible, their tendencies to engage in protective actions, seek and share additional crisis information, develop attributions of responsibility, feel a sense of urgency, and engage in a variety of other crisis responses may be impacted (Coombs, 2015; Liu et al., 2011; Schultz et al., 2011; Stevens et al., 2013). Thus, more information that can build toward a consistent record to make sense of the varied and at times conflicting findings regarding information credibility in extant literature will help crisis communication theory and practice.

Severity and Complexity. In addition to information credibility, there are other cognitive responses to information acquisition about which the SMCC model could enhance understanding. Namely, it is important to know whether information source or content elements (such as inclusion of visuals) differently impact how message recipients' perceive the disaster's severity—a certain amount of severity is

needed in order to prompt protective action taking in some instances (Covello, 2010)—as well as how complex they think the disaster information is, or how well they comprehend it (Liu et al., 2015b). In fact, perceived (and actual) disaster severity and ability to understand information and instructions is related to individuals' capabilities to quickly recover from adverse events (e.g., Norris et al., 2008). All of these outcomes could presumably influence individuals' likelihoods to engage within the groups of the publics the SMCC model delineates, participate in continued information sharing flows, and/or take communicative or behavioral actions about the disaster. Further, perceived severity of a risk or disaster is linked to publics' likelihood to take preventative or protective actions (e.g., Riad, Norris, & Ruback, 1999; Smith, 2013). Although testing all of these ideas is beyond the scope of the current work, building evidence about how information source and message content elements impact publics' cognitions, such as those related to severity and comprehension, surrounding disaster information is an important first step.

Involvement. In addition, the situational theory of publics (STP) (Aldoory, Kim, & Tindall, 2010; Grunig, Grunig, & Dozer, 2006; Grunig, 1997; Lee, Oshita, Oh, & Hove, 2014) hints at a couple of other cognitive outcomes of possible interest to disaster resiliency. The STP posits that organizations may in some circumstances more effectively segment and prioritize publics based on situational rather than enduring characteristics (or at least use a mixture of both). Although an examination of this theory is beyond the scope of this work, a related variable particularly relevant to crisis outcomes is *level of involvement*, or the extent to which people associate themselves with the problem. Involvement in a current or even a prior crisis situation

can impact a person's (1) crisis information seeking and (2) crisis information processing behaviors in relation to an evolving crisis (e.g., Jin et al., 2016; Liu et al., 2015a). Involvement is essential to better understand, as a large body of work in communication, particularly in health and advertising persuasion, has demonstrated that publics' involvement with an issue impacts their likelihood to scrutinize an issue-related message, be persuaded by the source or content of the message, remember the message, seek and share more information about the issue, or take actions related to the issue (e.g., Flora & Maibach, 1990; Liu et al., 2015a; Millar & Millar, 2000; Petty & Cacioppo, 1979; Quintero, Harrison, & Quick, 2013). Likewise involvement is, and has recently been posited as, an important consideration in a disaster context in particular (e.g., Claeys & Cauberghe, 2014; Fraustino, 2014; Liu et al., 2015a).

Self-efficacy. Finally, somewhat similar to the STP's *constraint recognition* variable, self-efficacy is also of great interest to risk and crisis scholars. Specifically, self-efficacy, with roots in Bandura's (1977) cognitive and behavioral psychology work, refers to an individual's belief in his/her abilities to engage in behaviors that would result in particular goal attainments. That is, in the context of risk related to HIV, a major area of study for this concept in risk and health communication, self-efficacy could refer to an individual's belief in the capability to use condoms during sexual activity for effective HIV protection and prevention (e.g., Bandura, 1990; Bowleg, Belgrave, & Reisen, 2000). In the context of crises, then, self-efficacy could refer to individuals' perceptions of their abilities to contribute to and impact disaster recovery, for example.

Self-efficacy has been studied from various angles in crisis, emergency, disaster, and risk research (e.g., Frisby, D. Sellnow, Lane, Veil, & T. Sellnow, 2013; Guastello, 2010; Höfler, 2014; Lo, Wei, & Su, 2013; Norris, Stevens, B. Pfefferbaum, Wyche, & R. Pfefferbaum, 2008; Plant, van Schaik, Sliwka, Boscardin, & O'Sullivan, 2011). In early research about self-efficacy from the social learning theory perspective, which has been adopted by many crisis and disaster scholars, Bandura and Adams (1977) proposed that people's perceptions of self-efficacy affects "how much effort they expend, and how long they will persist in the face of obstacles and aversive experiences" (p. 288). Frisby et al. (2013), for example, studied self-efficacy at the nexus of instructional communication and crisis communication theory to explore best practices for crisis communication and instruction. They defined efficacy perceptions as "those behavioral and cognitive abilities an individual believes they possess, and the conviction that these abilities can be successfully deployed to reach goals or complete tasks" (p. 253). Frisby et al.'s experimental study found that crisis communication is most effective at increasing self-efficacy in response to crisis when it delivers "logical explanations and specific actionable instructions" (p. 265).

In the realm of emergency response research, Guastello (2010) proposed that lower levels of self-efficacy likely leads individuals to "become disaffected, accept failure too easily, or find an easier goal" (p. 163), while higher perceived self-efficacy is more conducive to self-organization in response to emergencies, as well as prompting higher levels of perceived group-efficacy. In risk scholarship, perceived efficacy has been linked to the notion of resilience at the individual and community

levels (e.g., Höfler, 2014; Norris et al., 2008). Norris et al. (2008) compared self-efficacy (as an individual-level resilience resource) to collective-efficacy (as a source of community resilience), proposing that self-efficacy might be more influential for individuals in risk situations, but collective-efficacy at the community level has greater potential for community disaster preparedness. Further, coping self-efficacy has been found to produce positive outcomes for many, including vulnerable populations, in the wake of natural disasters (e.g., Benight & Bandura, 2004; Benight et al., 1997; Benight & Harper, 2002). Also essential to coping is emotion and affect, discussed next.

Affective Responses to Crisis Information

Just as there are a variety of ways communication researchers assess cognitive responses to information, similarly, there are a variety of ways communication scholarship investigates affect. In mass media, researchers have considered emotion as both a predictor and an outcome of a variety of mass communication processes, and they have examined such affective antecedents and outcomes as both discrete feelings as well as feelings that are mixed and exist along various continua (e.g., Doveling, von Scheve, & Konijin, 2010; Oliver, 2008). Emotions as they relate to crisis responses is not an area of inquiry new to the crisis literature, either (e.g., Choi & Lin, 2009; Jin, 2014; Zhao, Wang, Wei, & Liang, 2013). For example, researchers have investigated how emotions that Internet users display in online comments are related to those message recipients' likelihood to engage in organization-impacting behaviors (or, in NCC terms, secondary crisis behaviors), such as boycotting (Zhao et al., 2013). Others have investigated emotions to better understand how publics' online

displays of emotions may be associated with the process of attributing responsibility for a crisis to an organization (e.g., Choi & Lin, 2009). But these perspectives are again organization-centric. SMCC model research has begun to include investigations of publics' emotions. However, most investigations into publics' emotions from an SMCC perspective have generally been limited to enhancing understanding about how crisis origin (internal vs. external) impacts a variety of emotional responses (attribution-dependent vs. attribution-independent) (Austin et al., 2012), with limited exceptions (Jin et al., 2016).

However, emerging crisis research has aimed to more fully incorporate publics' affect into the crisis communication knowledge base (Jin, Pang, & Cameron, 2007; 2010). For example, the integrated crisis mapping (ICM) model asserts a desire to understand publics' "minds and hearts" (Jin et al., 2007, p. 266) surrounding crises. Briefly, the ICM model maps crises on two continua: (1) organizations' crisis engagement and (2) publics' coping strategies. Such strategies can be related to cognitive coping (e.g., seeking and sharing information to make sense of the crisis) and conative coping (e.g., taking actions to relieve crisis-related stress), with the latter being the generally most likely response (Jin & Hong, 2010; Jin et al., 2010; 2012). Research on the ICM model has demonstrated that that anger, fright, sadness, and anxiety are the primary emotions publics feel during crises—with anxiety serving as default emotion across crisis contexts, and anger, fright, and sadness dependent on the particular crisis type (Jin et al., 2016; Jin et al., 2012). Recently, Jin, Fraustino, and Liu (2016) found fright, anger, and anxiety were emotional predictors of how individuals sought and shared crisis communication from both organizational and

public sources in a manmade disaster context (i.e., hypothetical terrorist bombing attack).

Turning outside of crisis communication and public relations to the literature in traumatology and major disasters reveals that emotions play a key role in individuals' and relational networks' experience of and coping with traumatic losses. People experiencing catastrophic events often have negative experiences of anxiety and depression, which can lead to destructive behaviors such as substance abuse and violence; in turn, family members and support networks who have not experienced the trauma firsthand can grow fatigued with maintaining compassion and sensitivity, resulting in a trickle-down effect of sorts of negative emotions (e.g., Catherall, 2004, Figley, 2002; Walsh, 2007). Effectively managing both negative and positive emotions is one component of individual psychological resilience after disasters (e.g., Bonanno, Galea, Bucciarelli, & Vlahov, 2007), which can extend to community resilience. Thus, understanding how communication factors may contribute to or detract from crisis-related emotions, especially discrete emotions that have been posited as key players in coping for decades (e.g., Lazarus, 2001; Lazarus & Folkman, 1984) is important information for communicators choosing sources and message content elements for relaying crisis information.

Turning back to the literature on crisis communication and management in particular, affect is often viewed and measured as discrete emotions that people may feel as they experience a crisis or are exposed to crisis information (e.g., Fraustino, 2014; Jin, 2009, 2010; Jin & Pang, 2010; Jin, Pang, & Cameron, 2010, 2012; Kim & Cameron, 2011; Liu et al., 2015a). Fear and anger are prominent crisis emotions

explored in a variety of organizational and disaster-related crises, as was mentioned above (e.g., Jin et al., 2012) and natural or person-made disasters such as terrorism (e.g., Jin et al., 2016; Lerner, Gonzalez, Small, & Fischhoff, 2003). Other discrete emotions that are generally negative, such as dread, or generally positive, such as hope, have also been posited to impact resilience (e.g., Norris et al., 2008) and suggested as particularly relevant to risk, crisis, and/or disaster scenarios (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003; Lazarus & Folkman, 1984; Madera & Smith, 2009; Slovic, Finucane, Peters, & MacGregor, 2004). Thus, it is appropriate to use the discrete crisis-related emotions framework for assessing affect here. Further, this conception allows for adequately comparing findings across studies by engaging in partial replication of burgeoning science in this arena (e.g., Jin et al., 2016; Liu et al., 2015a), and has been noted previously, replication is essential to the quantitative scientific method of inquiry.

Behavioral Responses to Crisis Information

In addition to emotional responses, it is also important for researchers and crisis communicators to understand what contributes to or detracts from people's communicative responses (e.g., seeking, sharing, and/or creating crisis information) and other behaviors (e.g., taking protective actions, seeking and acting in accordance with formal recommendations, and/or contributing to crisis relief efforts) in response to receiving crisis information.

For years, disaster sociologists have asserted that in a process referred to as milling, when people receive information about a crisis or disaster, and more often than not, their first move is to search for information that will confirm or disconfirm

that initial information before they turn toward taking protective or other actions (e.g., Mileti et al., 1990). In this process, they may seek and share crisis information with others both offline and online. This is corroborated by research into the message convergence framework from a public relations risk communication standpoint (e.g., Anthony et al., 2013). For an example related to the SMCC in particular, Liu and colleagues (2015b) conducted an experiment testing effects of crisis information form and source on a variety of outcomes such as intentions to take protective actions and intentions to seek information from a variety of social, traditional, and word-of-mouth forms. However, regardless of information form and source, participants reported significantly stronger intentions to share information about the disaster via offline interpersonal communication forms rather than through online organizational and social mediated forms. Although this research examined a different disaster type than is proposed here (i.e., it studied person-made disasters, namely terrorist attacks), it is plausible that this finding will hold true during a flood, especially given that other research has found general preferences for crisis information sharing via interpersonal forms (e.g., Spence, Lachlan & Burke, 2008).

But in addition to information seeking and sharing, ultimately it is often the goal of disaster responding agencies to urge publics to take appropriate actions as quickly as possible (Ready.Gov, n.d.). More immediate disaster responses increase likelihood of resilience (e.g., Norris et al., 2008); thus, investigating the factors that may lead people to be more likely to take a host of protective actions for themselves and others after initial exposure to disaster information from a government source or credible major news media source can provide information that is of great interest to

disaster responding agencies as well as crisis and resilience scholars. Protective actions in the literature have ranged from returning contaminated food products if instructed to do so (e.g., Freberg, 2012) to evacuating if instructed to do so by government official or others (e.g., Fraustino, 2014; Liu et al., 2015a). Adopting and adapting prior protective action items from the contexts of terrorist attacks, riots, and extreme fires (e.g., Fraustino, 2014; Liu et al., 2015a) in the new context of flooding can provide a partial replication that enhances understanding about whether research findings from two single research studies can be confirmed and whether findings hold true in other contexts, as previous researchers (Liu et al., 2015a) have called for.

Another area of crisis communication in general and the SMCC model in particular that should be further be expanded is in understanding the roles that individuals may play in creating and disseminating original crisis information. Although, as mentioned above, research and anecdotal evidence has pointed to changes in the media landscape, such as the "Twitter effect" that allows journalists to gather information from non-journalists who post firsthand information on social media sites, research has been slow to explain and predict how and under what conditions people will be prompted not only to share information with others but also create content themselves. As content creation is an important feature of the "social" aspect of social media, as described at the beginning of this chapter, learning more about the features that may prompt content generation can be helpful for both theory building and practice. For theory building, understanding how various information sources and visuals might differentially lead to increased (or decreased) likelihood of publics creating content could inform the part of the SMCC model that has not yet

explained or predicted how or when audiences will become part of the key public *social media creators*.[2] Practically, if publics are able and willing to create content, that can be helpful for organization experiencing crises, which oftentimes results in strained resources for communicative functions and even silencing by legal counsel warning against possible communication ramifications (e.g., Tyler, 1997). Of course, this assumes that layperson content generation is accurate and aligned with the best interests of the organizations and publics, a question that is larger than the current work is capable of answering. However, an initial effort to determine how, if at all, initial crisis information features impact likelihood to generate new crisis content, in addition to seek and share existing information, is a worthy theoretical and practical endeavor nonetheless.

Biological Sex

Finally, research is beginning to paint a more consistent picture regarding the relationship between demographic information such as biological sex or self-identified gender and responses to disaster information (e.g., Fraustino, 2014; Jin et al., 2016; Lachlan et al., 2007; Liu et al., 2015; Spence et al., 2006; Spence, Lachlan & Griffen, 2007; Spence et al., 2008; Spence, Lachlan & Burke, 2011; Seeger, Venette, Ulmer & Sellnow, 2002), especially likelihood to engage in communicative and other behavioral responses. Although situational characteristics are important and informative characteristics for segmenting publics, as briefly mentioned in discussing the STP above, demographic information can also be enlightening. This is particularly so for crisis communicators who must often disseminate information as

[2] As described in Chapter 1, social media creators are those who generate and distribute content online.

quickly and effectively as possible; demographics are perhaps simpler to identify as audience segmenting characteristics than are psychographic or situational characteristics when a crisis hits and people need potentially life-saving information as soon as possible.

For example, in a survey of Hurricane Katrina evacuees, Spence et al. (2008) found that females exhibited greater tendencies than did males to seek survival-related information, which the authors attributed to women's general caring and nurturing tendencies. Outside of the U.S., researchers found that after a series of terrorist attacks in Israel, males reported significantly greater preferences for seeking terrorism information from visual-based media such as television whereas females preferred less vivid, nonvisual media such as radio (Keinan, Sadeh & Rosen, 2003). In Liu, Fraustino, and Jin's (2013) study, also based on a terrorist attack scenario, females reported greater intentions to seek more disaster information from a host of interpersonal forms, whereas males were more likely to turn online to videos and blogs. In addition, females reported greater likelihood than did males to take all measured protective actions, such as evacuating if told to do so by government officials or telling others to follow government instructions step-by-step. This finding was corroborated in a hypothetical university game day riot setting by Fraustino (2014), who found females were more likely than were males to take all seven measured protective actions. Women are also significantly more likely than are males to engage in volunteerism, regardless of education and socio-economic status (Bureau of Labor Statistics, 2013). Thus, research has pointed to several differences in the way that males and females may respond to and act upon crisis information.

In addition to behavioral outcomes, self-identified gender and/or biological sex have been found to be related to other outcomes as well. For example, in Fraustino's (2014) and Liu and colleagues' (2015b) studies, those who self identified as females reported significantly greater levels of negative crisis-related emotions such as fear, anxiety, and anger than did males. Differences in males' and females' crisis and resilience-related emotions have been uncovered in other work as well, both in crisis specifically (e.g., Freberg, 2012) as well as in the risk, disaster, and trauma literature more generally (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003; Freedy, Shaw, Jarrell, & Masters, 1992). Yet, the literature is less able to speak about whether gender is related to cognitive responses to disaster information, such as perceived information credibility, perceived disaster severity, perceived information complexity/comprehension, level of involvement with the disaster event, and disaster response self-efficacy—with minimal exceptions (e.g., Billings & Moos, 1981; Fraustino et al., 2013).

Hypotheses and Research Questions

Given the above theoretical groundings and literature, several hypotheses and research questions are posed, prefaced with brief recap and combined synthesis of relevant portions of the literature reviewed above.

First, as expanded upon in the literature reviewed, previous research in some instances has shown that people are more likely to report intentions to share information about disasters via offline interpersonal communication forms and traditional television rather than through online organizational and social mediated forms upon first learning of a crisis (e.g., Fraustino, 2014; Liu et al., 2015b; Spence et

al., 2008, 2011), although this is not always definitely the case and has not yet been confirmed in the arena of flooding communication initially received via online videos or podcasts. Therefore the following hypothesis is offered:

> **H1:** Regardless of crisis information source, given an array of communication form choices from which to rate likelihood of seeking additional information, participants will report strongest intentions to seek information via offline interpersonal forms and television immediately following exposure to hypothetical disaster information.

Second, a study revealed that experiment participants who were exposed to crisis information containing a crisis visual rated the information as significantly less credible than information without a crisis visual (Fraustino, 2014). Thus, in attempt to replicate this finding and expand it to a natural disaster as well as a more diverse sample (i.e., including but also beyond student convenience samples), as well as with a more sophisticated operationalization of crisis visual (i.e., various still and moving visuals as opposed to a single photo), the following hypothesis is offered:

> **H2:** Participants in the no-crisis-visual condition will rate the crisis information as more credible than will those in the still-crisis-visual and moving-crisis-visual conditions.

Next, the LC4MP's theoretical tenets provide backing for the third, fourth, and fifth hypotheses. For the third and fourth hypothesis, as discussed in the LC4MP section above, adding visual components such as increased pace (e.g., increasing the number of cuts or edits in a visual; Lang et al., 2006; Lang et al., 1999) can, to an extent, enhance a viewer's orienting to the message and thus encoding of both audio

and visual components. Adding greater orienting visual features alone in many cases is unlikely to overload the processing system and may even serve to increase recognition, as visuals are relatively automatically processed (e.g., Lang et al., 1999). Yet, importantly, increasing structural features such as visual pacing along with arousal indeed does contribute to overload. In a setting such as a crisis, the level of arousal produced by the message is likely to be inherently moderate or high by nature, and visuals of an extreme event such as a devastating flood may solidify or increase arousal. Thus, in a crisis setting, increased orienting cues such as greater pace might decrease message encoding (measured by message recognition or recall) in ways that the same types of visual cues would not in a neutral or positive context. Without adequately encoding, processing, and storing messages, people's attitudes and behavioral intentions are likely to be less impacted by the messages. Therefore the following hypotheses are offered:

> **H3:** The pace of crisis visuals and participants' cognitive responses are curvilinearly related such that initially as pace increases so do cognitive responses; however, beyond moderate pace, cognitive responses decrease (as a result of cognitive overload).
>
> **H4:** The pace of crisis visuals and participants' behavioral responses are curvilinearly related such that initially as pace increases so do behavioral responses; however, beyond moderate pace, behavioral responses decrease (as a result of cognitive overload).

And for the fifth hypothesis, research has yet to determine whether videos of still photos will produce differing levels of message recognition than will moving videos

of the same event, particularly in a disaster or crisis setting. Yet the LC4MP provides theoretical justification for why still and moving images will be processed differently. That is, as explained in greater detail above, moving images entail fluctuating visual information, and motion itself is an orienting cue. Consequently, moving images hold the potential to both trigger allocation and to require additional resources for processing—and even more so for arousing content such as inherently arousing extreme-flooding disaster information. Thus the following hypothesis is offered:

> **H5:** Regardless of pace, no visuals and still visuals will produce lesser auditory message recognition (i.e., aided recall) than will moving visuals, except for the fast-pace moving condition (wherein cognitive processing will exceed resources and inhibit encoding).

The final two hypotheses (six and seven) draw from literature probing self-identified gender and/or biological sex in relation to disaster-related affect and behavior. Research has shown in that females in many instances may be more likely than males to take several recommended or protective actions (both communicative and physical) for themselves and others as well as to report feeling more intense discrete crisis-related emotions (e.g., Fraustino, 2014; Freberg, 2012; Fredrickson et al., 1992; Jin et al., 2016; Spence et al., 2008; Tugade et al., 2003). This has implications for basic audience segmentation and tailored communication during an emerging treacherous disaster event. However, replication is needed to scientifically confirm this finding as well as to verify the prediction in slightly different settings (e.g., flooding), and with regard to information communicated in various ways (e.g.,

in this instance, visuals), as well as with diverse samples and methods. Therefore, the following hypotheses are offered:

H6: Females will report greater intentions than will males to (a) take all measured protective actions, (b) engage in all measured disaster relief efforts and (c) seek additional information.

H7: Females will exhibit higher reported levels of discrete crisis-related emotions than will males.

Further, based on the driving purposes of this work and dearth of research in many of these areas as pointed out in the literature reviewed previously, following are research questions meant to probe possible relationships left untapped by the offered hypotheses:

RQ1: How else, if at all, does crisis information source influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

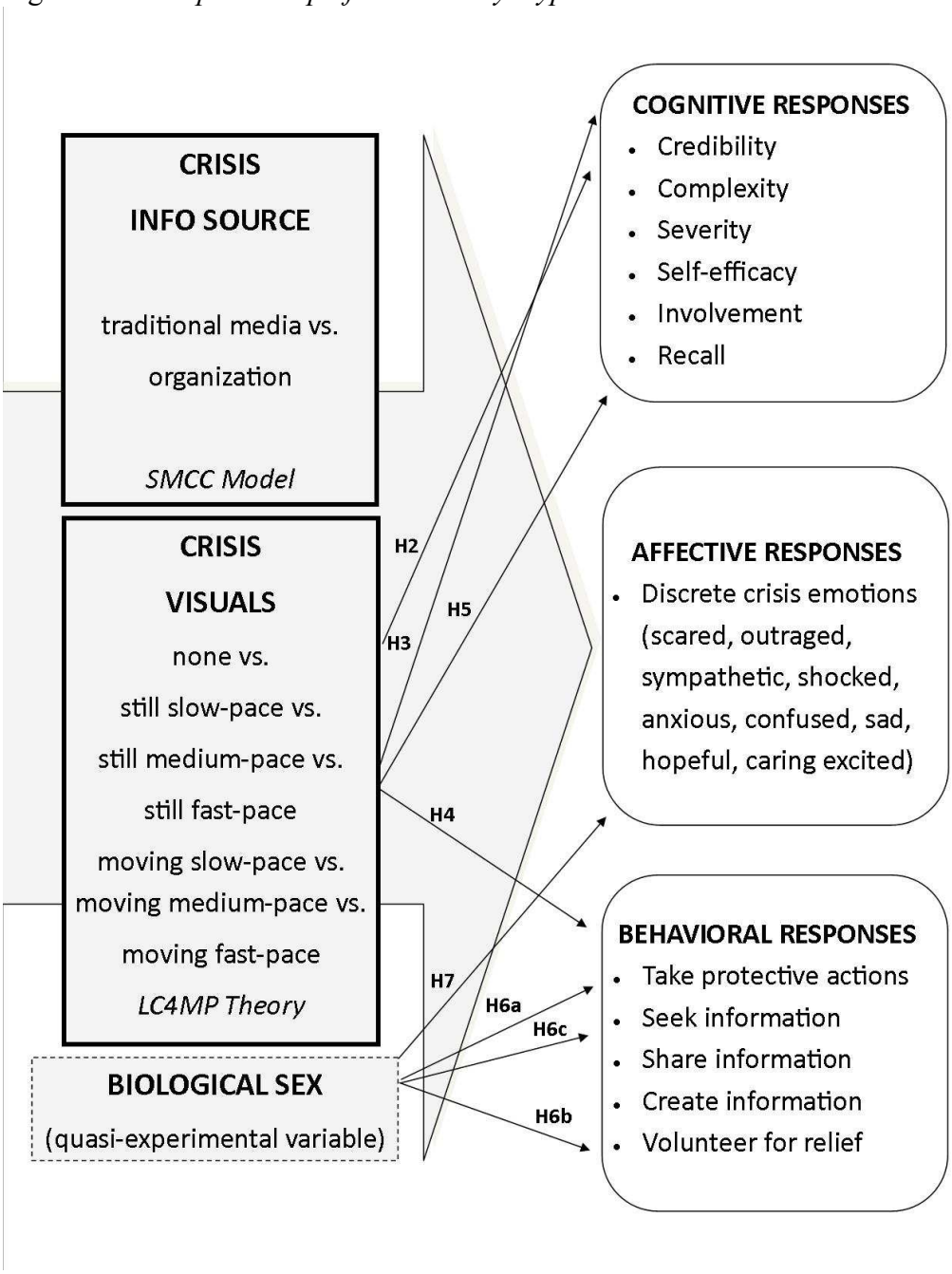
RQ2: How else, if at all, do crisis visuals influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

RQ3: How else, if at all, do crisis information source and crisis visuals jointly influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

RQ4: How else, if at all, is biological sex related to participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

To aid in conceptualizing several of the predicted relationships, see Figure 1.

Figure 1: *Conceptual Map of Several Key Hypotheses*



Chapter 3: Methods

To test hypotheses and answer research questions, two experiments were conducted. Experiment 1 used a convenience sample of university students recruited from an online participant pool at a large public Mid-Atlantic university. Experiment 2 used a more diverse convenience sample of Amazon Mechanical Turk (mTurk) respondents. Experimental stimuli manipulated crisis information visuals (experiment 1 and experiment 2) and crisis information source (experiment 1 only) to determine effects on cognitive, affective, and behavioral responses to hypothetical extreme-flooding disaster information, particularly in ways related to people's abilities to cope physically and psychologically and help themselves and others recover. Basic general procedures and stimuli for the experiments are discussed next, and then greater details for each are broken down by experiment 1 and experiment 2. Results are reported in Chapter 4, discussion of theoretical and practical implications as well as limitations takes place in Chapter 5, which closes this work with concluding remarks.

Procedure

Participants were recruited according to sampling procedures detailed in each experiment's section below. Both experiments took place online. Following approved IRB protocols, participants first gave informed consent. They were instructed during recruitment and again on the initial page to participate in the experiment only using a laptop or tablet, not a phone, with volume and Internet enabled. Upon providing consent, they entered the online experiment, which was administered via Qualtrics.

To immerse themselves in the pending crisis scenario (to enhance external validity), respondents in both experiments first were asked to read a brief passage that set the stage for why they were in an area about to experience coastal flooding and how they initially found out about the crisis. Narratives have been shown to hold the capacity to "transport" people into the story, allowing them to feel as though they are part of the story's time, place, and experience (e.g., Green & Brock, 2000; Green, Brock, & Kaufman, 2004). Figure 3.1 below shows the full narrative.

Figure 3.1: *Scenario Immersion Narrative*

Please read the following passage and imagine yourself in the scene it presents: Imagine you have traveled to a coastal region of Maryland for a late summer beach vacation. Unfortunately, it has been raining heavily since you arrived. After spending the morning in the hotel room sleeping in, relaxing, watching TV, and waiting for the rain to let down, you decide to log online to check the weather forecast. As you begin to search, a variety of responses pop up indicating that extreme coastal flooding has ravaged nearby areas and is closing in on the hotel beach area where you are staying. You quickly click on a link to learn more about the disaster. Please click the "next" arrows (>> on the bottom right) to see (imagine) what you came across.

Next, participants were brought to a screen with the following instructions: "Please ensure your volume is on and then press the play button to watch/listen to the entire video embedded here (it is 90 seconds in duration)." At that point participants were randomly assigned to one of the treatment conditions (expanded upon in the stimulus section next as well as in each experiment's section afterward). Subsequent to watching/listening to the treatment video detailing approaching coastal flooding, all participants completed a questionnaire. More specifically, to assess respondents' cognitions, emotions, and intentions to act in response to disaster information, the

post-stimulus online questionnaire included *cognitive* (perceived information credibility, information complexity/comprehension, crisis severity, self-efficacy, involvement, and auditory information recognition), *affective* (likelihood of feeling scared, outraged, sympathetic, shocked, anxious, confused, sad, hopeful, caring, excited), and *behavioral* (intentions to take a host of recommended/protective actions; intentions to seek, share, and/or create information; intentions to contribute to relief efforts) measures. Demographic information such as age, biological sex, race, and education was also collected, as was descriptive information and possible controls/covariates/other descriptives such as history of disaster experiences and typical media use. Manipulation checks were then administered, after which participants completed a multiple-choice auditory disaster information recognition quiz, leaving approximately 15-25 minutes between video watching and the recognition measure, with several cognitive tasks in the interim (i.e., the questionnaire). Finally, participants were thanked for their time and debriefed on the fictional nature of the materials, that is:

> Thank you for participating. Your responses are helpful in understanding how to help potential flood victims prepare and protect themselves and others. Please remember this scenario and video were hypothetical although based on real-world events.

Further details about the sampling and measures are provided in each experiment's section below, but first experimental stimuli will be discussed.

Stimuli

Visual Manipulation. For pilot experiment 1 (student sample), visuals were presented as either no visual or medium-paced moving visual (both explained in more detail for experiment 2 stimuli next). For experiment 2, based on conversations with prior news producers, current news and video producers, review of news video coverage, and review of prior research cited in the literature review, the previous operationalizations of slow-paced, medium-paced, and fast-paced visuals were adapted accordingly: (1) The *no-visual* condition included a black screen with voiceover (cf., a podcast); (2) The *"moving" visual* treatment conditions included continuously shot YouTube video with (a) slow pace (i.e., 6 cuts[3]; 2 per 30 seconds), (b) medium pace (i.e., 27 cuts; 9 per 30 seconds), and (c) fast pace (i.e., 60 cuts; 20 per 30 seconds); and (3) *The "still" visual* treatment conditions included a YouTube video of stationary screen shots, constructed to look like professional photo stills, which were taken from the moving video in the previous treatment condition to enhance consistency across conditions and to avoid confound as much as possible. These still-photo-based videos included (a) slow pace (i.e., 6 photos), (b) medium pace (i.e., 27 photos), and (c) fast pace (i.e., 60 photos), with photo changes occurring at the same times as in the moving video treatments, again to avoid confounds.

The videos were professionally edited and recorded by a paid videographer with real-world content incorporated as much as possible to enhance external validity.

[3] Cuts refer to relatively abrupt but normal film transitions (e.g., visual breaks, changes in visual perspective, wipes, zooms, fade-ins/fade-outs, etc.). For example, see how the video changes perspectives at the .05, .07, .09, and .10 minute-marks in the flooding news link available here: https://www.youtube.com/watch?v=jDcJ1-DIcyM.

The same videos were used for pilot experiment 1 and experiment 2 (in different combinations as described above).

Source Manipulation. For the pilot experiment 1 (student sample), source was also manipulated, in addition to visuals. These videos appeared to come from either the National Weather Service (NWS) as the government organization distributing crisis information (national government agencies have been used to operationalize "organization" in previous disaster research; e.g., Freberg, 2012; Liu et al., 2015a, 2015b) vs. *USA Today* online newspaper (the major news media source distributing the crisis information, as has been operationalized in prior research; e.g., Fraustino, 2014; Liu et al., 2015a, 2015b). Based on results not finding significant differences in most outcomes related to source in experiment 1 (reported in the results section in the next chapter), to allow for implementing a more sophisticated operationalization of visuals (including the LC4MP-driven pacing elements), and to maximize limited resources, the source manipulation was omitted from experiment 2. Thus all experiment 2 videos appeared solely from the NWS source.

All videos in both experiments included a stationary logo of the source in the bottom third on the right side of the screen (in the same place and size for all conditions). The source was also mentioned in the voiceover. All videos were 90 seconds in duration and audio content was constant across conditions with the exception of the source name for experiment 1. No people were displayed in the video in order to avoid potential confounds of identifying with (or lack of identifying with) those portrayed; only flood waters and flooding of land and property were shown. The videos were constructed from existing publicly accessible YouTube and B-roll

footage of coastal flooding, mostly in the Maryland area, scrubbed of any other added features (e.g., logos, music, audio, headers, footers, banners, etc.). A female voice provided the anchor voiceover for all the videos, but the anchor herself was never shown, again to attempt to avoid confounding factors to the extent possible. For the no-visual conditions, a black screen with the same logo placement at the right-hand bottom third and the same voiceover was employed. Figure 3.2 shows the video script, which was adapted from real-world flood announcements posted on YouTube[4] and from flood warning announcements published on the NWS website.

Figure 3.2 *Stimulus Video Voiceover Script*

> "This is a [SOURCE – *USA Today*/National Weather Service] report. We are announcing that a flood warning has been issued for this and surrounding counties. Doppler radar showed very heavy rains over the region and also moving in from the east and south.
>
> Due to recent rainfall and soil conditions, flooding has occurred in some regions and is expected to begin in others shortly. Excessive runoff from heavy rainfall will cause flooding of small creeks and streams, highways, underpasses, and other low-lying areas.
>
> Again, this is a flood warning. That means flooding is imminent or has high potential to occur. Residents along streams and creeks and areas prone to flooding should take immediate precautions to protect life and property.
>
> Be especially cautious at night when it is harder to recognize the dangers of flooding. Most flood deaths occur in automobiles. Never drive your vehicle into areas where the water covers the roadway. Flood waters are usually deeper than they appear, and just one foot of flowing water is enough to sweep vehicles off the road.
>
> If you are in a warning area or if you observe flooding, act quickly. Move to higher ground immediately. Do not stay in areas subject to flooding when water

[4] The script primarily was based on real-world flooding reports from the National Weather Service captured on YouTube, such as those found at the following links:
https://www.youtube.com/watch?v=_TJVxATDuII
https://www.youtube.com/watch?v=uSmPH6peWNQ
https://www.youtube.com/watch?v=mhZp2ypjT3I

begins rising. Well-built homes and businesses will be damaged, and some mobile homes may be swept away.

Stay tuned to media for updated information about which counties are affected by this flood warning. This has been a [SOURCE – *USA Today*/National Weather Service] report."

Experiment 1

Participants in experiment 1 were recruited by convenience sampling from a participant pool of university students run online by the researcher's home institution's department. In addition to housing an assortment of courses related to various facets of communication, the department is the main provider of a general education requirement course for all undergraduate majors in the university. Thus the participant pool is not limited to students who claim a communication-related major or minor. Participants were provided minimal course extra credit as incentive at their instructors' discretion.

For experiment 1, participants ($N = 302$) were randomly assigned to one of four conditions, which comprised the set of treatment conditions manipulating disaster information source (NWS vs. *USA Today*) and a simpler modified version of disaster visuals (no visuals vs. medium-paced moving visuals, as described above). Table 3.1 displays the treatment conditions and sample cell sizes for this phase. Those who completed their participation in an impossibly short timeframe (i.e., between 0-4 minutes, $n = 2$) or who indicated that they experienced technical difficulties in loading/playing the video ($n = 6$) were removed from the data set, resulting in a final sample of 294 participants included in analysis.

Table 3.1
List of Experimental Conditions for Experiment 1

Condition	IV: Source	IV: Visual	*n*
C1	National Weather Service	No Visual	80
C2	NWS	Moving Visual	66
C3	USA Today	No Visual	74
C4	USA Today	Moving Visual	74

The experiment 1 sample was composed of 145 adults who identified as female (49.3%) and 146 as male (49.7%). Participants ranged in age from 18-30 years old. The majority identified as White (*n* =169, 58%) and the remainder as Black (*n* = 28, 10%), Asian (*n* =57, 19%), Hispanic (*n* = 18, 6%), 2+ races (*n* = 14, 5%), and other (*n* = 6, 2%). All were college undergraduates, with the majority identifying as first-year undergraduates (*n* = 169, 57.5%) and the remainder identifying as second-year undergraduates (*n* = 44, 15%), third-year undergraduate (*n* = 43, 14.6%), fourth-year undergraduate (*n* = 28, 9.5%), and fifth+year undergraduate (*n* = 8, 2.7%).

Instrument

Measures for dependent variables related to cognitive, affective, and behavioral responses to disaster information as well as manipulation checks are as follows:

Cognitive Responses. Cognitive outcomes assessed in the questionnaire included perceived complexity/comprehension of the information, crisis severity, perceived information credibility, self-efficacy, level of involvement in the disaster, and auditory information recognition.

Information complexity. Perceived information complexity was measured with three 7-point semantic-differential items in answer to the question: "The disaster information I just heard/watched was ___" (i.e., 1 = extremely difficult to comprehend, 7 = extremely easy to comprehend; 1 = extremely complicated, 7 = extremely simple; 1 = extremely convoluted, 7 = extremely straightforward), based on prior research examining perceived information comprehension/complexity (e.g., Burgers, van Mulken, & Schellens, 2012; Fraustino et al., 2014; McQuarrie & Mick, 1996, 1999; Van Mulken, Le Pair, & Forceville, 2010). Internal consistency for the information complexity scale (M = 5.74, SD = 1.13) was high, Chronbach's $\alpha = .87$.

Information credibility. Perceived credibility of the disaster information was measured using a previously validated newspaper credibility index (Meyer, 1988) with items similar to Graziano and McGrath's (1986) conception, which was recently adapted to a disaster context (e.g., Fraustino et al., 2014; Fraustino, 2014). The construct was tapped by six 7-point semantic-differential items that asked respondents to indicate their reactions to the information they had just heard/watched (i.e., 1 = is not up-to-date, 7 = is up-to-date; 1 = is biased, 7 = is unbiased; 1 = doesn't tell the whole story, 7 = tells the whole story; 1 = inaccurate, 7 = is accurate; 1 = cannot be trusted, 7 = can be trusted; 1 = is based

on opinion, 7 = is based on fact). The resulting scale (M = 5.29, SD = 1.08) exhibited high reliability, Chronbach's α = .85.

Disaster severity. Perceived severity of the disaster was measured with three 7-point semantic-differential items in answer to the question: "The disaster I just learned about was ____" (i.e., 1= extremely severe, 7 = not severe at all; 1 = extremely bad, 7 = not bad at all; 1 = extremely difficult to recover from, 7 = not difficult to recover from). Adopted from prior research (e.g., Fraustino, 2014; Fraustino et al., 2014), these items again exhibited high internal consistency, Chronbach's α = .87, so they were transformed into a single composite measure (M = 3.13, SD = 1.12)

Self-efficacy. Self-efficacy related to general flood response was examined by Umphrey's (2004) four 7-point Likert-type questions, where 1 = strongly disagree and 7 = strongly agree, adapted to the flooding disaster context (i.e., I feel confident that I can act on extreme flooding effectively, I am confident in my ability to detect emergency flooding situations, I am confident that I know the correct procedures for acting on extreme flooding, I feel well informed about how to act on extreme flooding). The self-efficacy scale (M = 4.30, SD = 1.37) showed very good internal consistency, Chronbach's α = .89.

Involvement. To indicate level of involvement, participants were asked to think about what the disaster would mean them if experiencing the situation and then presented the question: "This disaster would be _____ to me." Response options included four 7-point semantic-differential items (i.e., 1 = important, 7 = unimportant; 1 = relevant, 7 = irrelevant; 1 = meaningful, 7 = not meaningful; 1 =

involving, 7 = not involving). Drawn from a validated and widely used personal involvement scale (Zaichkowsky, 1985) applied to a disaster context by Fraustino, Liu, and Jin (2014), this involvement scale (M = 2.38, SD = 1.33) showed excellent internal consistency, Chronbach's α = .92.

Aided recall (recognition). As has been implemented with prior LC4MP research (e.g., Fox et al., 2004), the encoding portion of participants' message processing was measured by aided recall (i.e., recognition). Participants were given five four-alternative multiple-choice questions based on the message content verbalized throughout the video by the reporter, and they were asked to choose the correct answer to the best of their recollection. Responses were coded as incorrect or correct, providing a total score between 0-5 for each participant, where 0 = no questions answered correctly and 5 = all questions answered correctly (M = 3.23, SD = 1.28), Chronbach's α = .98. Figure 3.3 displays the multiple-choice questions (see next page).

Figure 3.3:
Aided Recall (Recognition) Questions.

1. What amount of flowing water is enough to sweep vehicles off the road, according to the video you watched?
    a. .5 foot
    b. 1 foot
    c. 2 feet
    d. 3 feet

2. Which of the following flooding outcomes was explicitly mentioned in the video?
    a. Farmers near streams will likely lose crops
    b. Businesses may be demolished
    c. Mobile homes may be swept away
    d. Urban homes may become completely submersed

3. The video you watched issued a:
    a. Flood Warning
    b. Flood Watch
    c. Flood Advisory
    d. Flood Alert

4. According to the video, those in the flood areas or those who observe flooding should:
    a. Stay where they are and stay tuned to media for further notice
    b. Move to shelter in a basement or other secure area below ground
    c. Evacuate to higher ground
    d. Report flooding damage to the nearest law enforcement agency and wait for assistance

5. According to the video, most flood deaths occur in:
    a. Urban homes near streams
    b. Businesses in low-lying areas
    c. Mobile homes
    d. Automobiles

Affective responses. To investigate affective responses to the disaster information, the question "If you were in this situation, please indicate how likely you would be to feel each of the following…" was posed. Participants responded on a 7-point Likert-type scale (1 = very unlikely, 7 = very likely) for ten discrete emotions identified and examined in prior literature related to stress, coping, and/or disasters

(e.g., e.g., Choi & Lin, 2009; Jin et al., 2016; Jin et al., 2012, Lazarus, 2000; Lazarus & Folkman, 1984). Those emotions included: scared (M = 5.24, SD = 1.56), outraged (M = 3.46, SD = 1.73), sympathetic (M = 5.86, SD = 1.24), shocked (M = 4.99, SD = 1.59), anxious (M = 5.36, SD = 1.53), confused (M = 3.68, SD = 1.72), sad (M = 4.96, SD = 1.50), hopeful (M = 4.81, SD = 1.59), caring (M = 5.75, SD = 1.22), and excited (M = 3.58, SD = 1.67). These emotions were examined individually rather than as a composite measure to shed light on each discrete emotion, as has been done in prior crisis affect research (e.g., Jin et al., 2014, 2015, 2016; Liu et al., in press).

Behavioral responses. Behavioral responses to the crisis information were adapted from prior research (Austin et al., 2012; Fraustino, 2014; Fraustino et al., 2014; Liu et al., 2013; Liu et al., 2015a, 2015b), assessed in terms of participants intentions to seek, share, and/or create information; likelihood to take a host of recommended or protective actions; and intentions to contribute to relief efforts.

Protective behaviors. To examine the extent to which participants would intend to take recommended or other protective actions, six items were administered. In particular, respondents were prompted with "If you were in this disaster situation, please indicate how likely/unlikely you would be to take each of the following actions by clicking the bubble that best indicates the likelihood of your actions," and rated their likelihood on a 7-point Likert-type scale (1 = very unlikely, 7 = very likely) in response to the following options: evacuate from the area affected by the disaster no matter what (M = 4.85, SD = 1.57), evacuate from the area affected by the disaster if instructed to evacuate by government officials (M = 6.12, SD = 1.23), follow government instructions step-by-step (M = 5.60, SD = 1.37), tell others to follow

government instructions (M = 5.44, SD = 1.45), look for ore information from government sources (M = 5.73, SD = 1.30), and look for more information from news media sources (M = 5.84, SD = 1.22). These behaviors were examined individually rather than combined for a composite measure.

Relief contribution behaviors. To investigate the extent to which respondents would intend to contribute to disaster relief efforts if experiencing the hypothetical disaster, five additional items were administered using the same prompt and Likert-type scale as with protection behaviors detailed above. Responses to this question set, however, included: donate money to disaster relief efforts (M = 4.38, SD = 1.68), volunteer time to help others affected by the disaster (M = 4.77, SD = 1.57), take a leadership role in volunteer disaster relief efforts (M = 3.95, SD = 1.68), tell others to donate money to disaster relief efforts (M = 4.19, SD = 1.65), and tell others to volunteer time to help others affected by the disaster (M = 4.39, SD = 1.69). These behaviors were examined individually rather than combined for a composite measure.

Manipulation checks. To gauge the experimental manipulations, the first question asked participants to "Please select the number that best indicates your agreement/disagreement with each of the following three items about whether the flood information you saw included or did not include crisis visuals." The two statements that participants selected their assessments in regard to were "I saw a fully moving video of the flood and heard a person talking," and "I saw a black background and heard a person talking (no pictures or video)" (1 = strongly disagree, 7 = strongly agree).

One-way multivariate analysis of variance (MANOVA) assessed whether there were the expected significant differences among the mean vectors related to the two sets of visual manipulations. Analysis revealed significant mean differences in the expected directions, Wilks' $\lambda = .25$, $F(6, 560) = 95.12$, $p < .001$, par. $\eta^2 = .50$. Thus the visual manipulation was successful.

Second, to look at the crisis information source manipulation, respondents were asked to "Please select the number that best indicates your level of agreement/disagreement with each of the following two items on the *source* from which you saw the flood information." They responded on a 7-point Likert-type scale (1 = strongly disagree, 7 = strongly agree) to two options: (1) National Weather Service (NWS) and (2) *USA Today* online news. Again MANOVA showed participants significantly differed, in the expected directions, in their mean assessments of stimulus source based on treatment condition, Wilks' $\lambda = .74$, $F(6, 560) = 15.51$, $p < .001$, par. $\eta^2 = .14$. Thus the source manipulation was successful.

Experiment 2

Participants were recruited from the convenience sampling crowdsource-work platform Amazon Mechanical Turk (mTurk). Amazon Mechanical Turk is an online crowd-sourcing service that coordinates and supplies human intelligence and labor to complete tasks that require such assets, including participation in experimental research studies, which has become an increasingly popular use of mTurk (Paolacci, Chandler, & Ipeirotis, 2010). People who complete tasks posted on mTurk are considered workers and are compensated by those who post the tasks and request the labor (e.g., participation in experimental studies) (Paolacci & Chandler, 2014). Both parties—workers (e.g., research participants) and requesters (e.g., researchers)—remain anonymous to each other, though Amazon does keep records of unique worker IDs (Paolacci et al., 2010), and researchers may choose to self-disclose identies, which is likely given usual IRB protocols. When they log in, workers on mTurk can view available tasks, participation criteria, and examples of what the tasks entail (e.g., sample questions for studies) (Paolacci et al., 2010). Thus, participation is effectively anonymous, compensated, elective, and voluntary for mTurk workers.

According to Paolacci et al. (2010), wages paid for mTurk labor per task completed may be as low as $0.01 and usually do not exceed $1.00, which averages to about $1.40 in hourly wages. Participants in this study were provided $0.75 as incentive for their participation in the 20-25 minute study, a rate higher than the average hourly compensation for research participants on mTurk (Paolacci et al., 2010). However, research has shown that mTurk workers who participate in academic research studies are not always motivated by pay—some choose to participate in

studies on mTurk for more intrinsic reasons, such as senses of enjoyment or fulfillment from contributing to knowledge generation (Paolacci & Chandler, 2014; Paolacci et al., 2010).

Research has shown that, overall, "the pool of available workers [on mTurk] is large and diverse. It can replace or supplement traditional convenience samples, but it should not be treated as representative of the general population" (Paolacci & Chandler, 2014, p. 185). Further, selection criteria established by researchers who post studies on mTurk allow for selective recruitment of participants who fall into particular demographic or other identifying categories (Paolacci & Chandler, 2014). Thus, despite some limitations in sampling, participant pools of mTurk workers can more closely resemble the general population when compared to, for example, a convenience sample of participants recruited from a university undergraduate participant pool (Paolacci & Chandler, 2014; Paolacci et al., 2010). In sum, while Paolacci and Chandler (2014) cautioned against indiscriminating use of mTurk as a source of labor and research participants, they concluded that mTurk "has accelerated and democratized science by facilitating access to a heterogeneous research-participant pool and has provided scientists with a platform to conduct research that is hard to conduct within physical labs or elsewhere online" (p. 187).

Participants in experiment 2 ($N = 483$) were randomly assigned to one of the seven total conditions, which comprised the set of treatment conditions manipulating disaster visuals (six levels: slow-, medium-, and fast-paced *still* visuals and slow-, medium-, and fast-paced *moving* visuals, as described above) and a control condition (no visuals). Those who completed their participation in an impossibly short

timeframe (i.e., between 0-4 minutes, $n = 52$) or who indicated that they experienced technical difficulties in loading/playing the video ($n = 1$) were removed from the data set, resulting in a final sample of 429 participants included in analysis. Table 3.2 displays sample sizes for treatment conditions 1-7.

Table 3.2.
Experiment 2 Sample Size by Treatment Condition

Condition	*n*
1: No Visual	56
2: Still Visual, Slow Pace	68
3: Still Visual, Medium Pace	66
4: Still Visual, Fast Pace	61
5: Moving Visual, Slow Pace	55
6: Moving Visual, Medium Pace	60
7: Moving Visual, Fast Pace	63

Further, the experiment 2 sample was composed of 243 adults who identified as female (56.9%) and 184 as male (43.1%) (2 did not respond). Participants ranged in age from 19-76 years old. More than three-quarters identified as White ($n = 342$, 79.7%) and the remainder as Black ($n = 40$, 7.0%), Asian ($n = 17$, 4.0%), Hispanic ($n = 20$, 4.7%), 2+ races ($n = 13$, 3.0%), and other ($n = 4$, .9%). In addition, the sample of participants was highly educated, with the majority ($n = 372$) having completed an associate's/professional degree ($n = 55$, 12.8%), some college ($n = 108$, 25.2%), a bachelor's degree ($n = 126$, 29.4%), some graduate study ($n = 23$, 5.4%), or a graduate degree ($n = 50$, 14%). The remainder completed middle school as their highest level of education achieved ($n = 3$, .7%), high school diploma or GED ($n = 49$, 11.4%), or selected "other" ($n = 2$, .5%).

Instrument

Measures for dependent variables related to cognitive, affective, and behavioral responses to disaster information as well as manipulation checks follow.

Cognitive Responses. Cognitive outcomes assessed in the questionnaire included perceived complexity/comprehension of the information, crisis severity, perceived information credibility, self-efficacy, level of involvement in the disaster, and auditory information recognition (i.e., aided recall).

Information complexity. Perceived information complexity was measured with three 7-point semantic-differential items in answer to the question: "The disaster information I just heard/watched was ___" (i.e., 1 = extremely difficult to comprehend, 7 = extremely easy to comprehend; 1 = extremely complicated, 7 = extremely simple; 1 = extremely convoluted, 7 = extremely straightforward). Consistent with prior research developing and implementing these measures (e.g., Fraustino et al., 2014; Liu et al., in press) internal consistency for the information complexity scale (M = 6.21, SD = .92) was high, Chronbach's $\alpha = .87$.

Information credibility. Perceived credibility of the disaster information was measured using a previously validated newspaper credibility index (Meyer, 1988) with items similar to Graziano and McGrath's (1986) conception, which was recently adapted to a disaster context (e.g., Fraustino et al., 2014; Fraustino, 2014). The construct was tapped by six 7-point semantic-differential items that asked respondents to indicate their reactions to the information they had just heard/watched (i.e., 1 = is not up-to-date, 7 = is up-to-date; 1 = is biased, 7 = is unbiased; 1 = doesn't tell the whole story, 7 = tells the whole story; 1 =

inaccurate, 7 = is accurate; 1 = cannot be trusted, 7 = can be trusted; 1 = is based on opinion, 7 = is based on fact). The resulting scale (M = 5.88, SD = .96) exhibited high reliability, Chronbach's α = .88.

***Disaster severity*.** Perceived severity of the disaster was measured with three 7-point semantic-differential items in answer to the question: "The disaster I just learned about was ____" (i.e., 1= extremely severe, 7 = not severe at all; 1 = extremely bad, 7 = not bad at all; 1 = extremely difficult to recover from, 7 = not difficult to recover from). Adopted from prior research (e.g., Fraustino, 2014; Fraustino et al., 2014), these items again exhibited high internal consistency, Chronbach's α = .86, so they were transformed into a single composite measure (M = 2.44, SD = 1.05)

***Self-efficacy*.** Self-efficacy related to general flood response was examined by Umphrey's (2004) four 7-point Likert-type questions, where 1 = strongly disagree and 7 = strongly agree, adapted to the flooding disaster context (i.e., I feel confident that I can act on extreme flooding effectively, I am confident in my ability to detect emergency flooding situations, I am confident that I know the correct procedures for acting on extreme flooding, I feel well informed about how to act on extreme flooding). The self-efficacy scale (M = 4.77, SD = 1.34) showed excellent reliability, Chronbach's α = .91.

***Involvement*.** To indicate level of involvement, participants were asked to think about what the disaster would mean them if experiencing the situation and then presented the question: "This disaster would be _____ to me." Response options included four 7-point semantic-differential items (i.e., 1 = important, 7 =

unimportant; 1 = relevant, 7 = irrelevant; 1 = meaningful, 7 = not meaningful; 1 = involving, 7 = not involving). Drawn from a validated and widely used personal involvement scale (Zaichkowsky, 1985) applied to a disaster context by Fraustino, Liu, and Jin (2014), this involvement scale (M = 1.76, SD = .96) showed excellent internal consistency, Chronbach's α = .91.

Aided recall (recognition). As has been implemented with prior LC4MP research (e.g., Fox et al., 2004), the encoding portion of participants' message processing was measured by aided recall (i.e., recognition). Participants were given five four-alternative multiple-choice questions constructed based on the message content verbalized throughout the video by the reporter, and they were asked to choose the correct answer to the best of their recollection. Responses were coded as incorrect or correct, providing a total score between 0-5 for each participant, where 0 = no questions answered correctly and 5 = all questions answered correctly (M = 3.85, SD = 1.10), Chronbach's α = .96.

Affective responses. To investigate affective responses to the disaster information, the question "If you were in this situation, please indicate how likely you would be to feel each of the following…" was posed. Participants responded on a 7-point Likert-type scale (1 = very unlikely, 7 = very likely) for ten discrete emotions identified and examined in prior literature related to stress, coping, and/or disasters (e.g., e.g., Choi & Lin, 2009; Jin et al., 2016; Jin et al., 2012, Lazarus, 2000; Lazarus & Folkman, 1984). Those emotions included: scared (M = 5.15, SD = 1.59), outraged (M = 2.94, SD = 1.60), sympathetic (M = 6.03, SD = 1.23), shocked (M = 4.92, SD = 1.63), anxious (M = 5.48, SD = 1.45),

confused (*M* = 3.08, *SD* = 1.67), sad (*M* = 5.08, *SD* = 1.61), hopeful (*M* = 4.88, *SD* = 1.52), caring (*M* = 5.87, *SD* = 1.14), and excited (*M* = 3.45, *SD* = 1.71). These are examined as single items (rather than a compound measure), as has been done in prior crisis research examining discrete crisis-related emotions (e.g., Jin et al., 2014; Jin et al., 2016).

Behavioral responses. Behavioral responses to the crisis information were were adapted from prior research (Austin et al., 2012; Fraustino, 2014; Fraustino et al., 2014; Liu et al., 2013; Liu et al., 2015a, 2015b), assessed in terms of participants intentions to seek, share, and/or create information; likelihood to take a host of recommended or protective actions; and (newly constructed) intentions to contribute to relief efforts.

Communicative behaviors. Communicative behaviors included seeking disaster information and creating/sharing disaster information.

To investigate participants' information seeking behavioral intentions upon receiving initial disaster information, a question asked them to respond to "If I were in this situation, I would look for more information from/by _____," and to rate their levels of agreement/disagreement in relation to a variety of information forms. Respondents rated their disagreement/agreement on a 7-point Likert-type scale, where 1 = strongly disagree and 7 = strongly agree. Specifically, response options included: local newspaper (*M* = 3.34, *SD* = 2.21), national newspaper (*M* = 2.69, *SD* = 1.90), local government website (*M* = 4.91, *SD* = 1.93), federal government website (*M* = 4.06, *SD* = 2.04), television (*M* = 6.19, *SD* = 1.22), blogs (*M* = 2.87, *SD* = 2.00), online videos (*M* = 3.88, *SD* = 2.17), YouTube (*M* = 3.10, *SD* = 2.07), Instagram (*M*

= 2.51, *SD* = 1.89), Vine (*M* = 2.06, *SD* = 1.60), Facebook (*M* = 4.09, *SD* = 2.20), Twitter (*M* = 3.40, *SD* = 2.22), text messages (*M* = 4.72, *SD* = 2.07), phone calls (*M* = 5.15, *SD* = 1.85), face-to-face conversations (*M* = 5.40, *SD* = 1.65), and other sites devoted to photo/video sharing (e.g., Flickr, Pinterest) (*M* = 2.56, *SD* = 1.80).

To look at participants' information creation and information sharing behavioral intentions upon receiving initial disaster information, participants were again asked to rate their levels of agreement/disagreement in relation to a variety of statements regarding what they would/not do if they were in the disaster situation. Respondents rated their disagreement/agreement on a 7-point Likert-type scale, where 1 = strongly disagree and 7 = strongly agree. Specifically, response options included: "like" a friend's Facebook post about the disaster (*M* = 3.09, *SD* = 1.97), "retweet" a friend's tweet about the disaster (*M* = 3.43, *SD* = 2.15), email a news website link to other people (*M* = 4.06, *SD* = 2.08), use face-to-face conversations to tell people I know (e.g., family friends, co-workers, etc.) about the disaster (*M* = 5.50, *SD* = 1.57), email people I know (e.g., family, friends, co-workers, etc.) to tell them about the disaster (*M* = 4.55, *SD* = 2.01), call people I know (e.g., family, friends, and co-workers, etc.) via phone to talk about the disaster (*M* = 5.64, *SD* = 1.56), text people I know (e.g., family, friends and co-workers, etc.) about the disaster (*M* = 5.43, *SD* = 1.81), "like" a government Facebook post about the disaster on my Facebook page (*M* = 3.92, *SD* = 2.19), comment on a government Facebook page about the disaster (*M* = 3.11, *SD* = 2.00), post information on my friends' Facebook pages or groups about the disaster (*M* = 3.55, *SD* = 2.14), retweet a government Twitter post about the disaster (*M* = 3.31, *SD* = 2.20), tweet about the disaster (*M* = 3.18, *SD* = 2.16), write

a blog post on my own blog about the disaster (M = 2.30, SD = 1.71), post a comment on someone else's blog about the disaster (M = 2.58, SD = 1.88), comment on someone else's YouTube video about the disaster (M = 2.43, SD = 1.76), "like" or comment on someone else's picture related to the disaster on a site dedicated to photo sharing (e.g., Instagram, Flickr, Pinterest) (M = 2.77, SD = 1.94), upload a picture related to the disaster on a site dedicated to video sharing (e.g., Vine) (M = 2.85, SD = 1.98), look for more information form the National Weather Service/NOAA website (M = 6.06, SD = 1.33), and listen for more information form the National Weather Service/NOAA weather radio (M = 5.80, SD = 1.51).

Protective behaviors. To examine the extent to which participants would intend to take recommended or other protective actions, six items were administered. In particular, respondents were prompted with "If you were in this disaster situation, please indicate how likely/unlikely you would be to take each of the following actions by clicking the bubble that best indicates the likelihood of your actions," and rated their likelihood on a 7-point Likert-type scale (1 = very unlikely, 7 = very likely) in response to the following options: evacuate from the area affected by the disaster no matter what (M = 5.19, SD = 1.51), evacuate from the area affected by the disaster if instructed to evacuate by government officials (M = 6.22, SD = 1.08), follow government instructions step-by-step (M = 5.85, SD = 1.19), tell others to follow government instructions (M = 5.50, SD = 1.50), look for ore information from government sources (M = 5.83, SD = 1.27), and look for more information from news media sources (M = 6.11, SD = 1.02).

Relief contribution behaviors. To investigate the extent to which respondents would intend to contribute to disaster relief efforts if experiencing the hypothetical disaster, five additional items were administered using the same prompt and Likert-type scale as with protection behaviors detailed above. Responses to this question set, however, included: donate money to disaster relief efforts (M = 4.33, SD = 1.72), volunteer time to help others affected by the disaster (M = 4.70, SD = 1.74), take a leadership role in volunteer disaster relief efforts (M = 3.58, SD = 1.87), tell others to donate money to disaster relief efforts (M = 3.92, SD =1.87), and tell others to volunteer time to help others affected by the disaster (M = 4.08, SD = 1.87).

Both relief contribution and protective action questions were used in analysis as individual items, but Principal Components Analysis (PCA) conducted while investigating a hypotheses later reduces these variables to two components with excellent reliability, as will be reported in results in the next chapter.

Manipulation checks. To gauge the experimental manipulations, a question was posted to participants asking them to "Please select the number that best indicates your agreement/disagreement with each of the following three items about whether the flood information you saw included or did not include crisis visuals." The three statements that participants selected their assessments in regard to were "I saw a fully moving video of the flood and heard a person talking," and "I saw several still pictures of the flood and heard a person talking" and "I saw a black background and heard a person talking (no pictures or video)" (1 = strongly disagree, 7 = strongly agree).

Multivariate analysis of variance (MANOVA) assessed whether there were the expected significant differences among the mean vectors related to the three sets of visual manipulations. However, Lavene's test revealed that homogeneity of error variances (homoscedasticity) assumption was violated. This could be because the difference between continuously moving visuals and moving still visuals is not starkly evident; and further, the no-visual condition cell is singular whereas the still and moving conditions contain three cells each (slow-, medium-, and fast-paced). Because the cell size ratios in this conceptualization nonetheless remained lower than 4:1; because the overall model was significant, and the univariate tests are particularly robust to this violation; because the pattern of means were highly consistent with expectations; and because the manipulation of visuals was precisely designed from the production standpoint, moving forward using Pillai's Trace (which is more robust to such violations and most powerful; Tabachnick & Fidell, 2001) rather than Wilks' Lambda was deemed appropriate. Indeed, a multivariate main

effect of treatment condition was observed, Pillai's Trace = 1.39, $F(18, 1266) = 60.35$, $p < .001$, par. $\eta^2 = .46$. And significant differences in the appropriate directions among all three conditions were found: No visual, $F(6, 422) = 542.27$, $p < .001$, par. $\eta^2 = .89$; still visuals, $F(6, 422) = 67.05$, $p < .001$, par. $\eta^2 = .49$; moving visuals, $F(6, 422) = 77.06$, $p < .001$, par. $\eta^2 = .52$.

Therefore manipulation of disaster visuals for experiment 2 was successful. Results of ANOVA, MANOVA, *t*-tests, principal component analysis, and regression analysis (p set at .05) to address the hypotheses and research questions are reported next.

Chapter 4: Results

Results are organized in order of hypotheses and research questions. Pilot experiment 1 and experiment 2 results are reported in turn under each hypothesis or research question heading as relevant, rather than in two separate sections. This organization is meant to aid in side-by-side comparison across the two samples and to build a more easily digestible chain of evidence when possible, given the nearly identical predictions/questions in study one and study two.

Hypothesis 1 Results

H1 asserted that regardless of crisis information source, participants would report strongest intentions to seek information via offline interpersonal forms and television immediately following exposure to hypothetical disaster information.

Experiment 1

Information seeking from a variety of sources was not measured in pilot experiment 1. Results to examine this hypothesis were investigated in experiment 2, reported next.

Experiment 2

Participants' responses across the board regarding where they would seek additional information if experiencing the disaster were examined. Table 4.1 shows mean responses regarding participants likelihoods to look for additional crisis news from a variety of forms and sources, with participants generally reporting highest mean likelihood to turn to television, face-to-face conversations, and phone calls and

generally reporting lowest mean likelihood to turn to photo-sharing sites, Instagram, and Vine.

Table 4.1
Likelihood to Seek Additional Crisis Information from a Variety of Forms/Sources

Form	*M*	*SD*
Television	6.19	1.22
Face-to-face conversations	5.40	1.65
Phone calls	5.15	1.85
Local government website	4.91	1.93
Text messages	4.72	2.07
Facebook	4.09	2.20
Federal government website	4.06	2.04
Online videos	3.88	2.17
Twitter	3.40	2.22
Local newspaper	3.34	2.21
YouTube	3.10	2.07
Blogs	2.87	2.00
National newspaper	2.69	1.90
Other sites devoted to video/photo sharing (e.g., Flickr, Pinterest)	2.56	1.81
Instagram	2.51	1.89
Vine	2.06	1.59

Thus the pattern of means indicate that participants were generally more likely to seek crisis information from offline interpersonal forms and television than from some forms of online media, as predicted.

Hypothesis 2 Results

H2 predicted that regardless of source, participants in the no-crisis-visual condition would rate the crisis information as more credible than would those in the still-crisis-visual and/or moving-crisis-visual conditions.

Experiment 1

To investigate whether there were significant mean differences in assessments of credibility based on treatment conditions (no visual vs. visual), one-way analysis of variance (ANOVA) was conducted (although a *t*-test for this hypothesis in the pilot design with only two levels in the independent variable would also be appropriate). Data were screened to ensure meeting ANOVA assumptions regarding lacking outliers, approximating normal distribution, and homogeneity of variance.[5]

With visual treatment condition (regardless of source) as the independent variable and the credibility scale as the dependent variable, ANOVA revealed no significant mean differences between the no-visual condition (M = 5.29, SD = 1.07) and the visual treatment condition (M = 5.29, SD = 1.10) in their perceptions of information credibility, $F(1, 292) = .001$, *n.s.*

Thus the second hypothesis was not supported in pilot experiment 1.

Experiment 2

One-way analysis of variance (ANOVA) again examined this hypothesis. The variable was positively skewed, but ANOVA is robust to skewness. No main effect of treatment condition on credibility assessments was detected, $F(6, 422) = 1.06$, p = n.s. Overall credibility assessments were high across conditions, as depicted in Table 4.2.

[5] Box plot inspection revealed two outliers; before considering variable transformation or the Kruskal-Wallis *H*-test, the ANOVA was run with and without the outliers included and negligible differences were produced, so the outliers were retained for analysis. Visual inspection of normal Q-Q plots showed approximately normal distribution. And Levene's test of equality of variance was not significant, indicating homogeneity of variance.

Table 4.2
Mean Credibility Assessments by Treatment Condition

Condition	*M*	*SD*
C1 (No Visual)	*6.02*	*.13*
C2 (Still, Slow)	*5.90*	*.12*
C3 (Still, Medium)	*5.89*	*.12*
C4 (Still, Fast)	*5.85*	*.13*
C5 (Moving, Slow)	*5.65*	*.13*
C6 (Moving, Medium)	*6.03*	*.12*
C7 (Moving, Fast)	*5.82*	*.12*

Thus, the second hypothesis also was not supported in experiment 2.

Hypothesis 3 Results

H3 offered that the pace of crisis visuals and participants' cognitive responses are curvilinearly related. Specifically, H3 predicted that initially as stimulus video pace increased so would cognitive responses; however, beyond moderate pace, cognitive responses were predicted to decrease as a result of cognitive overload.

Experiment 1

This hypothesis did not apply to the pilot experiment 1 design; it is addressed in experiment 2 results next.

Experiment 2

Particularly, this hypothesis reflected an interest in determining the extent to which visual pacing impacted cognitive processing at the encoding stage, as measured by aided recall. To assess whether the magnitude or strength of the visual pacing as a predictor of cognitive processing (specifically encoding) was nonlinear, a variable was calculated to represent the quadratic function. To do this and assess the

potentially curvilinear rather than linear relationship, a new variable was computed by squaring the treatment condition variable. Then hierarchical multiple regression was implemented, with condition entered into the first block and the new condition-squared variable entered into the second block to predict auditory recognition (i.e., aided recall). The linear effect indicated by the first block was not significant. The nonlinear addition (control-squared variable) to the regression model (block two) was also not statistically significant; the change in R^2 was not significant between both blocks nor for the entire model. The two predictor variables for this investigation would be highly correlated, making mulitcollinearity a potential concern, but given the lack of model fit no further examination of tolerance was necessary.

To look at this from another perspective, a one-way ANOVA assessed whether mean differences were observed among the treatment condition groups in relation to participants' responses to the auditory recognition questionnaire items. No main effect of condition on aided recall was detected, $F(6, 412) = .99$, p = n.s. The consistent pattern of means, however, did appear somewhat in the predicted directions, which is interesting despite the lack of significant differences between and among groups. That is, those who saw no visuals exhibited the lowest mean recall of all treatment conditions. Further, the still visual conditions overall exhibited higher mean recall than did the moving visual condition. Yet the mean recall consistently fell as pace increased from slow to medium to fast (rather than increasing until cognitive overload and then decreasing as predicted). Again, however, despite this noticeable pattern, no statistically significant differences among groups were revealed. Perhaps larger sample size would allow for detection of statistical significance in this

consistent pattern. Table 4.3 displays aided recall score means by treatment condition.

Table 4.3:
Aided Recall Scores by Treatment Condition

Condition	Mean	SD
C1: No visual	3.68	.15
C2: Still, slow	4.08	.14
C3: Still, medium	3.94	.14
C4: Still, fast	3.87	.14
C5: Moving, slow	3.83	.15
C6: Moving, medium	3.78	.14
C7: Moving, fast	3.70	.14

Additionally, to assess whether any group mean differences were evidenced across treatment conditions in relation to perceived information complexity, information credibility, self-efficacy, and level of involvement, MANOVA did not show a significant multivariate model,

Therefore hypothesis 3 was not supported.

Hypothesis 4 Results

Similarly, H4 also offered that the pace of crisis visuals and participants' cognitive responses are curvilinearly related; and particularly it offered that initially as stimulus video pace increased so would behavioral responses; however, beyond moderate pace, behavioral responses were predicted to decrease as a result of cognitive overload.

Experiment 1

This hypothesis did not apply to the design of pilot experiment 1. Somewhat similar ideas will be explored by research questions later in this chapter; in the meantime, H4 is tested in experiment 2 results reported next.

Experiment 2

Given that encoding did not appear to be significantly influenced by pacing of visuals as determined by investigating the third hypothesis, and message processing is a partial prerequisite for taking actions promoted or inspired by the message (e.g., Fox et al., 2004; Lang, 1999, 2001), it was unlikely at this point that this hypothesis would be supported.

Nonetheless, principal components analysis with Varimax rotation with Kaiser normalization was performed on all the protective/recommended action and disaster relief behavioral intentions measured. Two factor loadings were yielded, explaining 67% of the total variance. The correlation matrix showed that all variables had at least one correlation coefficient $r > .3$. The overall KMO measure was .78, with individual KMO measures all greater than .7, classifications of 'middling' to 'meritorious' according to Kaiser (1974), and above the minimum of .50. Bartlett's test of sphericity was statistically significant, $p < .001$. So, overall, PCA was deemed appropriate. Further, it made logical sense that the items loaded cleanly on two factors with a simple structure, as one set of behavioral intentions focuses on actions to take to protect oneself and others and the other set focuses on donating time and resources to relief efforts. The factor structure was confirmed by looking at the scree plot, which showed two factors “above the bend,” and variance explained by

individual components, as well as confirmed by the eigenvalue-one criterion and total variance explained criterion. Component loadings and communalities of the rotated solution are presented in Table 4.4.

Table 4.4
Rotated Structure Matrix for PCA with Varimax Rotation and Two Components

Behavioral Intention Items	Component 1	Component 2	Communalities
Tell others to volunteer time to help others affected by the disaster.	**.896**	-.492	.820
Tell others to donate money to disaster relief efforts.	**.881**	-.480	.794
Take a leadership role in volunteer disaster relief efforts.	**.874**	-.431	.765
Volunteer time to help others affected by the disaster.	**.844**	-.395	.740
Donate money to disaster relief efforts.	**.796**	.434	.663
Follow government instructions step by step.	.661	**.875**	.774
Look for more information from government sources.	.658	**.804**	.678
Evacuate from the area affected by the disaster if instructed to evacuate by government officials.	.646	**.786**	.619
Tell others to follow government instructions.	.566	**.784**	.670
Look for more information from news media sources.	.394	**.730**	.546
Evacuate from the area affected by the disaster no matter what.	.491	**.515**	.271

Therefore two scales were constructed accordingly to reflect protective action behaviors (Chronbach's $\alpha = .84$) and relief effort behaviors (Chronbach's $\alpha = .91$)—each with good to excellent reliability.

ANOVA examined whether mean differences in protective action behaviors were evident based on treatment condition, but they were not, $F(6, 421) = .57$, $p = n.s.$ Further, ANOVA also found no significant mean differences between treatment groups in their likelihood to engage in relief effort behaviors as well, $F(6, 421) = .98$, $p = n.s.$

Thus hypothesis 4 was not supported.

Hypothesis 5 Results

H5 predicted that regardless of visual pace, no visuals and still visuals would produce lesser auditory message recognition (i.e., aided recall) than would moving visuals, except for the fast-pace moving condition (wherein cognitive processing was posited to exceed resources and inhibit encoding).

Experiment 1

To examine whether no visuals would produce lesser auditory recall than moving visuals, an independent-sample *t*-test was implemented to test whether those in the non-visual treatment condition and the moving-visual treatment condition, regardless of source, exhibited a statistically significant mean difference in auditory recognition (i.e., the aided recall total score). Data were screened to ensure compliance with assumptions of a lack of outliers, normal distribution, and homogeneity of variance. Yet no significant differences between the visual condition

(M = 3.27, SD = 1.33) and the non-visual condition (M = 3.19, SD = 1.25) were detected.

Thus, hypothesis 5 was not supported by experiment 1 data.

Experiment 2

The still visual and moving visual conditions from the treatment group variable were collapsed into a dichotomous categorical variable (i.e., all paces of still, all paces of moving). An independent-sample t-test revealed no significant differences between mean aided recall in the still visual condition (M = 3.96, SD = 1.02) and the moving visual condition (M = 3.77, SD = 1.13), $t(362) = 1.7$, $p = .09$ (equal variances not assumed). To look at this another way, the treatment condition variable was recoded into four levels: no visual, all paces of still visuals, slow and medium pace moving visuals, and fast visuals. One-way ANOVA again indicated no significantly different mean aided recall differences between groups (*n.s.*).

Therefore hypothesis 5 was not supported in experiment 2.

Hypothesis 6 Results

The three-part H6 asserted that females would report greater intentions to (a) take all measured protective actions, (b) engage in all measured disaster relief efforts, and (c) seek additional disaster information.

Experiment 1

MANOVA was conducted to investigate the linear composite of the means for behavioral intentions between males and females. Visual examination of box plots showed two potential outliers for the "evacuate from the area affected by the disaster

if instructed to evacuate by government officials" item as well as the "look for more information from news media sources" item, and one for the "volunteer time to help others affected by the disaster" variable. Only one was a severe multivariate outlier as determined by Mahalonobis Distance ($p < .001$), and running the analysis with and without the outlier did not substantially alter results. It is worth noting that the Box's test of equality of covariance matrices precisely met the cutoff for assuming homogeneity of variance-covariances matrices ($p = .001$).

A significant multivariate main effect of biological sex on behavioral intentions was apparent, Wilks' $\lambda = .89$, $F(11, 272) = 3.12$, $p = .001$, par. $\eta^2 = .11$. Univariate analysis revealed significant differences between males and females in all measured behavioral intention outcomes except for likelihood to take a leadership role in volunteer disaster relief efforts. Specifically, protective actions, relief efforts, and information-seeking-intention mean differences by biological sex included the following:

When it came to likelihood to intend to take protective/recommended actions, females ($M = 5.12$, $SE = .13$) were more likely than males ($M = 4.63$, $SE = .13$) *to evacuate from the area affected by the disaster no matter what*, $F(1, 282) = 6.98$, $p = .01$, par. $\eta^2 = .02$. Females ($M = 6.31$, $SD = .09$) were also more likely than males ($M = 5.97$, $SD = .09$) t*o evacuate from the area affected by the disaster if instructed to evacuate by government officials*, $F(1, 282) = 6.71$, $p = 01$, par. $\eta^2 = .02$. Females ($M = 5.84$, $SE = .11$) were more likely than males ($M = 5.36$, $SE = .12$) t*o follow government instructions step by step*, $F(1, 282) = 8.98$, $p = .003$, par. $\eta^2 = .03$. Females ($M = 5.71$, $SE = .12$) were more likely than males ($M = 5.16$, $SE = .12$) t*o*

tell others to follow government instructions $F(1, 282) = 10.41$, $p = .001$, par. $\eta^2 = .04$.

Similarly, females ($M = 4.62$, $SE = .14$) were more likely than males ($M = 4.12$, $SE = .14$) *to intend to donate money to relief efforts*, $F(1, 282) = 6.17$, $p = .01$, par. $\eta^2 = .02$. In addition, females ($M = 5.15$, $SE = .13$) reported stronger intentions than did males ($M = 4.14$, $SE = .13$) *to volunteer time to help others affected by the disaster*, $F(1, 282) = 16.31$, $p < .001$, par. $\eta^2 = .06$. Females ($M = 4.50$, $SD = .14$) also were more likely than were males ($M = 3.89$, $SE = .14$) to intend t*o tell others to donate money to disaster relief efforts*, $F(1, 282) = 9.83$, $p = .002$, par. $\eta^2 = .03$. Also, females ($M = 4.76$, $SE = .14$) were more likely than males ($M = 4.02$, $SE = .14$) t*o tell others to volunteer time to help others affected by the disaster*, $F(1, 282) = 14.19$, $p < .001$, par. $\eta^2 = .05$.

In addition, females ($M = 5.98$, $SE = .11$) were more likely than males ($M = 5.45$, $SE = .11$) *to look for more information from government sources*, $F(1, 282) = 12.39$, $p = .001$, par. $\eta^2 = .04$. Likewise, females ($M = 6.07$, $SE = .10$) were more likely than males ($M = 5.60$, $SE = .10$) to intend *to look for more information from news media sources*, $F(1, 282) = 10.68$, $p = .001$, par. $\eta^2 = .04$.

Thus hypothesis 6 was supported by experiment 1 data.

Experiment 2

To probe mean differences in likelihood to take the full host of protective and preventative actions as well as contribute to relief aid efforts based on gender, MANOVA revealed a significant multivariate model, Pillai's Trace = .52, $F(10, 416) = 2.28$, $p = .01$, par. $\eta^2 = .05$. Univariate analysis uncovered that females ($M = 6.34$,

SD = .07) were more likely than males (*M* =6.08, *SD* = .08*) to intend to evacuate from the area affected by the disaster if instructed to evacuate by government officials*, $F(1, 416) = 5.33$, $p = .02$, par. $\eta^2 = .01$. Females (*M* = 5.99, *SD* = .08) were also more likely than were males (*M* = 5.67, *SD* = .09) *to intend to follow government instructions step by step*, $F(1, 416) = 7.82$, $p = .01$, par. $\eta^2 = .02$. And females (*M* = 5.68, *SD* = .10) were more likely than males (*M* = 5.30, *SD* = .12) *to intend tell others to follow government instructions* $F(1, 416) = 7.73$, $p = .01$, par. $\eta^2 = .02$. There were not statistically significant mean differences by gender in relation to intentions to take any of the other protective/recommended actions.

Related to relief efforts, only one measured outcome exhibited a significant gender difference in behavioral intentions: Females (*M* = 4.47, *SD* = .11) were marginally significantly more likely than were males (*M* = 4.14, *SD* = .13) to intend *to donate money to disaster relief effort*s, $F(1, 416) = 3.83$, $p = .05$, par. $\eta^2 = .01$. That is, there were no observed gender differences in likelihood to: *volunteer time to help others affected by the disaster* (female: *M = 4.82, SD* = .12; male: *M* = 4.55, *SD* = .13), *take a leadership role in volunteer disaster relief efforts* (female: *M* = 3.53, *SD* = .12; male: *M* = 3.64, *SD* = .12), *tell others to donate money to disaster relief efforts* (female: *M* = 4.01, *SD* = 3.80, *SD* = .14), or *tell others to volunteer time to help others affected by the disaster* (female: *M* = 4.15, *SD* = .12; male: *M* = 4.00, *SD* = .14).

Finally, females (*M* = 6.20, *SD* = .07) reported significantly greater intentions than did males (*M* = 5.99*, SD* = .08) to look for more information from news media sources, $F(1, 4.55) = 4.41$, $p = .04$, par. $\eta^2 = .01$. However, there were no differences

between females' (M = 5.88, SD = .08) and males' (M = 5.78, SD = .09) intentions to look for more information from government sources.

To further investigate hypothesized gender differences in seeking information from a variety of forms/sources, MANOVA revealed a significant multivariate model, Wilks' $\lambda = .94$, $F(16, 426) = 1.73$, $p = .04$, par. $\eta^2 = .06$. Univariate post-hocs used Bonferonni step-wise correction to protect the alpha given the number of dependent measures. Contrary to expectations, analysis revealed that the multivariate main effect of gender on information seeking was being entirely driven by males (M = 3.66, SD = .16) being more likely than females (M = .3.22, SD = .14) to intend to get more crisis information from Twitter, $F(1, 412)$, $p = .04$, $\eta^2 = .01$.

Thus hypotheses 6a and 6b, and 6c were each partially supported.

Hypothesis 7 Results

Further, for the final hypothesis, females were expected to report greater likelihood to feel higher levels of all measured crisis-related emotions if they were experiencing the hypothetical disaster.

Experiment 1

MANOVA tested the prediction that there would be significant differences in males' and females' likelihood to feel crisis-related emotions upon learning about (hypothetical) extreme flooding. As predicted, a multivariate main effect of gender on emotional responses to crisis information was uncovered, Wilks' $\lambda = .82$, $F(10, 270) = 5.79$, $p < .001$, par. $\eta^2 = .18$.

Further analysis showed a univariate main effect of gender on reported likelihood to feel scared, outraged, sympathetic, shocked, anxious, confused, sad, and caring. Specifically, females (M = 5.79, SE = .12) reported likelihood to feel stronger anger than did males (M = 4.67, SE = .12), $F(1, 279) = 41.05$, $p < .001$, par. $\eta^2 = .13$. Females (M = 3.66, SE = .15) also were likely to feel stronger outrage than were males (M = 3.24, SE = .15), $F(1, 279) = 4.05$, $p = .045$, par. $\eta^2 = .01$. Females (M = 6.20, SE = .10) said they would feel greater sympathy than males did (M = 5.55, SE = .10), $F(1, 270) = 20.75$, $p < .001$, par. $\eta^2 = .07$. Following suit, females (M = 5.30, SE = .13) reported stronger shock than did males (M = 4.67, SE = .13), $F(1, 279) = 11.26$, $p = .001$, par. $\eta^2 = .04$. Females (M = 5.84, SE = .12) also were more likely to feel anxious than were males (M = 4.93, SE = .12), $F(1, 279) = 26.74$, $p < .001$, par. $\eta^2 = .09$. Females (M = 4.00, SE = .14) reported likelihood to feel more intense confusion than did males (M = 3.28, SE = .14), $F(1, 279) = 12.60$, $p < .001$, par. $\eta^2 = .04$. Females (M = 5.33, SE = .13) were more likely to feel stronger sadness as well, in comparison to males (M = 4.61, SE = .12) $F(1, 279) = 16.37$, $p < .001$, par. $\eta^2 = .06$. Likewise, females (M = 6.06, SE = .10) reported greater likelihood to feel caring toward people affected by the disaster than were males (M = 5.48, SE = ,10), $F(1, 279) = 16.75$, $p < .001$, par. $\eta^2 = .06$.

Univariate analysis did not find significant differences in male' and females' reported likelihood to feel hopeful or excited.

Thus hypothesis 7 was dominantly supported in experiment 1.

Experiment 2

To probe whether mean differences in several discrete crisis-related emotions were apparent based on participant gender, MANOVA was again conducted. A significant multivariate effect of gender on emotions was observed, Pillai's Trace = .15, $F(10, 416) = 7.35$, $p < .001$, par. $\eta^2 = .15$. Probing further, analysis showed a significant univariate main effect of gender on likelihood to feel scared by what happened, sympathetic toward people affected by the disaster, shocked by what happened, anxious about what could happen next, sad about what happened, and caring toward people affected by the disaster. Specifically, females ($M = 5.63$, $SD = .10$) were more likely than males ($M = 4.53$, $SD = .11$) to feel scared, $F(1, 416) = 56$, $p < .001$, par. $\eta^2 = .12$. Further, females ($M = 6.16$, $SD = .08$) were more likely than males ($M = 5.86$, $SD = .09$) to feel sympathetic toward the people affected by the disaster, $F(1, 9) = 5.96$, $p = .02$, par. $\eta^2 = .01$. Females ($M = 5.14$, $SD = .10$) were also more likely than males ($M = 4.63$, $SD = .12$) to feel shocked, $F(1, 416) = 10.92$, $p = .001$, par. $\eta^2 = .03$. Similarly, males ($M = 5.10$, $SD = .10$) were less likely than females ($M = 5.77$, $SD = .09$) to feel anxious, $F(1, 416) = 23.34$, $p < .001$, par. $\eta^2 = .05$; and they ($M = 4.81$, $SD = .12$) were less likely than females ($M = 5.28$, $SD = .10$) to feel sad, $F(1, 416) = 9.25$, $p = .003$, par. $\eta^2 = .02$. And finally, females ($M = 6.04$, $SD = .07$) were more likely than males ($M = 5.64$, $SD = .08$) to feel caring, $F(1, 416) = 12.88$, $p < .001$, par. $\eta^2 = .03$.

There were not significant differences in females' and males' likelihood to feel outraged, confused, hopeful, or excited.

Thus hypothesis 6 was partially supported in experiment 2 as well.

Research Question 1 Results

RQ1 asked how else, if at all, does crisis information source influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

Experiment 1

Cognitive responses. MANOVA investigated potential significant differences in effects of crisis information source on participants' cognitive responses, Wilks' $\lambda = .95$, $F(5, 280) = 2.70$, $p = .02$, par. $\eta^2 = .05$.

Further examination revealed a univariate main effect of source on participants' perceptions of information complexity as well as information credibility. Namely, those who received the initial disaster information from the National Weather Service deemed the crisis information as more credible ($M = 5.50$, $SE = .96$) than did those who received the information from *USA Today* ($M = 5.14$, $SE = 1.17$), $F(1, 284) = 8.17$, $p = .005$, par. $\eta^2 = .03$. Yet, those who received the information from the National Weather Service also perceived the disaster information as more complex (i.e., less comprehensible) ($M = 5.90$, $SD = 1.01$) than did those who received the same information from *USA Today* ($M = 5.61$, $SD = 1.23$), $F(1, 284) = 5.05$, $p = .03$, par. $\eta^2 = .02$—regardless of visuals.

Affective responses. No effects of crisis information source on affective responses to disaster information were detected (*n.s.*).

Behavioral responses. Similarly, no effects of crisis information source on behavioral responses to disaster information were detected (*n.s.*).

Note: this research questions was not examined in experiment 2, as source was not manipulated.

Research Question 2 Results

RQ2 asked how else, if at all, do crisis visuals influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

Experiment 1

Cognitive Responses. MANOVA examined the effects of visuals on cognitive response (with the exception of credibility and auditory aided recall, as those were addressed in hypothesis testing above). However, no multivariate main effect of visuals (i.e., no visual vs. moving visual) on cognitive disaster responses (i.e., perceived complexity of information, perceived severity of the disaster, level of involvement with the disaster, and level of disaster self-efficacy) was uncovered (*n.s.*).

Affective Responses. Again MANOVA was employed to examined effects of visuals on participants' affective responses to disaster information. However, there was no multivariate main effect of visuals on the host of measured affective responses.

Behavioral Responses. Unlike for cognitive and affective responses, visuals did indeed exert an effect on some behavioral responses. That is, a multivariate main effect of crisis visuals was detected in relations to behavioral intentions, Wilks' λ = .92, $F(11, 273) = 2.19$, $p = .02$, par. $\eta^2 = .08$. Specifically, univariate analysis revealed

main effects of visuals on intentions to look for more information from news media sources, $F(1, 283) = 4.93$, $p = .03$, par. $\eta^2 = .02$; to volunteer time to help others affected by the disaster, $F(1, 283) = 11.23$, $p = .001$, par. $\eta^2 = .04$; to take a leadership role in volunteer disaster relief efforts, $F(1, 283) = 5.39$, $p = .02$, par. $\eta^2 = .02$; to tell others to donate money to disaster relief efforts, $F(1, 283) = 7.15$, $p = .01$, par. $\eta^2 = .03$; and to tell others to volunteer time to help others affected by the disaster, $F(1, 283) = 10.29$, $p = .001$, par. $\eta^2 = .04$. Even more specifically, those who received the crisis information with no visuals ($M = 5.99$, $SE = 1.15$) were more likely to report intentions to look for more information from news media sources than were those who received the information including moving visuals ($M = 5.67$, $SE = 1.28$). But participants who received the information with no visuals were also more likely to intend to volunteer time to help others affected by the disaster ($M = 5.07$, $SD = 1.56$; as opposed to those in the visual condition, $M = 4.45$, $SD = 1.53$); to take a leadership role in volunteer disaster relief efforts ($M = 4.17$, $SD = 1.71$; as opposed to those in the visual condition, $M = 3.71$, $SD = 1.65$); to tell others to donate money to disaster relief efforts ($M = 4.44$, $SD = 1.60$; as opposed to those in the visual condition, $M = 3.92$, $SD = 1.69$); and to tell others to volunteer time to help others affected by the disaster ($M = 4.69$, $SD = 1.65$; as opposed to the visual condition, $M = 4.06$, $SD = 1.69$).

Experiment 2

Cognitive Responses. Cognitive outcomes in relation to visual treatment conditions were examined through hypotheses above.

Affective Responses. MANOVA showed no multivariate main effect of treatment condition on participants' likelihood to feel a host of crisis-related discrete emotions.

Behavioral Responses. Again, most behavioral intention outcomes as a function of crisis visuals in the stimuli were investigated through hypotheses above. The exceptions are related to visuals' effects on information seeking intentions from a variety of forms and sources as well as information creation/sharing intentions from a variety of forms and sources after exposure to initial disaster information. MANOVA showed that visual treatment conditions did not produce significant differences in relation to information seeking from a variety of sources. In addition, MANOVA revealed no statistically significant mean vector differences in relation to crisis information sharing/creating as well.

Research Question 3 Results

RQ3 asked how else, if at all, do crisis information source and crisis visuals jointly influence participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event?

Experiment 1

Cognitive Responses. No interaction effects of source and visuals were detected in relation to cognitive responses to disaster information (*n.s.*).

Affective Responses. No interaction effects of source and visuals were detected in relation to affective responses to disaster information (*n.s.*).

Behavioral Responses. No interaction effects of source and visuals were detected in relation to behavioral responses to disaster information (*n.s.*).

Note: this research questions was not examined in experiment 2, as source was not manipulated.

Research Question 4 Results

The final research question, RQ4, asked how else, if at all, biological sex might be related to participants' reported (a) cognitive, (b) affective, and (c) intended behavioral responses to a hypothetical extreme flooding event.

Experiment 1

Cognitive Responses. MANOVA probed whether there was a statistically significant influence of gender on cognitive responses to disaster information. A multivariate main effect of gender was uncovered, Wilks' $\lambda = .93$, $F(5, 278) = 2.19$, $p = .001$, par. $\eta^2 = .08$. Exploring this further with Bonferonni alpha adjustment ($p < .25$) uncovered a univariate main effect of gender on reported levels of involvement in the disaster situation, $F(1, 284) = 6.17$, $p = .01$, par. $\eta^2 = .02$. That is, males ($M = 2.18$, $SE = .11$) reported higher levels of involvement in the disaster scenario than did females ($M = 2.18$, $SE = .11$), although both genders reported relatively low involvement levels (below the scale midpoint).

Affective Responses. Affective outcomes as they relate to gender were examined through hypothesis 7 above, which was partially supported.

Behavioral Responses. The relationship between gender/biological sex and behavioral intentions to engage in a variety of crisis-related actions was looked at in hypothesis 6 above, which was supported.

Experiment 2

Cognitive Responses. The relationship between biological sex and perceived information credibility and information complexity, level of involvement, level of self-efficacy, and perceived disaster severity were examined. MANOVA revealed that there was a significant main effect of gender on cognitive responses to disaster information, Wilkes' $\lambda = .96$, $F(5, 421) = 3.42$, par. $\eta^2 = .04$. Specifically, gender exerted a main affect on levels of disaster involvement, $F(1, 416) = 17.16$, par. $\eta^2 = .04$, wherein males ($M = 1.98$, $SD = .07$) reported stronger involvement in the disaster than did females ($M = 1.59$, $SD = .06$), similar to experiment 1 results. It is worth noting here that again both males and females reported extremely low levels of involvement, well below the 7-point scale midpoint.

Affective Responses. Affective outcomes as they relate to gender were examined through hypothesis 7 above, which was partially supported.

Behavioral Responses. The relationship between gender/biological sex and behavioral intentions to engage in a variety of crisis-related actions was looked at in hypothesis 6 above, which was partially supported.

Now having tested all hypotheses and investigated all research questions, discussing these results' theoretical and practical implications, as well as this study's limitations, is warranted. Chapter 5 will do so before recapping and concluding.

Chapter 5: Discussion

This chapter discusses some of the key results from the two experiments detailed in the previous chapter. First cognitive, affective, and behavioral responses to the disaster information are examined further in light of previous and suggested future studies as well as practical implications. Then theoretical implications are expanded upon. This work concludes by touching on some of the studies' limitations and recapping with final remarks.

Cognitive Responses

Pertaining to involvement with the disaster situation, this work's findings uncovered a novel insight that was consistent across both experiments. Namely, in both studies, those who self-identified as male reported significantly higher levels of involvement in the crisis than did those who identified as female. It is worth noting that levels of involvement were low across the board (i.e., well below the midpoint in both experiment samples), though, and that the effect sizes of these findings were low. Nonetheless, if in general males experience greater involvement with flooding disaster information communicated via online videos or podcasts, this has theoretical and practical implications. For example, as discussed in Chapter 2, situational theory of publics (STP) holds involvement as a key variable in understanding and segmenting various types of publics (e.g., Aldoory et al., 2010; Grunig et al., 2006; Grunig, 1997). Further, disaster involvement has been found to impact publics' crisis information seeking and processing behaviors (e.g., Jin et al., 2016; Liu et al., 2015a). And from a more organization-centric perspective, crisis involvement has been found

to moderate the relationship between message framing and post-crisis attitudes toward the organization (Claeys & Cauberghe, 2014). Ultimately, knowing that males under some conditions may be more involved in the situation opens the door for disaster communicators to better reach this demographic segment with potentially lifesaving information. Further, more research is clearly needed to determine how to increase crisis news receivers' involvement in the disaster, given that overall that mean responses were extremely low (regardless of information source or visuals).

Regarding perceived credibility of crisis information, regardless of crisis information sources and visuals, participants deemed the crisis information highly credible. Yet a previous study found that experiment participants who were exposed to crisis information containing a crisis visual regarding a riot with gun shots fired rated the information as significantly less credible than information without a crisis visual (Fraustino, 2014). Thus, the current research sought to replicate this finding and expand it to a natural disaster context, a more diverse sample (i.e., including but also beyond student convenience samples), and a more sophisticated operationalization of crisis visual (i.e., various still and moving visuals as opposed to a single photo). However, support for this credibility prediction was not observed in either experiment's findings here. Thus, perhaps the previous research's puzzling credibility findings was an artifact of sampling error. If so, this serves as a reminder of the importance of replication in science, especially for puzzling, groundbreaking, or important findings—something that is perhaps not done enough in the crisis communication literature. In addition, future research is needed to determine how visuals can enhance credibility (or at least not diminish it), given the increasing

emphasis on infographics and other visuals, especially related to the visual representation of risk and science, in today's public relations practice; in fact, the Centers for Disease Control and Prevention (CDC, 2016) "encourages the strategic use of infographics when the message is more visual in nature and requires more than data or charts to communicate successfully to the target audience" (CDC, n.d., para 2).

Further, related to both credibility and complexity, an interesting finding emerged. Specifically, in the first experiment, which manipulated information source (NWS vs. *USA Today*) and visuals (no crisis visual vs. moving video crisis visual), it was discovered that participants rated the report from the NWS as more credible than the same exact information from the national news media source. Positive news for government agency crisis communicators, this flies in the face of U.S. trust ratings of federal government, which remain at historically low levels (e.g., Pew Research Center, 2015). Yet, complicating this finding, although the NWS source's information was perceived as more credible, it was at the same time also perceived as more complex (i.e., less comprehensible) than the same information from *USA Today*. This credibility-complexity conundrum highlights the importance of distributing crisis information widely and across not only government but also news media (and other) sources to mitigate ramifications of decreased credibility in some and increased perceptions of complexity in others. It also points to areas for both NWS and *USA Today* to empirically examine to determine the driving mechanisms for these differing audience assessments of their organizations' credibility/complexity. Finally, despite theoretical reason to believe visual pace would impact perceptions of

information complexity, various kinds of visuals (or no visuals at all) did not prompt any differing perceptions regarding the complexity of the crisis information, which is good news for crisis communicators turning to videos, livecasts, and podcasts to relay crisis information. It perhaps goes without saying that communicators would not want important crisis information to be perceived as incomprehensible or complex. Knowing that various ways of presenting moving and still visuals in a YouTube-video-style format does not negatively impact perceived comprehension is useful practical information.

Lastly, despite that journalism research has linked the inclusion of photographs in press and television news stories to viewers' perceptions about the severity of the issue discussed in the story (e.g., Arpan, Maker, Lee, Jung, Lorusso, & Smith, 2006; Gibson & Zillmann, 1999), in the current work's extreme flooding disaster scenario with news portrayed via online video or podcast, viewers did not produce significantly varying perceptions regarding the severity of the flood. This should be examined further to verify in future research and see if it holds true across contexts and forms of information distribution or if it can be replicated as a function of the particular crisis type. The finding certainly runs counter to the "need to see it to believe it" and "picture is worth a thousand words" adages.

Affective Responses

Interestingly, neither crisis information source nor crisis information visuals significantly influenced viewers' levels of crisis-related emotions. Parsing out why, how, and under what conditions crisis visuals prompt different emotions (or do not, as found here) is an important area for research, especially given the connection between

crisis emotions, coping, and resilience (e.g., Jin et al., 2014, 2016). Further, certain emotional reactions to disaster events (such as shock and sorrow in response to a terrorist attack; Fahmy, Cho, Wanta & Song, 2006) can impact subsequent image recall and, in turn, attitudes toward and concern with disasters. This link should be explored in natural disaster settings from public relations perspectives, especially pertaining to online communication, in future research. Similarly, no difference in emotional responses to disaster information based on the source of that information was detected. This results is less surprising, as the effects of source on emotions in prior work have been minimal and inconsistent, as noted in the literature review (e.g., Liu et al., 2015b). Perhaps operationalizing organization and news media differently would have produced different results, but perhaps also those differences would be driven more by individual sources' reputations as opposed to characteristics of the source category itself; this is an empirical question research could address.

Moreover, confirming, diverging from, and expanding prior crisis communication research, affect was, however, significantly associated with biological sex in both of the current studies. As noted in earlier chapters, research has shown in that females in many instances may be more likely than males to take several recommended or protective actions for themselves and others as well as to report feeling more intense discrete crisis-related emotions (e.g., Fraustino, 2014; Freberg, 2012; Fredrickson et al., 1992; Jin et al., 2016; Spence et al., 2008; Tugade et al., 2003). However, it was posited herein that replication is needed to scientifically confirm these finding as well as to substantiate the prediction in slightly different settings (such as in flooding situations) and with regard to information communicated

in various ways (in this instance, visuals)—as well as with more diverse samples and methods. This work set out to meet those calls, finding similarities and differences from prior crisis research and even between studies here.

Specifically, experiment 1 found that after young adults received initial extreme flooding information, females reported greater likelihood than males did to feel *scared* (by what has happened), *outraged* (by what has happened), *sympathetic* (toward people affected by the disaster), *shocked* (by what has happened), *anxious* (about what could happen next), *confused* (by the disaster information), *sad* (about what has happened), and *caring* (toward people affected by the disaster). Yet, in experiment 1, there were not significant differences in males' and females' likelihoods to feel *hopeful* (about disaster recovery) or *excited* (to be involved in the disaster recovery). In the second experiment, females again reported greater likelihood than males did to feel sympathetic, shocked, anxious, sad, and caring, echoing some of the findings from experiment 1 (and prior research such as Fraustino, 2014; Fraustino et al., 2014; Jin et al., 2014); but in the second experiment's sample, there were not differences in males' and females' likelihoods to feel outraged, confused, hopeful, or excited. While the first experiment confirmed prior research findings, expanding it to a natural disaster flooding setting with information received from online videos/podcasts, the second experiment also dominantly confirmed but also diverged insofar as there were not differences observed in females'/males' reports of feeling outraged and confused. Why this conflicting evidence emerged is unclear and a question for future research. Again it is worth noting that there were small effect sizes for these relationships.

Further, past crisis research has tended to examine what could be considered negative emotions (e.g., fright, anger, sadness, anxiety), particularly those emotions that could be associated with potential ramifications for organizations such as negative word-of-mouth communication or boycotts (e.g., Coombs & Holladay, 2005; Utz et al., 2013) or inhibit/contribute to coping in disaster situations (e.g., Jin et al., 2016). Many differences in the expected directions related to the relationship between biological sex/gender and these negative emotions echoed prior findings. But in addition, several emotions that could be considered positive were introduced to the natural disaster communication literature, namely: hopeful, excited, and caring (cf., Lazarus, 2000; Lazarus & Folkman, 1984). Intriguingly, in both experiments males and females were equally likely to feel hopeful and excited, rather than continuing the pattern of differing in the full array of emotional assessments tapped by prior research. Yet females in both experiments reported higher levels of caring than did males. More research is needed to account for a wider array of emotions and to determine what crisis-related factors predict those emotions as well as the extent to which emotions predict resilience-related outcomes such as coping, protective actions, and relief/recovery actions. Publics' differing levels of crisis-related discrete emotions hold implications for basic audience segmentation and tailored communication during an emerging treacherous disaster event.

Behavioral Responses

First, previous research in some instances has shown that people are more likely to report intentions to share information about disasters via offline interpersonal communication forms and traditional television rather than through

online organizational and social mediated forms upon first learning of a crisis (e.g., Fraustino, 2014; Liu et al., 2015b; Spence et al., 2008), although this is not always definitely the case and has not yet been confirmed in the arena of flooding communication initially received via online videos or podcasts. The current research expanded prior research by looking at where people turn for more information when they first learn of a flooding disaster via online videos or online live podcasts. Findings here echoed that people tend to turn to interpersonal offline sources or television when they first learn of a crisis (e.g., Liu et al., 2015b; Spence et al., 2008). Findings also showed the people registered the lowest intentions to seek additional information from some social media sources, creating more evidence to support Liu and colleagues' cautions against communicators "jumping on the social media bandwagon" to the exclusion of attention to more traditional and interpersonal information dissemination venues (2015a, p. 44).

Turning to effects of crisis information source and visuals on individuals' likelihoods to engage in a variety of resilience-related behaviors revealed limited but illuminating results. Specifically, no effects of source on a variety of behavioral responses were observed, emphasizing the limited role crisis information source may play in disaster situations, at least when source is operationalized as traditional news media and government organization, which the growing body of research explored in the literature review is beginning to show. Although the source variable did not produce differing behavioral responses to crisis information, the visual variable in some instances did. Particularly, in experiment 1, those who obtained initial crisis information from the "podcast" (i.e., no visuals) were significantly more likely than

those who received the initial information from the visual video to report intentions to look for more information from news media sources. This points to the possibility that lack of a visual, or being able to see and virtually experience the disaster information could lead to increased milling behavior (i.e., looking for additional information to confirm/disconfirm—and ultimately arrive at message convergence).

Similarly, those who receive initial information in the "podcast" (black screen) rather than "video" (visual) form also were significantly more likely to intend to volunteer time to help others affected by the disaster, take a leadership role in volunteer disaster relief efforts, tell others to donate money to disaster relief efforts, tell others to volunteer time to help others affected by the disaster. It is worth noting however, that these results were not obtained in experiment 2, pointing to the need for additional research to build a record related to the roles of visuals in crisis communication and response. If these results are replicated, this has stark implications for crisis communicators who are often urged to include visuals (which are automatically cognitively processed; Lang, 2001) and who are increasingly turning to visual-based online platforms to meet audiences where they already are. Of course, with the rise of infographics for displaying scientific information, especially regarding risk (e.g., CDC, 2016), this is another visual area that needs further research.

Moreover, assessments of behavioral intentions in relation to participants' biological sex revealed some insights, although at times again with small effect sizes. Yet, for example, in experiment 1, females were more likely than males to report intentions to engage in 11 of the 12 measured resilience-related behaviors (e.g.,

evacuate from the area affected by the disaster if instructed to evacuate by government officials, help others affected by the disaster, look for information from government sources)—all except for likelihood to take a leadership role in volunteer disaster relief efforts. Yet although there were still several group mean differences in these outcomes in the second experiment, there were fewer, pointing to the potential of age or cohort effects that should be examined in future research. Nonetheless, prior research has found females are often more likely than males to engage in a variety of proactive, protective, or aid-related efforts surrounding disasters (e.g., Lachlan et al., 2007; Spence et al., 2008, 2011), and the current findings findings corroborate, refine, and extend this to a flooding setting when initial information is obtained from online videos/podcasts. Because biological sex is a relatively simple demographic segmentation tool (e.g., in comparison to situational segmentation tools such as those provided by the STP), understanding how males and females react differently to crisis information provides insights to crisis communicators who need to reach audiences quickly and effectively with crisis information about how to take action to protect oneself and others.

Theoretical Implications

An important intended contribution of this work was to examine crisis and disaster communication from a public relations standpoint focused on communities and resilience, in part answering calls to overcome the 'managerial bias' in the dominant literature centered on organization-based outcomes such as reputational or financial ramifications (e.g., Heath, 2010; Liu & Fraustino, 2014). This work did so by looking at several cognitive, affective, and behavioral outcomes that could

contribute to or detract from individual (and community) wellbeing and resilience during and following adverse advents. For one key example, this research introduced a modified set of measures of behavioral intentions to engage in protective actions and disaster relief contributions (the latter newly constructed). PCA in experiment 2 data showed a logical two-component structure emerging from the 11-item questionnaire, and the resulting scales exhibited high reliability. Scale development was not a driving purpose of this work so was not expanded upon throughout this manuscript; however, examining further and continuing to validate and refine these scales will provide useful and needed measures for resilience-related community crisis outcomes, supplementing the organization-focused outcomes in dominant crisis communication literature.

Another goal of this work was to introduce the LC4MP (e.g., Lang, 1990, 1989, 1995, 2000, 2006) and its constructs to the public relations crisis communication literature, providing a well-documented theoretical grounding for examining visuals, which are severely lacking in the extant crisis literature, and extending the LC4MP to the rapidly growing online crisis communication sphere. Unfortunately, data did not allow for rejecting the null hypothesis in relation to all LC4MP-driven hypotheses. For example, according to the LC4MP, adding visual components such as increased pace (e.g., increasing the number of cuts or edits in a visual; Lang et al., 2006; Lang et al., 1999) can enhance a viewer's orienting to the message and thus encoding of both audio and visual components. Adding greater orienting visual features alone in many cases is unlikely to overload the processing system and may even serve to increase recognition, as visuals are relatively

automatically processed (e.g., Lang et al., 1999). Yet, increasing structural features such as visual pacing along with arousal indeed does contribute to overload. Thus, in a crisis setting, which is inherently arousing, increased orienting cues such as greater pace was posited herein to decrease message encoding in ways that the same types of visual cues would not in a neutral or positive context. Without adequately encoding, processing, and storing messages, people's attitudes and behavioral intentions are likely to be less impacted by the messages. Therefore, several hypotheses were offered and data from two experiments tested the predicted curvilinear relationship between visual pacing and both cognitive and affective outcomes as well as differences between no visual, still visuals, and moving visuals on participants' cognitive and behavioral responses. However, none of these hypotheses was supported.

Yet, this does not mean that LC4MP is not a relevant theoretical lens for public relations crisis communication scholars. Instead, there may be a couple of mechanisms related to the research design that may explain why this research does not align with extensive LC4MP research. First, the operationalization of pacing may have been a driving contributor to the lack of support for otherwise well hypothesized and demonstrated relationships in the LC4MP research record. In prior research, pacing has been operationalized as the frequency of scene changes or cuts in a message (e.g., Hibbs et al., 1995; Lang et al., 1999). Specifically, for example, Lang and colleagues (1999) created levels such that for each 30 seconds of video commercial messaging, slow-paced messages had 0-1 changes, medium-paced messages had 4-6 changes, and fast messages had 11 or more changes. However,

based on examination of real-world crisis footage and consultations with television broadcasters and an LC4MP researcher, the current work modified the number of edits/cuts composing slow, medium, and fast pace from what has been previously examined (e.g., Fox et al., 2004; Hibbs et al., 1995; Lang et al., 1999). Those modifications increased scene changes and cuts and possibly could have added too many cuts/edits to each level of pacing, thereby already starting at what is actually a "fast" level in what is claimed to be the "slow" level herein; this would explain the pattern of means that continually decrease in apparent cognitive encoding (i.e., aided recall) as pace increases, rather than the predicted curvilinear relationship between pace and encoding found in previous work (e.g., Fox et al., 2004; Hibbs et al., 1995; Lang et al., 1999). Future research should attempt to apply LC4MP principles to online crisis communication visuals, but more work on the operationalization of pacing may be needed.

Similarly, another explanation for the lack of support for LC4MP hypotheses could be related to the aided recall (i.e., recognition, or multiple-choice "quiz") measure. Research examining editorial scene changes in television spots using the framework of LC4MP has measured recall by administering a multi-question four-response-option multiple-choice test to participants (e.g., Hibbs et al., 1995; Lang et al., 1999). Modifying this to reduce the time required (thus minimizing participant fatigue) and to reflect the content of the work's stimulus messages, participants in the current research filled out a five-question, multiple-choice question block with four response options per question based on the information content of the crisis message Although the researcher informally pretested the recall measure with an extremely

small convenience sample and there appeared to be variance in responses, nonetheless the mean score across both samples was above the midpoint. Perhaps more difficult recall questions would produce different (hypothesis-supporting) results. In addition, Fox and colleagues (2004) asked participants to rate their level of confidence in their multiple choice answers; that is another consideration for adjusting the recall measure in future work.

Overall, the LC4MP framework is highly relevant to communication researchers seeking to expand knowledge about crisis visuals and videos, especially in the evolving online realm. Prior LC4MP research has looked at political issues and health risks but not imminent breaking crisis situations. The current research should serve as inspiration to employ these ideas in public relations scholarship, despite the flaccid results obtained herein. Should these results continue not to replicate prior work in the new visual online social-mediated crisis information settings, this would present yet another interesting and perhaps even deeper empirical research question. Namely, in the ever-evolving media environment that has sculpted a new set of expectations and reactions to visual media, are humans also evolving in such a way so as no longer to process visuals in the manners that LC4MP research has robustly supported in the past?

The final theoretical goal of this work was to add scientific evidence to support and inform existing components of SMCC research (i.e., crisis information source); potentially add a new factor to the model (i.e., visuals); and replicate and expand resilience-related cognitive, affective, and behavioral outcome variables. First, an examination of crisis information source, as described in relation to

discussion of outcomes at the start of this chapter, provided benefits in replication to enhance confidence in results from prior research. Operationalizing crisis information source as responding national government organization (i.e., NWS) and national news media (i.e., *USA Today*) aligned with prior SMCC research looking at the media and organization portions of the model (e.g., Fraustino, 2014; Fraustino et al., 2014; Liu et al., 2015a, 2015b), and expanded the organization to include NOAA for a weather-related event. Some telling but minimal effects of source emerged, as detailed above. Future SMCC research should look at additional sources with more expansiveness and diversity, especially interpersonal sources, given that the current research confirmed prior research (e.g., Liu et al., 2015b; Spence et al., 2014) that people may turn to offline, interpersonal sources first to seek and share disaster information.

Further, the crisis communication scholarship in general has been slow to catch up with the inflating visual-based social and digital media environment. The SMCC model in particular, despite being the most comprehensive account of crisis communication in a diverse media environment, does not in any way incorporate an understanding of how crisis visuals may play a role in the flow of crisis communication. The theoretical framework posits that within the organization portion of the model, there are five considerations: (1) crisis origin, (2) crisis type, (3) infrastructure, (4) message strategy, and (5) message form. The current work, however, now proposes a major revision to the fourth category: (4) message content elements. Message content elements are those features of the message itself that may prompt variations in receiver responses. These message content elements are not restricted to crisis message strategy (operationalized as the stances SCCT provides

with varying levels of accommodation based on publics' likely attributions of responsibility for the crisis to the organization). Instead, this category should also include visuals, such as has begun to be tested herein.

For example, the current findings provide preliminary evidence in support of the idea that visuals, or lack of visuals, included in or as the content of a crisis message may produce individuals' differing likelihoods to engage in resilience-related behaviors, as described above. Future research can continue to refine the knowledge base regarding crisis visuals and also test additional content elements for this refined category based on prior research. For instance, another potentially fruitful area to examine is emotional appeals, such as fear appeals or humor appeals, within crisis message content (e.g., Reyolds & Seeger, 2005; Witte & Allen, 2000) to expand this new model category. In addition, message framing (e.g., gain v. loss, episodic v. thematic) provides another relevant set of constructs to examine for this category (e.g., Iyengar, 1991; Scheufele, 1999). Correspondingly, more attention to resilience-related individual and community outcomes in relation to the new category of message content elements, as well as more broadly in relation to the SMCC model, should continue to be an area of future research attention.

Limitations and Future Research

All research methods and designs come with limitations, and this work is no exception. First, in terms of methods, both experiments employed convenience sampling. Nonprobability samples limit inference to the sample and do not generalize to the population (Wimmer & Dominick, 2014). Further, these particular samples exhibited higher than average education levels and all had access to a computer and

internet, just a couple of the features that set them apart from the general population. Future research should attempt to secure funding/resources to collect data from a probability sample to produce results reflect the U.S. population.

Second, the mTurk sample in particular, although providing greater diversity than the traditional student convenience sample, may have delivered its own setbacks as well. Namely, mTurk workers are crowdsource workers; in addition to participating in academic research studies, more often they also work by the minute/hour to complete tasks for various organizations and individuals (called "requestors") for minimal pay. Oftentimes the requestors soliciting workers for pay place limits on who can participate, and those limits are dominantly based on the workers' past performance and ratings from other people publishing "hits."[6] This understandably leads to workers being anxious and wary of receiving poor feedback or withheld pay. To avoid such detrimental outcomes, workers do their best to follow all instructions and not make any perceived mistakes (indeed such behaviors may be grounds for a requestor to withhold pay and negatively impact workers' profiles). Workers regularly contacted the researcher in this current work to explain potentially incorrect multiple choice (i.e., aided recall) responses on the survey and plead for no negative feedback as a result. It is possible that workers watched the video more than once to avoid such problems. In addition, as the mTurk discussion boards indicate, others have found ways to backtrack to previous content in surveys even when that option has been disabled by the researcher. Therefore, it is possible that mTurk workers pay closer attention to and re-review stimulus materials in ways that may

[6] Hits are "jobs" that requestors post for workers to sign up to complete, such as looking up information, transcribing interviews, providing feedback on advertisements, filling out databases (or, in this case, watching a video and filling out a questionnaire).

mask what a normally attentive participant who is unable to return to previous content might experience.

Third, both the pilot experiment 1 (student) sample and the experiment 2 (mTurk) sample comprised US residents. Western biases in crisis communication research have been called out by crisis researchers such as Liu and Fraustino (2014) and others (e.g., Falkheimer & Heide, 2006; Lee, 2005) who urged for more cross-borders research. Future work should examine and compare Western responses to crisis information, from both organizations' and publics' perspectives, with responses in other geographic regions and cultural contexts.

Fourth, self-report data is not as immediate as direct observations or physiological monitoring. For example, behavior intentions are a proxy for actual behaviors and may contain a variety of error; yet it is nonetheless worth noting that intentions are the best known predictor of actual behavior (e.g.,Ajzen, 1985). Further, social considerations regarding the emotion measures in particular are warranted. That is, social constructs about traditional femininity and masculinity could be playing a role in males' and females' comfort in reporting (and/or displaying) emotions. A more inclusive and diverse understanding of gender rather than biological sex as well as physiological measures such as heart rate and skin conductance could be fruitful avenues of inquiry here—although nevertheless, as noted earlier, the demographic of biological sex can be informative for crisis communicators who need to get as much information out as possible to as many people as possible and may initially have limited time and resources to engage in highly nuanced segmentation and tailoring techniques.

Finally, as addressed with greater depth in the theoretical implications section, the pacing operationalization and/or aided recall measures may have been contributors to the lack of ability to reject the null for LC4MP hypotheses.

Conceptually, first, because of the nature of crisis communication and the constraints of attainable sampling, this study was confined to audiences (i.e., receivers of information) as opposed to the richer and more nuanced understanding of publics (i.e., people who recognize an issue and gather to address it) that public relations literature and theory provides. Although knowledge of general audiences' responses to crisis information is highly valuable, especially in the onset of a breaking crisis news event as examined herein, advancing understanding of publics in particular should also be a goal of crisis communication research from a public relations perspective. Future research could, for instance, collect empirical data in the field at the start of a naturally occurring disaster and track how and why publics form, act, flow, and/or disintegrate—especially with a focus on how those publics contribute to or detract from community resilience. Such research requires advance planning, flexibility in researcher availability and travel, and funding for samples, incentives, and other reasonable research costs to produce transferable and/or generalizable results. Future research could also seek to test, refine, and develop theories of publics particular to disaster resilience.

Second, resilience is a complex process with myriad components and several levels and contexts (e.g. Buzzanell 2010; Buzzanell et al., 2009; Norris et al., 2008; Zhour, want, Wan, & Jia, 2010). Many definitions of resilience abound, with interdisciplinary literature displaying 20 (e.g., Zhour et al., 2010) or more (e.g.,

Norris et al., 2008) conceptualizations. As resilience researchers such as those cited in the literature review have noted, resiliency has been conceived of and measured at several levels, such as at the individual, social, community, physical system, and ecological system units of analysis—and it has been viewed as both a trait and a process (e.g., Boon et al., 2012; Norris et al., 2008). As Boon and colleagues (2008) explained: "People who are resilient display a greater capacity to quickly regain equilibrium physiologically, psychologically and socially following stressful events, thus also supporting community resilience" (p. 389). It is clear that crises, and particularly disasters, are adverse events that can negatively impact individuals, publics, communities, and organizations; thus, communication that enhances resilience should be an integral part of crisis communication theories and scholarly examinations. The current work focused on resilience at the individual level because of the nature of the experimental design. Although individual resilience contributes to community resilience, as noted in the quote above (i.e., Boon et al., 2008) and in previously cited literature, nonetheless, research that extends beyond individuals to focus not only on publics but also communities would add laudable perspectives to the crisis and disaster communication literature from a public relations vantage.

Conclusion

Ultimately, this project used the lenses of SMCC and LC4MP to probe how crisis information sources and visuals affect audiences' resilience-related cognitive, affective, and behavioral responses to a hypothetical natural disaster based on real-world extreme flooding. In doing so, this research has contributed scientifically guided knowledge about (1) how the source of crisis information impacts recipients'

responses to crisis messages; (2) how crisis visuals impact recipients' responses to crisis communication; (3) the SMCC model, by introducing the new factor of visuals to the newly proposed category of content elements under the organizational considerations portion of the model, and by proposing the removal of "message strategy" to subsumed under the new category; (4) leveraging public relations perspectives to focus on resilience-based crisis outcomes, such audience thoughts, feelings, and behaviors that are related to physical and psychological coping and aiding oneself and others in recovery; and (5) integrating extensively researched perspectives from media effects and mass communication theory into public relations and crisis scholarship, especially the LC4MP, which has yet to take root in public relations and crisis communication despite its relevance to both the traditional and digital/social media commonly used for crises communication. In doing so, this research has moved toward incorporating community resilience-oriented outcomes to the organization-focused public relations crisis communication literature, providing theoretical and practical takeaways the can guide future research as well as public disaster preparedness, responses, recovery, and policy making.

Appendices

Appendix A: Questionnaire Instrument

[*Note:* These are question wordings only; the questionnaire was formatted online using Qualtrics. Wording in brackets was not included for participants to see but is instead is additional information to aid in easy reviewing.]

[1. Participants give consent by reading consent materials on welcome screen and choosing to click "continue"]

[2. Participants are instructed to read the following narrative placing them in a vacation scene:

Imagine you have traveled to a coastal region of Maryland for a late summer beach vacation. Unfortunately, it has been raining heavily since you arrived. After spending the morning in the hotel room sleeping in, relaxing, watching TV, and waiting for the rain to let down, you decide to log online to check the weather forecast. As you begins to search, a variety of responses pop up indicating that extreme coastal flooding has ravaged nearby areas and is closing in on the hotel beach area where you are staying. You quickly click on a link to learn more about the disaster.

Please click "next" to see (imagine) what you came across.**]**

[3. Participants view a video of ocean waters and flooding on streets and land; no people are present in the video. The video transcript follows for your review:]

"This is a [SOURCE – *USA Today*/National Weather Service] report. We are announcing that a flood warning has been issued for this and surrounding counties through the night. Doppler radar showed very heavy rains over the region and also moving in from the east and south.

Due to recent rainfall and soil conditions, flooding has occurred in some regions and is expected to begin in others shortly. Excessive runoff from heavy rainfall will cause flooding of small creeks and streams, highways, and underpasses. Additionally, country roads and farmlands along the banks of creeks, streams, and other low lying areas are subject to flooding.

Again, this is a flood warning. A flood warning means that flooding is imminent or has high potential to occur. All interested parties should take necessary precautions in areas prone to flooding or in floodways on small creeks and streams or in urban areas. Residents along streams and creeks should take immediate precautions to protect life and property.

Be especially cautious at night when it is harder to recognize the dangers of flooding. Most flood deaths occur in automobiles. Never drive your vehicle into areas where the water covers the roadway. Flood waters are usually deeper than they appear. Just one foot of flowing water is enough to sweep vehicles off the road.

If you are in a warning area or if you observe flooding, act quickly. Move to higher ground immediately. Do not stay in areas subject to flooding when water begins rising. Well built homes and businesses will be damaged, and some mobile homes may be swept away.

Report flooding or flood damage to the national weather service or, you may contact the nearest law enforcement agency or your county emergency management

Stay tuned to media for updated information about which counties are affected by this flood warning. This has been a [SOURCE – *USA Today*/National Weather Service] report."**]**

[4. Participants fill out the following questionnaire:]

Next, please fill out this questionnaire. Your honest, candid responses are appreciated.

The information I read about the disaster situation was _____

Extremely difficult to comprehend	1 2 3 4 5 6 7	Extremely easy to comprehend
Extremely complicated	1 2 3 4 5 6 7	Extremely simple
Extremely convoluted	1 2 3 4 5 6 7	Extremely straightforward

The disaster I read about was _____

Extremely severe	1 2 3 4 5 6 7	Not severe at all
Extremely bad	1 2 3 4 5 6 7	Not bad at all
Extremely difficult to recover from	1 2 3 4 5 6 7	Not difficult to recover from

Please evaluate the disaster information you just read by clicking the bubble (between each pair of words and phrases with opposite meanings) that best indicates your reaction:

The disaster information I just read _____

Is not up-to-date	1 2 3 4 5 6 7	Is up-to-date
Is biased	1 2 3 4 5 6 7	Is unbiased
Doesn't tell the whole story	1 2 3 4 5 6 7	Tells the whole story
Is inaccurate	1 2 3 4 5 6 7	Is accurate
Cannot be trusted	1 2 3 4 5 6 7	Can be trusted
Is based on opinion	1 2 3 4 5 6 7	Is based on fact

Please choose the bubble that best reflects your agreement/disagreement with the following statements, imagining you were experiencing the ongoing disaster you just read/heard about.

I feel confident that I can act on extreme flooding effectively
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
I am confident in my ability to detect emergency flooding situations
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
I am confident that I know the correct procedures for acting on extreme flooding
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
I feel well informed about how to act on extreme flooding
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Please indicate what the disaster situation would mean to you as an individual if you were in this situation by clicking the bubble between each pair (of words and phrases with opposite meanings) that best indicates your reaction:

The disaster situation would be _____ to me

Important	1 2 3 4 5 6 7	Unimportant
Relevant	1 2 3 4 5 6 7	Irrelevant
Meaningful	1 2 3 4 5 6 7	Not meaningful
Involving	1 2 3 4 5 6 7	Not involving

If you were in this disaster situation, please indicate how likely you would be to feel each of the following by clicking the bubble that best indicates the likelihood of your feelings:

Scared (by what has happened)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Outraged (by what has happened)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Sympathetic (toward people affected by the disaster)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Shocked (by what has happened)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Anxious (about what could happen next)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Confused (by the disaster information)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Sad (about what has happened)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Hopeful (about disaster recovery)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Caring (toward people affected by the disaster)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Excited (to be involved in the disaster recovery)
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Please click the bubble that best indicates the extent of your agreement/disagreement with each of the following statements. If the question is not applicable to you, select "N/A."
[Experiment 2 only]

If I were in this situation, I would look for more information from/by

_____

Local newspaper
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
National newspaper
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Local government website
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Federal government website
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Television
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Blogs
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Online videos
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

YouTube
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Instagram
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Vine
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Facebook
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Twitter
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Text messages
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Phone calls
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Face-to-face conversations
Other sites devoted to video/photo sharing (e.g., Flickr, Pinterest)
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Other (Please indicate _____)
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Again, please click the bubble that best indicates the extent of your agreement/disagreement with each of the following statements. If the question is not applicable to you, select "N/A."

"Like" a friend's Facebook post about the disaster
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

"Retweet" a friend's tweet about the disaster
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Email a news website link to other people
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Tell people I know (e.g., family, friends and co-workers, etc.) via **face-to-face conversations** about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Tell people I know (e.g., family, friends and co-workers, etc.) by **emailing** them about the disaster

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Call people I know (e.g., family, friends and co-workers, etc.) **via phone** to talk about the disaster

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Text people I know (e.g., family, friends and co-workers, etc.) about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

"Like" a government Facebook post about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

"Share" a government Facebook post about the disaster on my Facebook page.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Comment on a government Facebook page about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Post information on my friends' Facebook pages or groups about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Re-tweet a government Twitter post about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Tweet about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Write a blog post on my own blog about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Post a comment on someone else's blog about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Make a comment on someone else's YouTube video about the disaster.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

"Like" or comment on someone else's picture related to the disaster on a site dedicated to photo sharing (e.g., Instagram, Flickr, Pinterest)

Upload a picture related to the disaster on a site dedicated to photo sharing (e.g., Instagram, Flickr, Pinterest)

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Upload a video related to the disaster on a site dedicated to video sharing (e.g., Vine)
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Look for more information from the National Weather Service/NOAA **website**
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Listen for more information from the National Weather Service/NOAA weather **radio**
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

If you were in this disaster situation, please indicate how likely/unlikely you would be to take each of the following actions by clicking the bubble that best indicates the likelihood of your actions:

Evacuate from the area affected by the disaster no matter what.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Evacuate from the area affected by the disaster if instructed to evacuate by government officials.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Follow government instructions step by step.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Tell others to follow government instructions.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Look for more information from government sources.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Look for more information from news media sources.
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Donate money to disaster relief efforts
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Volunteer time to help others affected by the disaster
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Take a leadership role in volunteer disaster relief efforts
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Tell others to donate money to disaster relief efforts
Very Unlikely 1 2 3 4 5 6 7 Very Likely

Tell others to volunteer time to help others affected by the disaster
Very Unlikely 1 2 3 4 5 6 7 Very Likely

What is the gender you most closely identify with?

1) Female
2) Male
3) Other

What is your age? Please enter a whole number only (e.g., 20). _____

What race do you most closely identify with?

1) White
2) Black
3) Asian
4) Hispanic
5) 2+ races
6) Other

What is your year in school?

1) First-year undergraduate
2) Second-year undergraduate
3) Third-year undergraduate
4) Fourth-year undergraduate
5) Fifth+-year undergraduate
6) Graduate (master's level)
7) Graduate (professional)
8) Graduate (doctoral level)
9) Not in school

Have you ever experienced this type of disaster?

1) Yes, I experienced it in the past 6 months.
2) Yes, I experienced it more than 6 months ago.
3) No, I have never experienced this type of disaster before.

Please select the number that best indicates your agreement/disagreement with each of the following two items on the *source* from which you saw the flood information **[Experiment 1 only]**

National Weather Service (NWS)
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

USA Today online news
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Please select the number that best indicates your agreement/disagreement with each of the following three items about whether the flood information you saw included or did not include crisis visuals

I saw a **fully moving video** of the flood and heard a person talking
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

I saw **several still pictures** of the flood and heard a person talking
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
[Experiment 2 only]

I saw a **black background** and heard a person talking (no pictures or video)
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, please answer these multiple-choice questions, based on the video you watched, to the best of your recollection:

6. What amount of flowing water is enough to sweep vehicles off the road, according to the video you watched?
    a. .5 foot
    b. 1 foot
    c. 2 feet
    d. 3 feet

7. Which of the following flooding outcomes was explicitly mentioned in the video?
    a. Farmers near streams will likely lose crops
    b. Businesses may be demolished
    c. Mobile homes may be swept away
    d. Urban homes may become completely submersed

8. The video you watched issued a:
    a. Flood Warning
    b. Flood Watch
    c. Flood Advisory
    d. Flood Alert

9. According to the video, those in the flood areas or those who observe flooding should:
    a. Stay where they are and stay tuned to media for further notice
    b. Move to shelter in a basement or other secure area below ground

c. Evacuate to higher ground
d. Report flooding damage to the nearest law enforcement agency and wait for assistance

10. According to the video, most flood deaths occur in:
    a. Urban homes near streams
    b. Businesses in low-lying areas
    c. Mobile homes
    d. Automobiles

Thank you for your time and participation. Your responses are helpful in understanding how to help potential flood victims prepare and protect themselves and others. Please remember this scenario and video were hypothetical although based on real-world events. If you have any questions about this study, please contact the principal investigator, Julia Daisy Fraustino, at jdf@umd.edu. Thanks again.

References

Abraham, L., & Appiah, O. (2006). Framing news stories: The role of visual imagery in priming racial stereotypes. *The Howard Journal of Communication*, 17, 183-203

Adger, W. (2000). Social and ecological resilience: Are they related? *Progress in Human Geography, 24*, 347–364.

Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior* (pp. 11-39). Springer Berlin Heidelberg.

Aldoory, L., & Grunig, J. (2012). The rise and fall of hot-issue publics: Relationships that develop from media coverage of events and crises. *International Journal of Strategic Communication*, *6*(1), 93-108.

Aldoory, L., Kim, J. N., & Tindall, N. (2010). The influence of perceived shared risk in crisis communication: Elaborating the situational theory of publics. *Public Relations Review*, *36*(2), 134-140

Alhabash, S., McAlister, A. R., Hagerstrom, A., Quilliam, E. T., Rifon, N. J., & Richards, J. I. (2013). Between likes and shares: Effects of emotional appeal and virality on the persuasiveness of anticyberbullying messages on Facebook. *Cyberpsychology, Behavior, and Social Networking*, *16*(3), 175-182.

Allen, M., Titsworth, S., & Hunt, S. K. (2009). *Quantitative research in communication*. Thousand Oaks, CA: Sage.

American Press Institute. (2015, March 16). How Millennials get news: Inside the

habits of America's first digital generation. Retrieved from https://www.americanpressinstitute.org/publications/reports/survey-research/millennials-news/

American Red Cross. (2010). Social media in disasters and emergencies. Retrieved from http://www.redcross.org/wwwfiles/Documents/pdf/other/SocialMediaSlideDeck.pdf

An, S-K. & Cheng, I.-H. (2010). Crisis communication research in public relations journals: Tracking research trends over thirty years. In W. T. Coombs & S. Holladay (Eds.), *The handbook of crisis communication* (pp. 65–90). Malden, MA: Wiley-Blackwell.

Anthony, K. E., Sellnow, T. L., & Millner, A. G. (2013). Message convergence as a message-centered approach to analyzing and improving risk communication. *Journal of Applied Communication Research*, *41*(4), 346-364.

Antonovsky, A. (1987). *Unravelling the mystery of health*. San Francisco: Jossey Bass.

Arpan, L. M., Baker, K., Lee, Y., Jung, T., Lorusso, L., & Smith, J. (2006). News coverage of social protests and the effects of photographs and prior attitudes. *Mass Communication & Society*, *9*(1), 1-20.

Arpan, L. M., & Pompper, D. (2003). Stormy weather: Testing "stealing thunder" as a crisis communication strategy to improve communication flow between organizations and journalists. *Public Relations Review, 29*(3), 291-308.

Associated Press. (2016, March 12). Louisiana flash floods leave at least three dead

as Mississippi face deluge. Retrieved from http://www.theguardian.com/us-news/2016/mar/12/louisiana-mississippi-flash-floods-rain-deaths

Avery, E. J., Lariscy, R. W., Kim, S., & Hocke, T. (2010). A quantitative review of crisis communication research in public relations from 1991 to 2009. *Public Relations Review, 36*(2), 190–192.

Austin, L., Fraustino, J. D., Jin, Y., & Liu, B. F. (in press). Crisis communication in a changing media environment: Refining the social-mediated crisis communication model. In L. Austin & Y. Jin (Eds.), *Social media and crisis communication*. New York: Routledge.

Austin, L., Liu, B. F., & Jin, Y. (2012). How audiences seek out crisis information: Exploring the social-mediated crisis communication model. *Journal of Applied Communication Research, 40*(2), 188-207.

Austin, L. L., Liu, B. F., & Jin, Y. (2014). Examining signs of recovery: How senior crisis communicators define organizational crisis recovery. *Public Relations Review*. Retrieved from http://dx.doi.org/10.1016/j.pubrev.2014.06.003

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.

Bandura, A. (1990). Perceived self-efficacy in the exercise of control over AIDS infection. *Evaluation and program planning*, *13*(1), 9-17.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research, 1*(4), 287-310.

Baron, G., & Philbin, J. (2009, March 23). Social media in crisis communication: Start with a drill. *Public Relations Tactics*. Retrieved from

https://prsa.org/SearchResults/view/7909/105/Social_media_in_crisis_communication_Start_with_a#.VwmlooRZbKA

Benight, C. C., Antoni, M. H., Kilbourn, K., Ironson, G., Kumar, M. A., Fletcher, M. A., ... & Schneiderman, N. (1997). Coping self-efficacy buffers psychological and physiological disturbances in HIV-infected men following a natural disaster. *Health Psychology*, *16*(3), 248.

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour Research and Therapy*, *42*(10), 1129-1148.

Benight, C. C., & Harper, M. L. (2002). Coping self-efficacy perceptions as a mediator between acute stress response and long-term distress following natural disasters. *Journal of Traumatic Stress*, *15*(3), 177-186.

Bennett-Smith, M. (2012, October 29). Fake Hurricane Sandy photos spread on Internet as storm barrels toward northeast. *Huffington Post*. Retrieved from http://www.huffingtonpost.com/2012/10/29/fake-hurricane-sandy-photos-internet-northeast_n_2041283.html

Benoit, W. L. (1997). Image repair discourse and crisis communication. *Public Relations Review*, *23*(2), 177-186.

Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social resources in attenuating the stress of life events. *Journal of behavioral medicine*, *4*(2), 139-157.

Bolls, P. D. & Muehling (2007). The effects of dual-task processing on consumers' responses to high- and low-imagery radio advertisements. *Journal of*

Advertising, 36(4), 35-47

Bolls, P. D., Muehling, D. D., & Yoon, K. (2003). The effects of television commercial pacing on viewers' attention and memory. *Journal of Marketing Communications*, *9*(1), 17-28.

Bonanno, G. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*, 20–28.

Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of consulting and clinical psychology*, *75*(5), 671.

Boon, H. J., Cottrell, A., King, D., Stevenson, R. B., & Millar, J. (2012). Bronfenbrenner's bioecological theory for modelling community resilience to natural disasters. *Nat Hazards, 60*, 381-408.

Botan, C. & Taylor, M. (2004). Public relations: State of the field. *Journal of Communication, 54*(4), 645-661.

Boulianne, S. (2015). Social media use and participation: a meta-analysis of current research. *Information, Communication & Society*, *18*(5), 524-538.

Bowen, S. A., & Zheng, Y. (2014). Auto recall crisis, framing, and ethical response: Toyota's missteps, *Public Relations Review*. Retrieved from http://dx.doi.org/10.1016/ j.pubrev.2014.10.017

Bowleg, L., Belgrave, F. Z., & Reisen, C. A. (2000). Gender roles, power strategies, and precautionary sexual self-efficacy: Implications for Black and Latina women's HIV/AIDS protective behaviors. *Sex roles*, *42*(7-8), 613-635.

Briones, R. L., Kuch, B., Liu, B. F., & Jin, Y. (2011). Keeping up with the digital age: How the American Red Cross uses social media to build relationships. *Public Relations Review*, *37*(1), 37-43.

Bronfenbrenner, U. (1989). Ecological systems theory. *Annals of Child Development*, 6, 187–249.

Bronfenbrenner, U. (2005). *Making human beings human: Bioecological perspectives on human development*. Thousand Oaks: Sage.

Brosius, H. (1989). Influence of presentation features and news content on learning from television news. *Journal of Broadcasting & Electronic Media, 33*, 1-14.

Brummette, J., & Fussell Sisco, H. (2014). Using Twitter as a means of coping with emotions and uncontrollable crises. *Public Relations Review,* (in press). Retrieved from http://dx.doi.org/10.1016/j.pubrev.2014.10.009

Bruneau, M., Chang, S., Eguchi, R., Lee, G., O'Rourke, T., Reinhorn, A., et al. (2003). A framework to quantitatively assess and enhance the seismic resilience of communities. *Earthquake Spectra, 19*, 733–752.

Bruno, N. (2014). Tweet first, verify later?: How real-time information is changing the coverage of worldwide crisis events. *Reuters Institute Fellow Papers.* Retrieved from http://reutersinstitute.politics.ox.ac.uk/publication/tweet-first-verify-later

Burgers, C., van Mulken, M., & Schellens, P. J. (2012). Type of evaluation and marking of irony: The role of perceived complexity and comprehension. *Journal of Pragmatics*, *44*(3), 231-242.

Buzzanell, P. M. (2010). Resilience: Talking, resisting, and imagining new

normalcies into being. *Journal of Communication*, *60*(1), 1-14.

Buzzanell, P. M., Shenoy, S., Remke, R., & Lucas, K. (2009). Intersubjectively creating resilience: Responding to and rebounding from potentially destructive organizational experiences. In P. Lutgen-Sandvik & B. D. Sypher (Eds.), The destructive side of organizational communication (pp. 530–576). New York: Routledge.

Carlson, J. R., & Zmud, R. W. (1999). Channel expansion theory and the experiential nature of media richness perceptions. *Academy of management journal*, *42*(2), 153-170.

Carr, D. (2013, April 21). The pressure to be the TV news leader tarnishes a big brand. *New York Times.* Retrieved from: http://www.nytimes.com/2013/04/22/business/ mediain-boston-cnn-stumbles-in-rush-to-break-news.html?_r=0

Catherall, D.R. (Ed.). (2004). *Handbook of stress, trauma, and the family*. New York: Routledge.

Centers for Disease Control and Prevention. (2016). Infographics. Retrieved from http://www.cdc.gov/socialmedia/tools/infographics.html

Chaffee, S. H., & Metzger, M. J. (2001). The end of mass communication? *Mass Communication & Society*, *4*, 365-379.

Chewning, L.V. (2014). Multiple voices and multiple media: Co-constructing BP's crisis response. *Public Relations Review* (in press). Retrieved from http://dx.doi.org/10.1016/j.pubrev.2014.10.012

Choi, Y., & Lin, Y.-H. (2009). Consumer responses to Mattel product recalls posted

on online bulletin boards: Exploring two types of emotion. *Journal of Public Relations Research, 21*(2), 198–207.

Choudhary, A., Hendrix, W., Lee, K., Palsetia, D., & Liao, W-K. (2012, May). Social media evolution of the Egyptian revolution. *Communications of the ACM*, *55*(5), 74-80.

Claeys, A-S., & Cauberghe, V. (2014). What makes crisis response strategies work? The impact of involvement and message framing. *Journal of Business Research*, *67*(2), 182-189.

Crigler, A. N., Just, M., & Neuman, W. R. (1994). Interpreting visual versus audio messages in television news. *Journal of Communication, 44*, 132-149.

Coombs, W. T. (2007). Protecting organization reputations during a crisis: The development and application of situational crisis communication theory. *Corporate Reputation Review*, *10*(3), 163-176.

Coombs, W. T. (2010). Pursuing evidence-based crisis communication. In W. T. Coombs, & S. J. Holladay (Eds.). *The Handbook of Crisis Communication* (pp. 791-725). New York: Wiley-Blackwell.

Coombs, W. T. (2014). State of crisis communication: Evidence and the bleeding edge. *Research Journal of the Institute for Public Relations, 1*(1), 1-12.

Coombs, W. T. (2015). *Ongoing crisis communication: Planning, managing, and responding* (4th ed.). Thousand Oaks, CA: Sage.

Coombs, W. T., & Holladay, S. J. (2005). An exploratory study of stakeholder emotions: Affect and crises. In N. M. Ashkanasy, W. J. Zerbe, & C. E. J. Härtel (Eds.), *The effect of affect in organizational settings*, (pp. 263–280).

New York: Emerald Group.

Coombs, W. T., & Holladay, S. (2011) An exploration of the effects of victim visuals on perceptions and reactions to crisis events. *Public Relations Review, 37,* 115-120.

Coombs, W.T., & Holladay, S. J. (2014). How publics react to crisis communication efforts: Comparing crisis response reactions across sub-arenas. *Journal of Communication Management, 18*(1), 40-57

Covello, V. T. (2003). Best practices in public health risk and crisis communication. *Journal of Health Communication*, *8*(1), 5-8.

Covello, V. T. (2010). Strategies for overcoming challenges to effective risk communication. *Handbook of Risk and Crisis Communication*, 143-167.

Cowen E.L., Wyman, P.A., Work, W.C., Iker, M.R. (1995). A preventive intervention for enhancing resilience among highly stressed urban children. *J Prim Prev, 15*, 247–260.

Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organization design. *Research in Organizational Behavior*, *6*, 191-233.

Daft. R. L., & Lengel, R. H. (1986). Organisational design. *Management Science*, *32*, 554-571.

Dardis, F. E., Schmierbach, M., Ahern, L., Fraustino, J. D., Bellur, S., Brooks, S., & Johnson, J. (2015). The effects of in-game virtual direct experience (VDE) on reactions to real-world brands. *Journal of Promotion Management*, *21*(3), 313-334.

David, P. (1998). News concreteness and visual-verbal association: Do news pictures narrow the recall gap between concrete and abstract news? *Human Communication Research, 25*, 180-210

DeBroff, S. (2015, December 15). Reaching millennial women: The continued rise of visual social platforms. Retrieved from http://www.business.com/social-media-marketing/millennial-women-and-the-continued-rise-of-visual-platforms/

Doolittle, A., & Faul, A. C. (2013). Civic engagement scale: A validation study. *SAGE Open*, July-September, 1-7.

Doveling, K., von Scheve, C., & Konijn, E. A. (Eds.). (2010). *The Routledge handbook of emotions and mass media*. New York: Routledge.

Drew, D. G., & Grimes, T. (1987). Audio-visual redundancy and TV news recall. *Communication Research, 14*, 452-461

D'Urso, S. C., & Rains, St. (2008). Examining the source of channel expansion: A test of channel expansion theory with new and traditional communication media. *Management Communication Quarterly*, *21*(4), 486-507.

Duggan, M., & Smith, A. (2013, December 30). Social media update 2013. *Pew Research Internet Project*. Retrieved from http://www.pewinternet.org/2013/12/30/social-media-update-2013/

Easley, R. W., Madden, C. S., & Dunn, M. G. (2000). Conducting marketing science: The role of replication in the research process. *Journal of Business Research*, *48*(1), 83-92.

Edwards, S. M. (2011). A social media mindset. *Journal of Interactive Advertising,*

12(1). http: //jiad.org/article148.

Ehrlich, T. (1997). Civic learning: Democracy and education revisited. *Educational Record*, *78*(3/4), 57-65.

Fairchild, C. (2014, February 27). Corporate reputation crises: A timeline. *Fortune.* Retrieved from http://fortune.com/2014/02/27/corporate-reputation-crises-a-timeline/

Falkheimer, J., & Heide, M. (2006). Multicultural crisis communication: Towards a social constructionist perspective. *Journal of Contingencies and Crisis Management*, *14*(4), 180-189.

Fearn-Banks, K. (2010). *Crisis communications: A casebook approach* (4th ed.). New York: Routledge.

Fischhoff, B., Brewer, N. T., & Downs, J. S. (2011). *Communicating risks and benefits: An evidence-based user's guide.* Silver Spring, MD: U.S. Department of Health and Human Services, Food and Drug Administration.

Figley, C. R. (Ed.). (2002). *Treating compassion fatigue*. New York: Routledge.

Fiske, S. T., & Taylor, S. E. (2013). *Social cognition: From brains to culture,* 2nd ed. Thousand Oaks, CA: Sage.

Flora, J. A., & Maibach, E. W. (1990). Cognitive responses to AIDS information: The effects of issue involvement and message appeal. *Communication Research*, *17*(6), 759-774.

Fox, J. R., Park, B., & Lang, A. (2007). When available resources become negative resources: The effects of cognitive overload on memory sensitivity and criterion bias. *Communication Research, 34*, 277-296.

Fox, J., Lang, A., Chung, Y., Lee, S., & Potter, D. (2004). Picture this: Effects of graphics on the processing of television news. *Journal of Broadcasting & Electronic Media, 48*, 646-674.

Fraustino, J. D., & Kennedy, A. (under review). Civic callings for resilience: Adapting discourse of renewal theory. Paper submitted for presentation consideration at the annual meeting of the National Communication Association, Philadelphia, PA.

Fraustino, J. D. (2014). They don't believe what they see: Effects of crisis information form, source, and visuals. Paper presented at the annual meeting of the Association for Education in Journalism and Mass Communication, Montreal, Canada.

Fraustino, J. D., & Liu, B. F. (in press). Toward more audience-oriented approaches to crisis communication and social media research. In L. Austin & Y. Jin (Eds.), *Social media and crisis communication*. New York: Routledge.

Fraustino, J. D., Liu, B. F., & Jin, Y. (in press). Social media use during disasters: A research synthesis and roadmap. In L. Austin & Y. Jin (Eds), *Social media and crisis communication.* New York: Routledge.

Fraustino, J. D., Liu, B. F., & Jin, Y. (2014). Refining the social-mediated crisis communication model: Expanding understanding of cognitive and affective disaster responses. Paper presented at the annual convention of the Association for Education in Journalism and Mass Communication, Montreal.

Freberg, K. (2012). Intention to comply with crisis messages communicated via social media. *Public Relations Review*, *38*(3), 416-421.

Freberg, K., Saling, K., Vidoloff, K. G., & Eosco, G. (2013). Using value modeling to evaluate social media messages: The case of Hurricane Irene. *Public Relations Review*, *39*(3), 185-192.

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of personality and social psychology*, *84*(2), 365.

Freedy, J. R., Shaw, D. L., Jarrell, M. P., & Masters, C. R. (1992). Towards an understanding of the psychological impact of natural disasters: An application of the conservation resources stress model. *Journal of Traumatic Stress*, *5*(3), 441-454.

Frisby, B. N., Sellnow, D. D., Lane, D. R., Veil, S. R., & Sellnow, T. L. (2013). Instruction in crisis situations: Targeting learning preferences and self-efficacy. *Risk Management, 15*(4), 250–271. doi:10.1057/rm.2013.7

Fulk, J., & Collins-Jarvis, L. (2001). Wired meetings: Technological mediation of organizational gatherings. In. F. M. Jablin, and L. L. Putnam (Eds.), *The new handbook of organizational communication* (pp. 624-663). Thousand Oaks, CA: Sage.

Ganor, M., & Ben-Lavy, Y. (2003). Community resilience: Lessons derived from Gilo under fire. *Journal of Jewish Communal Service*, Winter/Spring, 105–108.

Gaziano, C., & McGrath, K. (1986). Measuring the concept of credibility. *Journalism Quarterly, 63*, 451-462.

Geiger, S., & Reeves, B. (1993). The effects of scene changes and semantic relatedness on attention to television. *Communication Research, 20*, 155-175.

Gibson, R., & Zillmann, D. (2000). Reading between the photographs: The influence of incidental pictorial information on issue perception. *Journalism & Mass Communication Quarterly, 77*, 355–366.

Gilgoff, D., & Lee, J. J. (2013, April 15). Social media shapes Boston bombings response: Twitter and Facebook created national response, may help authorities. *National Geographic*. Retrieved from http://news.nationalgeographic.com/news/ 2013/13/130415-boston-marathon-bombings-terrorism-social-media-twitter-facebook/

Graber, D. (1990). Seeing is remembering: How visuals contribute to learning from television news. *Journal of Communication*, 40, 134-155.

Graham, M., & Avery, E. J. (2013). Government public relations and social media: An analysis of the perceptions and trends of social media use at the local Government level. *Public Relations Journal*, *7*(4).

Graham, M. W., Avery, E. J., & Park, S. (2015). The role of social media in local government crisis communications. *Public Relations Review*, *41*(3), 386-394.

Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of personality and social psychology*, *79*(5), 701.

Green, M. C., Brock, T. C., & Kaufman, G. F. (2004). Understanding media enjoyment: The role of transportation into narrative worlds. *Communication Theory*, *14*(4), 311-327.

Grimes, T. (1991). Mild auditory-visual dissonance in television news may exceed viewer attentional capacity. *Human Communication Research, 18*, 268-298.

Grunig, J. E., Grunig, L. A., & Dozier, D. M. (2006). The excellence theory. In C. H. Botan and V. Hazelton (Eds.), *Public relations theory II* (pp. 21-62). Mahwah, NJ: Lawrence Erlbaum Associates.

Guastello, S. J. (2010). Nonlinear dynamics of team performance and adaptability in emergency response. *Human Factors, 52*(2), 162–172.

Guidry, J., Messner, M., Jin, Y., & Medina-Messner, V. (in press). From #mcdonaldsfail to #dominossucks: An analysis of Instagram images about the 10 largest fast food companies. *Corporate Communications: An International Journal*.

Guskin, E. (2011, March 24). In social media it's all about Japan. *Pew Research Journalism Project.* Retrieved from http://www.journalism.org/index_ report/social_media_it%E2%80%99s_all_about_japan

Hallahan, K., Holtzhausen, D., Van Ruler, B., Verčič, D., & Sriramesh, K. (2007). Defining strategic communication. *International Journal of Strategic Communication*, *1*(1), 3-35.

Heath, R. L. (2010). Crisis communication: Defining the beast and de-marginalizing key publics. In W. T. Coombs, & S. Holladay (Eds.), *The handbook of crisis communication* (pp. 1–13). Malden, MA: Wiley-Blackwell.

Heath, R. L., & Millar, D. P. (2004). A rhetorical approach to crisis communication: Management, communication process, and strategic responses. In D. P. Millar & R. L. Heath (Eds.), *Responding to crisis: A rhetorical approach to crisis*

communication (pp.1-17). Mahwah, NJ: Lawrence Erlbaum Associates.

Heath, R. L., & Palenchar, M. J. (2009). *Strategic issues management: Organizations and public policy changes* (2nd ed.). Thousand Oaks, CA: Sage.

Höfler, M. (2014). Psychological resilience building in disaster risk reduction: Contributions from adult education. *International Journal of Disaster and Risk Science, 5*, 33–40.

Houston, J. B., Hawthorne, J., Perreault, M. F., Park, E. H., Goldstein Hode, M., Halliwell, M. R., ... & Griffith, S. A. (2015). Social media and disasters: a functional framework for social media use in disaster planning, response, and research. *Disasters*, *39*(1), 1-22.

Houston, J. B., Spialek, M. L., Cox, J., Greenwood, M., & First, J. (2015). The centrality of media and communication in fostering community resilience: A framework for assessment and intervention. *American Behavioral Scientist, 59,* 270-283.

Hughes, A. L., & Palen, L. (2009). Twitter adoption and use in mass convergence and emergency events. *International Journal of Emergency Management*, *6*(3), 248-260.

Hyman, J. B. (2002). Exploring social capital and civic engagement to create a framework for community building. *Applied Developmental Science*, *6*(4), 196-202.

IJsselsteijn, W., Ridder, H. D., Freeman, J., Avons, S., & Bouwhuis, D. (2001). Effects of stereoscopic presentation, image motion, and screen size on subjective and objective corroborative measures of presence. *Presence*, *10*(3),

298-311.

Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago: University of Chicago Press.

Jin, Y. (2009). The effects of public's cognitive appraisal of emotions in crises on crisis coping and strategy assessment. *Public Relations Review, 35*, 310-313.

Jin, Y. (2010). Making sense sensibly in crisis communication: How publics' crisis appraisals influence their negative emotions, coping strategy preferences, and crisis response acceptance. *Communication Research, 37*(4), 522-552.

Jin, Y., Fraustino, J. D., & Liu, B. F. (2016). The scared, the outraged, and the anxious: How crisis emotions, involvement, and demographics predict publics' conative coping. *International Journal of Strategic Communication.* 1-20.

Jin, Y., & Pang, A. (2010). Future directions of crisis communication research: Emotions in crisis—The next frontier. In W. T. Coombs & S. J. Holladay (Eds.), *The handbook of crisis communication* (pp. 677-682). Malden, MA: Blackwell.

Jin, Y., Pang, A., & Cameron, G. T. (2007). Integrated crisis mapping: Towards a publics-based, emotion-driven conceptualization in crisis communication. *Sphera Publica*, *7*, 81-96.

Jin, Y., Pang, A., & Cameron, G. T. (2010). The role of emotions in crisis responses: Inaugural test of the integrated crisis mapping (ICM) model. *Corporate Communications: An International Journal, 15*(4), 428-452.

Jin, Y., Pang, A, & Cameron, G. T. (2012). Toward a publics-driven, emotion-based

conceptualization in crisis communication: Unearthing dominant emotions in multi-staged testing of the integrated crisis mapping (ICM) model. *Journal of Public Relations Research, 24*(3)*,* 266-298.

Johnson, T. J., & Kaye, B. K. (2004). Wag the blog: How reliance on traditional media and the Internet influence credibility perceptions of Weblogs among blog users. *Journalism & Mass Communication Quarterly, 81*, 622–642.

Johnson, T. J., & Kaye, B. K. (2009). In blog we trust? Deciphering credibility of components of the Internet among politically interested Internet users. *Computers in Human Behavior, 25*, 175–182.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*, 32-36.

Keim, M. E., & Noji, E. (2010). Emergent use of social media: a new age of opportunity for disaster resilience. *American Journal of Disaster Medicine*, *6*(1), 47-54.

Kennan, W. R., & Hazleton, V. (2006). Internal public relations, social capital, and the role of effective organizational communication (pp. 311-338). In C. H. Botan and V. Hazleton, Eds, *Public Relations Theory II*. New York: Routledge.

Kent, M. L. (2010). Directions in social media for professionals and scholars. In R. Health (Ed.), *The SAGE Handbook of Public Relations* (pp. 643-656). Thousand Oaks, CA: SAGE Publications.

Kim, J.-N. (2011). Public segmentation using situational theory of problem solving: Illustrating summation method and testing segmented public profiles. *PRism, 8*(2). Retrieved from http://www.prismjournal.org/homepage.html

Kim, H., & Cameron, G. (2011). Emotions matter in crisis: The role of anger and sadness in the publics' response to crisis news framing and corporate crisis response. *Communication Research, 38(*6), 826-855.

Lachlan, K. A., Spence, P. R. and Eith, C. A. (2007), 'Access to Mediated Emergency Messages: Differences in Crisis Knowledge across Age, Race, and Socioeconomic Status', in Swan, R. and Bates, K. (Eds.), *Through the Eyes of Katrina: Social Justice in the United States,* Carolina Academic Press, Durham, NC, pp.203–220.

Lachlan, K. A., Spence, P. R., Lin, X., & Del Greco, M. (2014). Screaming into the Wind: Examining the Volume and Content of Tweets Associated with Hurricane Sandy. *Communication Studies*, *65*(5), 500-518.

Lamal, P. A. (1990). On the importance of replication. *Journal of Social Behavior and Personality*, *5*(4), 31.

Lang, A. (1990). Involuntary attention and physiological arousal evoked by structural features and emotional content in TV commercials. *Communication Research, 17*, 275-299.

Lang, A. (1989). Effects of chronological presentation of information on processing and memory for broadcast news. *Journal of Broadcasting & Electronic Media, 33*, 441-452.

Lang, A. (1995). Defining audio/video redundancy from a limited capacity information processing perspective. *Communication Research, 22*, 86-115.

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50*(1), 46-70.

Lang, A. (2006). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication, 56*, 557-580.

Lang, A., Bolls, P. D., Potter, R., & Kawahara, K. (1999). The effects of production pacing and arousing content on the information processing of television message. *Journal of Broadcasting and Electronic Media, 43*, 451-475.

Lang, A., Chung, Y., Lee, S., Schwartz, N., & Shin, M. (2005). It's an arousing, fast-paced kind of world: The effects of age and sensation seeking on the information processing of substance-abuse PSAs. *Media Psychology, 7*, 421-454.

Lang, A., Dhillon, P., & Dong, Q. (1995). Arousal, emotion, and memory for television messages. *Journal of Broadcasting and Electronic Media, 38*, 1–15.

Lang, A., Geiger, S., Strickwerda, M., & Sumner, J. (1993). The effects of related and unrelated cuts on viewers' memory for television: A limited capacity theory of television viewing. *Communication Research, 20*, 4-29.

Lang, A., Newhagen, J., & Reeves, B. (1996). Negative video as structure: Emotion, attention, capacity, and memory. *Journal of Broadcasting and Electronic Media, 40*, 460–477.

Lang, A., Park, B., Sanders-Jackson, A. N., Wilson B. D., & Wang, Z. (2007). Cognition and emotion in TV message processing: How valence, arousing content, structural complexity, and information density affect the availability of cognitive resources. *Media Psychology, 10*(3), 317-338.

Lang, A., Potter, R. F., & Bolls, P. D. (1999). Something for nothing: Is visual

encoding automatic? *Media Psychology, 1*(2), 145-163.

Lang, A., Sanders-Jackson, A., Wang, Z., & Rubenking, B. (2013). Motivated message processing: How motivational activation influences resource allocation, encoding, and storage of TV messages. *Motivation and Emotion*, *37*(3), 508-517.

Lang, A., Schwartz, N., Chung, Y., & Lee, S. (2004). Processing substance abuse messages: Production pacing, arousing content, and age. *Journal of Broadcasting and Electronic Media, 48*, 61-88.

Lang, A., Chung, Y., Lee, S., Schwartz, N., & Shin. (2005). It's an arousing, fast-paced kind of world: The effects of age and sensation seeking on the information processing of substance-abuse PSAs. *Media Psychology, 7*(4), 421-454.

Lang, A., Zhou, S., Scwartz, N., Bolls, P. D., & Potter, R. F. (2000). The effects of edits on arousal, attention, and memory for television messages: When an edit is an edit can an edit be too much? *Journal of Broadcasting & Electronic Media, 44*(1), 94-109.

Lazarus, R. S. (2000). Evolution of a model of stress, coping, and discrete emotions. *Handbook of stress, coping, and health: Implications for nursing research, theory, and practice*, 195-222.

Lazarus, R. S., & Folkman, S. (1984). S*tress, appraisal, and coping*. New York: Springer.

Lee, B. K. (2005). Crisis, culture, community. *Communication Yearbook*, *29*, 275-309.

Lee, H., Oshita, T., Oh, H. J., & Hove, T. (2014). When Do People Speak out? Integrating the Spiral of Silence and the Situational Theory of Problem Solving. *Journal of Public Relations Research*, (online), 1-15.

Lerbinger, O. (1997). *The crisis manager: Facing risk and responsibility*. Mahwah, NJ: Erlbaum.

Lerner, J. S., Gonzalez, R. M., Small, D. A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological Science, 14*(2), 144–150.

Lin, N. (1999). Building a network theory of social capital. *Connections*, *22* (1), 28-51.

Liu, B. F., Austin, L. L., & Jin, Y. (2011). How publics respond to crisis communication strategies: The interplay of information form and source. *Public Relations Review, 37*, 345-353.

Liu, B. F., & Fraustino, J. D. (2014). Beyond image repair: Suggestions for crisis communication theory development. *Public Relations Review*, *40*(3), 543-546.

Liu, B. F., Fraustino, J. D., & Jin, Y. (2013). Social media use during disasters: The joint influences of information forms, sources, and demographics. Paper presented at the annual convention of the National Communication Association, Washington, DC.

Liu, B. F., Fraustino, J. D., & Jin, Y. (2013). Social media use during disasters: Results from a nationally representative field experiment. Report to the Science and Technology Directorate, U.S. Department of Homeland Security. College Park, MD: START.

Liu, B., Fraustino, J. D., & Jin, Y. (2015a). How disaster information form, source, type, and prior disaster exposure affect public outcomes: Jumping on the social media bandwagon. *Journal of Applied Communication Research,* 43(1), 44-65.

Liu, B. F., Fraustino, J. D., & Jin, Y. (2015b). Social media use during disasters: How information form and source influence intended behavioral responses. *Communication Research,* (online before print), 1-21.

Liu, B. F., Jin, Y., & Austin, L. L. (2013). The tendency to tell: Understanding publics' communicative responses to crisis information form and source. *Journal of Public Relations Research*, 25, 51-67.

Liu, B. F., Jin, Y., Austin, L. L., & Janoske, M. (2012). The social-mediated crisis communication model: Guidelines for effective crisis management in a changing media landscape. In S. Duhé (Ed.), *New Media in Public Relations* (2nd Ed., pp. 257-266). New York: Peter Lang.

Liu, B. F., & Pompper, D. (2012). The crisis with no name: Defining the interplay of culture, ethnicity, and race on organizational issues and media outcomes. *Journal of Applied Communication Research, 40*(2), 127-146.

Lo, V.-H., Wei, R., & Su, H. (2013). Self-efficacy, information-processing strategies, and acquisition of health knowledge. *Asian Journal of Communication, 23*(1), 54–67. Retrieved from http://dx.doi.org/10.1080/01292986.2012.725175

Madera, J. M., & Smith, D. B. (2009). The effects of leader negative emotions on evaluations of leadership in a crisis situation: The role of anger and sadness. *The Leadership Quarterly*, *20*(2), 103-114.

McKinley, C. J., & Fahmy, S. (2011). Passing the ‘‘breakfast test’’: Exploring the effects of varying degrees of graphicness of war photography in the new media environment. *Visual Communication Quarterly, 18*, 70–83.

McQuarrie, E. F., Mick, D. G. (1996). Figures of rhetoric in advertising language. *Journal of Consumer Research*, *22*, 424–437.

McQuarrie, E. F., Mick, D. G. (1999). Visual rhetoric in advertising: Text-interpretive, experimental and reader-response analyses. *Journal of Consumer Research, 26*, 37–53.

Merchant, R. M., Elmer, S., & Lurie, N. (2011). Integrating social media into emergency-preparedness efforts. *New England Journal of Medicine*, *365*(4), 289-291.

Millar, M. G., & Millar, K. U. (2000). Promoting safe driving behaviors: The influence of message framing and issue involvement. *Journal of Applied Social Psychology*, *30*(4), 853-866.

Mileti, D. S., & Sorensen, J. H. (1990). *Communication of emergency public warnings: A social science perspective and state-of-the-art assessment*. Oak Ridge, TN: Oak Ridge National Laboratory, U.S. Department of Energy.

Mitchell, A. (2014, March). State of the news media 2014. *PewResearch Journalism Project*. Retrieved from http://www.journalism.org/2014/03/26/state-of-the-news-media-2014-overview/

New York Times Editorial Board (2014, January 10). Haiti, unfinished and forsaken. *New York Times.* Retrieved from http://www.nytimes.com/2014/01/11/opinion/haiti-unfinished-and-

forsaken.html

Nielsen. (2011). State of the media: The social media report Q3 2011. Retrieved from http://blog. nielsen.com/nielsenwire/social/#showcase

Norris, F.H., Stevens, S.P., Pfefferbaum, B., Wyche, K.F., & Pfefferbaum, R.L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1-2), 127-150.

O'Donoghue, S. (2015, June 22). Evoloving social media trends—The rise of visual sharing. Retrieved from http://social360monitoring.com/blog/2015-07-22-evolving-social-media-trends-the-rise-of-visual-sharing

Oliver, M. B. (2008). Tender affective states as predictors of entertainment preference. *Journal of Communication*, *58*(1), 40-61.

Palen, L., Vieweg, S., Liu, S., & Hughes, A. L. (2009). Crisis in a networked world: Features of computer-mediated communication in the April 16, 2007 Virginia tech event. *Social Science Computer Review, 27*, 467-480.

Palenchar, M. J. (2010). Risk communication. *The Sage Handbook of Public Relations* (pp. 447-480). Thousand Oaks, CA: Sage.

Pang, A., Hassan, N.,B. B. A., & Chong, A. C. Y. (2014). Negotiating crisis in the social media environment: Evolution of crises online, gaining credibility offline. *Corporate Communications: An International Journal*, *19*(1), 96-118.

Paolacci, G., & Chandler, J. (2014). Inside the Turk: Understanding Mechanical Turk as a participant pool. *Current Directions in Psychological Science, 23*(3), 1984-188. doi:10.1177/0963721414531598

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*, 411–419.

Paton, D., & Johnston, D. (2001). Disasters and communities: Vulnerability, resilience, and preparedness. *Disaster Prevention and Management, 10*, 270–277.

Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, *30*(3), 227-238.

Perrin, A. (2015, October 8). Social media usage: 2005-2015. *Pew Research Center.* Retrieved from: http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/

Perse, E., Buton, P. L., Kovner, E. S., Lears, M. E., & Sen, R. J. (1992). Predicting computer-mediated communication in a college class. *Communication Research Reports*, *9(2),* 161–170.

Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 381-391.

Petty, R. E., & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology*, *37*(10), 1915.

Pew Research Center. (2012, July 16). YouTube & news: A new kind of visual news. Retrieved from http://www.journalism.org/2012/07/16/youtube-news/

Pew Research Center. (2015, November 23). Beyond distrust: How Americans view their government. Retrieved from http://www.people-press.org/2015/11/23/1-

trust-in-government-1958-2015/

Pew Research Journalism Project (2012, July 16). YouTube & news: Video length. Retrieved from http://www.journalism.org/2012/07/16/video-length/

Pfau, M., Haigh, M., Fifrick, A., Holl, D., Tedesco, A., Cope, J., . . . Martin, M. (2006). The effects of print news photographs of the casualties of war. *Journalism & Mass Communication Quarterly, 83*, 150–168.

Purcell, K. (2013, October 10). Online video 2013. *Pew Research Internet Project.* Retrieved from http://www.pewinternet.org/2013/10/10/online-video-2013/

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, *6*(1), 65-78.

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.

PRSA (n.d.). What is public relation? PRSA's widely accepted definition. Retrieved from http://www.prsa.org/aboutprsa/publicrelationsdefined/#.VGa8X4cwd88

Quintero, J. M., Harrison, K., & Quick, B. L. (2013). Understanding the effectiveness of the entertainment-education strategy: An investigation of how audience involvement, message processing, and message design influence health information recall. *Journal of Health Communication*, *18*(2), 160-178.

Rawlins, B. L. (2006). Prioritizing stakeholders for public relations. *Institute for public relations*, 1-14.

Ready.gov. (n.d.). Floods. Retrieved from http://www.ready.gov/floods

Reeves, B., Thorson, E., Rothschild, M., McDonald, D., Hirsch, J., & Goldstein, R.

(1985). Attention to television: Intra stimulus effects of movement and scene changes on alpha variation over time. *International Journal of Neuroscience, 25*, 241–255.

Reynolds, B. (2006). Response to best practices. *Journal of Applied Communication Research, 34*(3), 249–252.

Reynolds, B., & Seeger, M. (2012). Crisis emergency + risk communication: 2012 edition. *U.S. Department of Health and Human Services Center for Disease Control and Prevention*. Retrieved from: http://emergency.cdc.gov/cerc/pdf/CERC_2012edition.pdf

Reynolds, B., & SEEGER, M. W. (2005). Crisis and emergency risk communication as an integrative model. *Journal of Health Communication*, *10*(1), 43-55.

Riad, J. K., Norris, F. H., & Ruback, R. B. (1999). Predicting evacuation in two major disasters: risk perception, social influence, and access to resources. *Journal of Applied Social Psychology*, *29*(5), 918-934.

Rice, R. E. (1992). Task analyzability, use of new medium and effectiveness: A multi-site exploration of media richness. *Organization Science, 3*(4), 475–500.

Sani, F., & Todman, J. (2006). *Experimental design and statistics for psychology*. Malden, MA: Blackwell Publishing.

Scheufele, D. A. (1999). Framing as a theory of media effects. *Journal of Communication*, *49*(1), 103-122.

Schmierbach, M., & Oeldorf-Hirsch, A. (2012). A little bird told me, so I didn't believe it: Twitter, credibility, and issue perceptions. *Communication Quarterly, 60*(3), 317-337.

Schultz, F., Utz, S., & Göritz, A. (2011). Is the medium the message? Perceptions of and reactions to crisis communication via twitter, blogs and traditional media. *Public Relations Review, 37*(1), 20-27.

Seeger, M. W. (2006). Best practices in crisis communication: An expert panel process. *Journal of Applied Communication Research*, *34*(3), 232-244.

Seeger, M. W., Sellnow, T. L., & Ulmer, R. S. (2003). *Communication and organizational crisis*. Westport, CT: Praeger.

Sellnow, T. L., & Seeger, M. W. (2013). *Theorizing crisis communication.* Oxford, UK: Wiley-Blackwell.

Shah, D., Schmierbach, M., Hawkins, J., Espino, R., & Donavan, J. (2002). Nonrecursive models of Internet use and community engagement: Questioning whether time spent online erodes social capital. *Journalism and Mass Communication Quarterly*, 79, 964-987.

Shearman, S. (2014, March 27). Social is the rage, but consumers still trust TV news: Study. *PR Week*. Retrieved from http://www.prweekus.com/article/social-rage-consumers-trust-tv-news-study/1287459

Sheer, V. C. (2011). Teenagers' use of MSN features, discussion topics, and online friendship development: The impact of media richness and communication control. *Communication Quarterly*, *59*(1), 82-103.

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk analysis*, *24*(2), 311-322.

Sohn, Y. J., & Lariscy, R. W. (2014). Understanding reputational crises: Definition,

properties, and consequences. *Journal of Public Relations Research, 26*(1), 23-43.

Sommerfeldt, E. J. (2013). The civility of social capital: Public relations in the public sphere, civil society, and democracy. *Public Relations Review, 39*, 280-289.

Sommerfeldt, E., Paquette, M., Janoske, M., & Ma, L. (2013). Identifying network "communities" of theory: The structure of public relations paradigms. Paper presented at the annual meeting of the Association for Education in Journalism and Mass Communication, Washington, DC.

Short, J.*,* Williams, E.*, and* Christie, B. *(*1976*). The social psychology of telecommunications. London: Wiley.*

Sosik, V. S., & Bazarova, N. N. (2014). Relational maintenance on social network sites: How Facebook communication predicts relational escalation. *Computers in Human Behavior*, *35*, 124-131.

Spence, P. R., Lachlan, K. A. and Burke, J. (2008), 'Crisis Preparation, Media use, and Information Seeking: Patterns across Katrina Evacuees and Lessons Learned for Crisis Communication', *Journal of Emergency Management*, Volume 6, Number 1, pp. 11-23.

Spence, P. R., Lachlan, K. A., & Burke, J. A. (2011). Differences in crisis knowledge across age, race, and socioeconomic status during Hurricane Ike: A field test and extension of the knowledge gap hypothesis. *Communication Theory*, *21*(3), 261-278.

Starbird, Kate and Leysia Palen (2011). "Voluntweeters": Self-organizing by digital volunteers in times of crisis. Proceedings of the ACM 2011 Conference on

Computer Human Interaction (CHI 2011), Vancouver, BC, Canada.

Stephens, K. K., Barrett, A. K., Mahometa, M. J. (2013). Organizational communication in emergencies: Using multiple channels and sources to combat noise and capture attention. *Human Communication Research, 39*, 230-251.

Stephens, K. K., & Malone, P. (2009). If the organizations won't give us information…: The use of multiple new media for crisis technical translations and dialogue. *Journal of Public Relations Research, 21*(2), 229-239.

Stewart, M. C., & Wilson, B. G. (2016). The dynamic role of social media during Hurricane# Sandy: An introduction of the STREMII model to weather the storm of the crisis lifecycle. *Computers in Human Behavior*, *54*, 639-646.

Sturges, D. L. (1994). Communicating through crises: A strategy for organizational survival. *Management Communication Quarterly, 7*(3), 297-316.

Stynes, T. (2014, May 1). USA Today top U.S. newspaper in total circulation. *Wall Street Journal.* Retrieved from http://online.wsj.com/articles/SB10001424052702304178104579535822452265610

Sun, P. C., & Cheng, H. K. (2007). The design of instructional multimedia in e-Learning: A Media Richness Theory-based approach. *Computers & Education*, *49*(3), 662-676.

Tabachnick, B. G., & Fidell, L. S. (2001). *Computer-assisted research design and analysis*. Needham Heights, MA: Allyn & Bacon.

Terlutter, R., & Capella, M. L. (2013). The gamification of advertising: analysis and

research directions of in-game advertising, advergames, and advertising in social network games. *Journal of Advertising*, *42*(2-3), 95-112.

Toth, E. L. (2010). Reflections on the field. In R. L. Heath (Ed), *The SAGE handbook of public relations* (2nd ed., pp. 711-22). Thousand Oaks, CA: Sage.

Trotta, D., & Barbara, P. (2012, November 5). Sandy's aftermath causes nightmare commute,housing crisis. Reuters. Retrieved from: http://www.reuters.com/article/ 2012/11/05/us-storm-sandy-hurricane-idUSBRE89N16J20121105

Tyler, L. (1997). Liability Means Never being Able to Say You're Sorry Corporate Guilt, Legal Constraints, and Defensiveness in Corporate Communication. *Management Communication Quarterly*, *11*(1), 51-73.

Ulmer, R. R., Seeger, M. W., & Sellnow, T. L. (2007). Post-crisis communication and renewal: Expanding the parameters of post-crisis discourse. *Public Relations Review*, 33, 130-134.

Umphrey, L.R. (2004). Message defensiveness, efficacy, and health-related behavioral intentions. *Communication Research Reports, 21*(4), 329-337.

Van Mulken, M., Le Pair, R., & Forceville, C. (2010). The impact of perceived complexity, deviation and comprehension on the appreciation of visual metaphor in advertising across three European countries. *Journal of Pragmatics*, *42*(12), 3418-3430.

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.

Veil, S. R., Sellnow, T. L., & Petrun, E. L. (2012). Hoaxes and the Paradoxical Challenges of Restoring Legitimacy Dominos' Response to Its YouTube Crisis. *Management Communication Quarterly*, *26*(2), 322-345.

Walsh, F. (2007). Traumatic loss and major disasters: Strengthening family and community resilience. *Family process*, *46*(2), 207-227.

Walton, L. R., Seitz, H. H., & Ragsdale, K. (2012). Strategic use of YouTube during a national public health crisis: The CDC's response to the 2009 H1N1 flu epidemic. *Case Studies in Strategic Communication*, *1*(3), 25-37.

Wan, S., Koh, R., Ong, A., & Pang, A. (2015). Parody social media accounts: Influence and impact on organizations during crisis. *Public Relations Review*, *41*(3), 381-385.

Westerman, D., Spence, P. R., & Van Der Heide, B. (2014). Social media as information source: Recency of updates and credibility of Information. *Journal of Computer‐Mediated Communication*, *19*(2), 171-183.

White, C. M. (2011). *Social media, crisis communication, and emergency management: Leveraging Web 2.0 technologies*. New York: CRC press

Wigley, S., & Zhang, W. (2011). A study of PR practitioners' use of social media in crisis planning. *Public Relations Journal*, *5*(3), 1-16.

Willis, P. (2012). Engaging communities: Ostrom's economic commons, social capital and public relations. *Public Relations Review, 38*, 116-122

Wimmer, R. D., & Dominick, J. R. (2014). *Mass media research*, 10th ed. Boston, MA: Wadsworth.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for

effective public health campaigns. *Health education & behavior*, *27*(5), 591-615.

Wogalter, M. S. (2006). Communication-human information processing (C-HIP) Model. In M. S. Wogalter (Ed.), *Handbook of warnings* (pp. 51-61). Mahwah, NJ: Lawrence Erlbaum.

Wright, D. K., & Hinson, M. (2009). An updated look at the impact of social media on public relations practices. *Public Relations Journal, 3*(2), article 2.

Wright, D. K., & Hinson, M. D. (2013). An updated examination of social and emerging media use in public relations practices: A longitudinal analysis between 2006 and 2013. *Public Relations Journal, 7*(3), article 1. Retrieved from http://www.prsa. org/Intelligence/PRJournal/Archives/#.U1V1HOZdVuo

Xiao, Y., Huang, Q., & Wu, K. (2015). Understanding social media data for disaster management. *Natural Hazards*, *79*(3), 1663-1679.

Yates, D., & Paquette, S. (2011). Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal of Information Management*, *31*(1), 6-13.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research*, 341-352.

Zhao, D., Wang, F., Wei, J., & Liang, L. (2013). Public reaction to information release for crisis discourse by organization: Integration of online comments. *International Journal of Information Management, 33*, 485-495.

Zhou, H., Wang, J., Wan, J., Jia, H. (2010). Resilience to natural hazards: A

geographic perspective. Nat Hazards 53, 21–41.

Zillmann, D., Knobloch, S., & Yu, H. S. (2001). Effects of photographs on the selective reading of news reports. *Media Psychology, 3*, 301–324.