

Individuals' Religiosity and Emotional Coping in Response to Disasters

Jungkyu Rhys Lim

Ph.D. Student

Department of Communication,

University of Maryland

4300 Chapel Drive

College Park, MD 20740

jklim@umd.edu

240-515-6843

Brooke Fisher Liu

Associate Professor

Department of Communication,

University of Maryland

4300 Chapel Drive

College Park, MD 20740

bliu@umd.edu

301-405-6524

Michael Egnoto

Assistant Clinical Professor

National Consortium for the Study of Terrorism and Responses to Terrorism (START),

University of Maryland

8400 Baltimore Ave, Suite 250

College Park, MD 20740

megnoto@umd.edu

(Since completing data collection for this research project, Dr. Egnoto joined The Walter Reed Army Institute of Research)

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/1468-5973.12263](https://doi.org/10.1111/1468-5973.12263)

This article is protected by copyright. All rights reserved

Holly Roberts

Program Manager and Researcher,
Risk Communication and Resilience

National Consortium for the Study of Terrorism and Responses to Terrorism (START),

University of Maryland
8400 Baltimore Ave, Suite 250
College Park, MD 20740

hroberts@umd.edu

Keywords: crisis; disaster; risk; emotions; religiosity

Funding disclosure: This material presented in the paper is based upon work supported by the National Oceanic and Atmospheric Administration (NOAA), VORTEX-SE award number: NA15OAR4590237.

Received Date:

Revised Date:

Accepted Date:

Article Type: Original Article

Individuals' Religiosity and Emotional Coping in Response to Disasters

Providing information to help individuals cope physically and psychologically with a disaster is critical in crisis communication. However, how individuals cope is relatively understudied. In particular, researchers have examined how people emotionally cope during different types of crises, but not in a natural disaster context and not religiosity. Yet, religiosity can be important during disasters, given that about 89% of adults in the United States believe in God (Pew Research Center, 2014). Through ten focus groups ($N = 77$) and a survey ($N = 1,484$), this study examines how residents of the Southeast U.S. cope in response to tornadoes. Findings indicate that participants experience anxiety and fear during a tornado, but fear and hope trigger physical action taking (e.g., sheltering in place or collecting supplies). Prayer during a tornado does not significantly predict action taking. Religiosity significantly predicts physical action taking.

Keywords: crisis; disaster; risk; emotions; religiosity

Individuals' Religiosity and Emotional Coping in Response to Disasters

During disasters, organizations can help individuals physically and psychologically cope through effective crisis communication (Coombs, 2016; Holladay, 2009; Sturges, 1994). Recent studies published at the *Journal of Contingencies and Crisis Management* also examined crisis communication during disasters (Bakker, van Bommel, Kersthoud, & Giebels, 2018; van Dijk, Zebel, & Gutteling, 2018). Yet, disaster research has focused on “prevention and control through modification of the human habitat”

rather than “human adaption” to risks like tornadoes (Islam, 2012, pp. 209-210). One form of human adaption is the coping strategies that individuals use during disasters. Researchers have started to focus on individuals’ cognitive and affective coping during different types of events, including product recalls (Choi & Lin, 2009), workplace violence and product tampering (Coombs & Holladay, 2005), terrorist attacks (Jin, Fraustino, & Liu, 2016), and pandemics (Kim & Niederdeppe, 2013). However, research on the coping process people go through in response to organizational communication during natural disasters is lacking. Given that more than 300 disasters triggered by natural hazards occur every year, more research is needed on how people’s coping affects their responses to these disasters (Guha-Sapir, Hoyois, Wallemacq, & Below, 2017).

Researchers also have neglected another component of crisis coping: religiosity. Relying on religiosity, or a devotion to religion, is the most commonly reported coping strategy used by individuals in the U.S. (Pargament, 1997), even in crisis contexts, such as terrorist attacks (Schuster et al., 2001). Research so far has found that religiosity is related to mental health, acceptance, hope, life satisfaction, stress-related growth, and posttraumatic growth (Ano & Vasconcelles, 2005; Hackney & Sanders, 2003; Helgeson, Reynolds, & Tomich, 2006; Prati & Pietrantonio, 2009). Research also found that different religions provide different narrative frameworks to interpret, prepare for, and respond to disasters (McGeehan & Baker, 2017). Still, only a few prior studies examined how religiosity affects how people respond to disasters (e.g., Adams, Anderson, Turner, & Armstrong, 2011; Lachlan & Spence, 2011). None of these prior studies examined how individuals’ religiosity affects their responses to governments’ threat messages distributed during disasters, such as tornado watches and warnings. Prior research also has not simultaneously examined religiosity and emotional coping, which may better explain how people respond to disaster information than studying emotional coping alone. As prior research found, religious rituals like candle lighting can help people emotionally heal and recover from disasters (Danbolt & Stifoss-Hanssen, 2011; Rezaeian, 2008). Additionally, religious leaders often provided spiritual and emotional care in the aftermath of disasters (Entwistle, Moroney, & Aten, 2018). Religious individuals make more attributions to God, prayer, faith, and worship to explain why people survive tornadoes compared to agnostic individuals (Riggio et al., 2018). Still, it is unknown how religiosity and emotional coping may affect how people respond government messages during disasters.

Accordingly, this study examines how emotions and religiosity affect how Southeast U.S. residents respond to National Weather Service tornado messages through ten focus groups ($N = 77$) and a survey ($N = 1,484$). Findings extend the integrated crisis mapping (ICM) model (Jin et al., 2007) and the

extended parallel process (EPPM) model (So, 2013; Witte, 1992). Ultimately, findings improve understanding of how people respond to tornado disaster communication, which can improve tornado message construction. Such improved message construction is especially important in the Southeast U.S. where the most dangerous tornadoes occur in the U.S. when controlling for tornado frequency (Ashley, 2007; NOAA, 2017).

Literature Review

Coping in Crisis Contexts

In order to develop effective disaster messages, we need to better understand how individuals cope in response to threats. Coping is how individuals combat or prevent stress (Ahmadi, 2006) and is a constantly changing cognitive and behavioral process (Lazarus & Folkman, 1984). During stressful situations, individuals use thoughts and actions to manage distress (emotion-focused coping), problems causing distress (problem-focused coping), and sustain positive well-being (meaning-focused coping) (Folkman, 2013). Specifically, problem-focused coping attempts to change the stressor by direct action and occurs when individuals appraise a situation as controllable (e.g., seeking information and advice, negotiating, solving problems). Emotion-focused coping focuses on changing internal emotions rather than on changing external situations that trigger emotional responses (e.g., distancing, humor, day dreaming, blaming others). Meaning-focused coping focuses on deeply held beliefs and values, including religion, and reframing situations in positive ways.

Despite the importance of understanding a variety of coping strategies, studies on how individuals cope with crises have focused on problem solving and emotions (e.g., Choi & Lin, 2009; Coombs, 2007; Jin et al, 2007). In crises, individuals sometimes cannot solve problems with direct action, such as eliminating their risk to tornadoes while living in the Southeast U.S. Furthermore, emotional coping is not the only coping strategy that individuals can employ. They can also employ religiosity, as we further discuss below.

Emotions and Crisis Coping

Emotions function as “the anchors of the publics’ interpretation” of crises (Jin, Pang, & Cameron, 2012, p. 268). In crises, negative emotions have been the primary focus of coping research (Choi & Lin, 2009; Coombs, 2007; Jin et al., 2007, Kim & Cameron, 2011; Kim & Niederdeppe, 2013). In particular, the dominant crisis emotions model, the integrated crisis mapping (ICM) model,

comprehensively identifies negative emotions, including anger, fright, anxiety, and sadness, through content analysis on media reports (Jin, Pang, & Cameron, 2007, 2012). The ICM model used Lazarus's (1991) definition of emotions, which is "organized cognitive-motivational-relational configurations whose status changes with changes in the person-environment relationship as this is perceived and evaluated (appraisal)" (p. 38). Specifically, the ICM model maps primary and secondary emotions based on different types of crises on two continua: individuals' primary coping strategy (conative coping vs. cognitive-focused coping) and level of organizational involvement (relevance between organizational goal and the crisis and organization's appraisal of its crisis responsibility). For example, natural disasters and accidents are located in the high engagement/cognitive coping quadrant, while terrorist attacks and rumors are located in the low engagement/cognitive coping quadrant. Still, across all crisis types, research on the ICM model found that individuals are more likely to use conative coping, such as taking actions to address crises, than cognitive coping, which includes learning about what happened, making sense, and changing crisis interpretations (Jin et al., 2012)."

According to the ICM model, anxiety is the default emotion that individuals feel during all crises, but the crisis type dictates what other emotions individuals experience, such as anger, fright, and sadness (Jin et al., 2007, 2012). For example, research on the ICM model posited that preventable crises, such as terrorist attacks, elicit anxiety, fight, and anger (Jin et al., 2012). After exposure to a hypothetical terrorist attack, anger and anxiety predicted individuals' intentions to seek information, but fear and anxiety predicted individuals' intentions to take government-recommended protective actions (e.g., evacuation) (Jin et al., 2016). Another study found that individuals most frequently displayed anger on social media, followed by fright, sadness, and anxiety in the context of a repeat school shooting (Brummette & Sisco, 2015).

During natural disasters like tornadoes, the ICM model posits that the primary emotion is sadness due to suffering from irrevocable loss; the secondary emotion is fright due to facing an uncertain and existential threat, despite "insufficient evidence" (Jin et al., 2012, p. 286; Lazarus, 1991). Researchers have noted that the ICM model has yet to test anxiety, sadness, and fright in a natural disaster context (Jin et al., 2016), which we do perhaps for the first time in this study.

Another dominant approach to understanding emotions in risky situations is the extended parallel process model (EPPM) (So, 2013; Witte, 1992; Witte & Allen, 2000). In EPPM research, message recipients must feel susceptible to a severe threat for a message to be persuasive by inducing fear and

anxiety. In other words, fear and anxiety motivate responses to risks (So, 2013; Witte, 1992). Moreover, the risk message should also include adequate information on how to avoid the danger. Subsequently, individuals should perceive high levels of self-efficacy so that they feel competent to perform the recommended action. Individuals also should feel response efficacy so that they think the suggested response will successfully control the risk. The EPPM has been applied in crisis research with a focus on efficacy. For example, in crisis situation, general self-efficacy predicts crisis efficacy, which in turn predicts motivation to comply with instructing messages (Avery & Park, 2016). When individuals think that the crisis communicator is similar to themselves and the emergency messages are sensitive to their demographics, they perceive higher self-efficacy (Heath, Lee, & Ni, 2009). Still, there is a need for additional EPPM research in crisis communication, especially research on the emotions of fear and anxiety (Coombs, 2010), in a natural disaster context.

In addition to the dominant negative emotions of anxiety and fear, an increasing number of researchers are beginning to identify positive emotions in individuals' crisis coping. These positive emotions include gratitude (Fredrickson, Tugade, Waugh, & Larkin, 2003), hope (Fredrickson et al., 2003; Jin, Park, & Len-Ríos, 2010), relief (Choi & Lin, 2009; Liu & Kim, 2011), and sympathy (Coombs & Holladay, 2005; Jeong, 2010; Kim & Niederdeppe, 2013). Positive emotions tend to broaden attention, thinking, and behavioral responses (Fredrickson, 2001; Fredrickson & Joiner, 2002), increase supporting behavior (Jeong, 2010), and increase willingness to seek information (Kim & Niederdeppe, 2013). Individuals may also experience positive emotions, such as hope, during disasters. Such positive emotions can be related to EPPM's self-efficacy and response efficacy and can motivate individuals to respond to threat messages during disasters (Chadwick, 2015; Underhill, 2012). Individuals may also experience some positive emotions, such as gratitude and relief, for their survival after natural disasters, and these positive emotions may influence their future disaster responses. For example, in climate change and personal finance contexts, persuasion research found that hope appeals generate higher interest and perceived message effectiveness (Chadwick, 2015), more hopeful thoughts, more accurate recall, and more supportive thoughts about the hope appeal, compared to the fear appeal (Underhill, 2012). Still, such positive emotions have been less discussed in the ICM model and the EPPM research in a disaster context.

Research on the EPPM and ICM models alluded that threat messages may induce negative emotions (fear, anxiety, and sadness), which in turn may not motivate individuals to take protective actions during disasters (Jin et al., 2016; So, 2013). Moreover, positive emotions such as hope can

motivate individuals to take protective actions (Chadwick, 2015; Fredrickson et al., 2003; Kim & Niederdeppe, 2013; Underhill, 2012). However, such negative and positive emotions have not empirically been tested in a disaster context. More research also needs to examine whether individuals' emotional coping affects their response to government recommendations, as one prior study found (Jin et al., 2016). Therefore, this study addresses the following research questions and hypothesis:

RQ1: How, if at all, does a threat of experiencing a tornado evokes anxiety, fear, and sadness?

H1: A threat of experiencing a tornado evokes anxiety (H1a), fear (H1b), and sadness (H1c).

RQ2: How do crisis emotions affect how people respond to government's tornado threat messages?

Religiosity and Crisis Coping

Religiosity means how important religion is for one or how religious one considers oneself generally and encompasses intellectual, ideological, ritualistic, experiential, and consequential dimensions (Glock, 1962; S. Huber & O. Huber, 2012). Relying on religiosity is the most commonly reported coping strategy used by individuals in the U.S. to respond to challenges (Pargament, 1997). For example, 90% of individuals interviewed following the 9/11 terrorist attacks reported turning to religion as a way of coping (Schuster et al., 2001). Stronger faith, hope, and spirituality were inversely correlated with depression and anxiety related to trauma from the terrorist attacks (Ai, Cascio, Satangelo, & Evans-Campbell, 2005). Individuals who possess positive religious coping strategies are less disturbed by the aftermath of disasters and more resilient (O'Grady et al, 2018; Johnson, Aten, Madson, & Bennett, 2006; Smith, Pargament, Brant, & Oliver, 2000). Of particular relevance to this study, past experimental research using a fictional tornadoes vignette found that religious individuals make more attributions to God, prayer, faith, and worship to explain why people survive tornadoes, compared to agnostic individuals only when no one died (Riggio et al., 2018).

Research points to three key resources that religiosity provides for crisis survivors: openness to religious growth, engagement in spiritual reflection, and involvement in a faith-based community (Adams et al., 2011; Marks, Cherry, & Silva, 2009). For example, individuals displaced after Hurricane Katrina found prayer allowed them to feel a greater connection to God and reduced their sense of isolation (Spence, Lachlan, & Burke, 2007). In another study, religiosity influenced how Hurricane Katrina survivors assigned meanings to the storm (Pecchioni, Edwards, & Grey, 2011). Furthermore, religiosity

can buffer against post-traumatic stress disorder following natural disasters (McElroy-Heltzel et al., 2018; Smith et al., 2000).

Religiosity also helps crisis responders cope. Reliance on a spiritual practice was the third most commonly cited coping practice among New Orleans police officers responding to Hurricane Katrina (Adams et al., 2011). Additionally, McGeehan and Baker (2017) examined four religions groups in Hawaii, including the Bahá'í Faith, Buddhism, Church of Jesus Christ of Latter-day Saints (LDS), and the United Methodist Church. They found that each religion's narrative influences their group members to differently interpret, prepare for, and respond to disasters. For example, the LDS community members reported exceptionally greater levels of disaster preparedness than the other religious groups, in part because they believe in the second coming of Christ during disasters. In comparison, Buddhist community members were least prepared for disasters, in part because they believe in karma. Still, little research has been conducted on how religion influences responding to the threat messages during crises.

Research so far alludes that religion may be positively associated with responding to a government's disaster messages. Some scholars found that religious priming may activate conformity to a message (Saroglou, Corneille, & Van Cappellen, 2009; Van Cappellen, Cornielle, Cols, & Saroglou, 2011). Other scholars found that more religious individuals also are more effective in regulating their emotions and behaviors than non-religious individuals (Carter, McCullough, & Carver, 2012; Koole, McCullough, Kuhl, & Roelofsma, 2010). Specifically, one way that religious individuals regulate their emotions is by changing the meaning of emotion through cognitive reappraisal (Vishkin et al., 2016). Additional research documents religious coping during disasters without linking religious coping to government disaster messages (e.g., Adams et al., 2011; Aten, O'Grady, Milstein, Boan, & Schrub, 2014; Chester, Duncan, & Dibben, 2008). Therefore, this study examines:

RQ3: How, if at all, do people employ religiosity in response to government's tornado threat messages?

RQ4: How, if at all, does religiosity affect how people respond to the government's tornado threat messages?

Overview of the Studies

To answer the hypothesis and research questions, researchers first conducted ten focus groups with residents of the Southeastern United States ($N = 77$). Focus groups are ideal for exploring how and why (if at all) people attend and respond to communication (Berg, 2009). They also are well suited for understanding human behaviors surrounding topics for which minimal empirical knowledge exists (Lunt & Livingstone, 1996). Indeed, the focus groups for this project revealed the importance of religiosity in how Southeast U.S. residents respond to tornadoes; the study's original design only included emotional coping. Second, a survey of 1,484 Southeast U.S. residents was conducted, guided by the focus group findings and prior research. Surveys are ideal in generating robust and generalizable conclusions from a naturalistic setting (Allen, Titsworth, & Hunt, 2009).

Study 1: Focus groups

Method

Procedures. The research team conducted focus groups in February 2016 in three cities in the Southeastern United States: Tuscaloosa, AL, Winston-Salem, NC, and Lexington, KY. These locations represented high risk (Tuscaloosa), moderate risk (Lexington), and low risk (Winston-Salem) for EF3 or stronger tornados (FEMA, 2011). Focus group moderators were the research team members and the moderators followed a focus group script approved by the Institutional Review Board (IRB). The 30 focus group questions focused on understanding how people in the Southeast U.S. understand, process, and respond to tornado threat messages. Sample questions from the focus group script are: (1) "Once you've received a tornado warning, what do you typically do? Why?;" (2) "Tornado warnings typically tell you to take shelter immediately. How do you decide whether to follow this recommended action? Why?;" and (3) "How do you feel when you receive a tornado warning? Why?;"

Each focus group lasted about two hours and all focus group sessions were transcribed verbatim from video and audio recordings. While transcription was undertaken, the research team discussed initial themes based on their moderation, observation, and review of notes they took during the focus groups.

Analysis. During these discussions, the team created a running list of codes, such as prayer during a tornado. This early, team-based analysis enhanced subsequent formal qualitative data analysis by ensuring common understanding of findings and generating codes to be used in formal analysis (Guest & MacQueen, 2008). For the formal analysis, researchers entered the transcripts into the

qualitative analysis program NVivo 12, which allows for systematic coding and data visualization among multiple coders.

While in NVivo, research team members used the coding techniques recommended by Corbin and Strauss (2014) to code the focus group transcripts line by line (e.g., using the participants' own words to identify themes and constantly looking for data that might contradict emergent themes). Using codes developed at team meetings and additional codes that emerged during data analysis, team members independently coded the data in NVivo. Coding was conducted deductively to reflect previous literature, such as coding for the emotions identified in prior research. Coding also was conducted inductively to allow researchers to reflect participants' lived experiences independent of prior research, such as coding for religious coping behavior in the form of prayer. The team worked together to draw conclusions from conceptually clustered findings (Miles, Huberman, & Saldaña, 2013). To help in drawing conclusions, the team used NVivo 12 to display all instances of coding throughout the dataset. The team then collapsed some codes when there was redundancy in two separate codes (e.g., fear and fright). The team also used NVivo to reassign some coding when there was disagreement over coding (e.g., when team members disagreed on whether a focus group quote represented a specific emotion). Once consensus was achieved on coding, the team assigned themes from the coded data and drew conclusions from these themes, as presented later in this paper.

Participants. We conducted 10 focus groups with 77 individuals (See Table 1). Participants were recruited with the assistance of a third-party vendor in each of the local markets. The selection criteria were designed to create focus groups to be as representative as possible of the U.S. Census demographics in each area by race, age, and education. Approximately 52.9% ($n = 37$) of the participants were male, while 47.1% ($n = 33$) were female, with seven participants who opted to not report their demographics. Participants predominantly reported their race/ethnicity as Caucasian (75.7%) or African American (20%). The mean participant age was 44.49, with the minimum age of 18 and the maximum age of 76 ($SD = 14.63$). Across three cities in the Southeastern U.S., 65% of participants experienced tornadoes ($n = 50$), 6% were exposed to tornado watches, warnings, aftermath, but not actual tornadoes ($n = 5$), and 27% did not experienced tornadoes ($n = 21$). Each city showed varying degree of tornado experience. For more information, please find Table 1 below.

[Insert Table 1 about here]

Results

This article is protected by copyright. All rights reserved

Emotional coping and tornadoes: Anxiety, fright, and sadness (RQ1). RQ1 asked about how, if at all, a threat of experiencing a tornado evokes anxiety, fear, and sadness. Focus group analysis revealed that participants experience anxiety and fright in response to a tornado and to a lesser extent experience sadness for loss after tornadoes. Focus groups do not confirm or disconfirm hypotheses, yet help us explore and better understand phenomena. Quantitative research then can test hypotheses, including this study's survey.

Participants shared feeling anxiety about tornados. For example, one participant noted: "Anxiety for me. Gotta take care of the kids, gotta. . . what else can I do, what other things can I do to make sure they're ok?" Another participant mentioned: "Anxiety. . . Could I have been prepared?" A third participant stated: "I cannot sleep. Living through the one I was in, I cannot rest. . . I can't. So, I am up. And I've got all kinds of energy [during a tornado]."

Participants also discussed their fright and fear of tornados. For example, one participant said: "One had come this close to our house; it just barely touched the gutters and that was close enough. (nods in agreement from all). It's scary." Another participant noted: "It's basically just like this bulldozer. (nods and agreement from others). And so the intensity and the quickness that it, you know, I was definitely scared of tornadoes."

Sadness was not a major emotion that participants experienced for tornado threat messages, but some participants expressed sadness for losses after tornadoes occurred and sadness for not helping others out more during tornadoes. For example, one participant recalled after a tornado: "You know, then hearing, you know someone, so and so passed away, and people don't have homes." Another shared: "it [was] just. . . rough. I saw people walking with babies in their arms. . . I should have just been bringing people into my home because my house was untouched. You know? And I didn't do that. And I feel bad cause there were a lot of people together just misplaced."

Religion and tornadoes (RQ3). RQ3 asked how, if at all, people employ religion in response to tornado. Focus group participants used religious expressions when discussing tornados. For example, one participant mentioned: "I have a direct line to the great Lord because it was coming my way and it went a quarter mile to the right of my house." Another said:

When I was younger and I did not take tornadoes seriously at all not one bit, then lost my home to one then after that, thank you (hands in prayer form, looks up), I can't tell you why we left that day.

Participants further implied that tornadoes and their consequence were "acts of God." For example, one participant noted: "It's weather, it's an act of God, that's what happens, you know they're just gonna do what they want to do period. Really, nobody knows." Another said: "From my past experience, they could pop up from anywhere. I mean you're from Oklahoma, you should know. You don't know. They know. You're playing God at that point. But you can't do it."

Acts of God also implied that participants think sometimes that God shows mercy by not making tornadoes approach vulnerable populations. For example, one participant noted, "Sometimes you think God has this thing about going around schools when there's school kids there or when that one was coming towards the hospital and it kinda made a little turn."

Focus group participants "pray" or "engage in prayer" as a reaction to tornadoes. Focus group participants indicated that to "pray" or to "engage in prayer" is a common reaction for some to tornadoes in the Southeastern U.S. For example, one participant said: "We all come together in the bathroom, like I said I was coming up under the house, but we always pray. Calling lord name of Jesus all the time when the weather is bad, you know. And that's how we do it." Another said: "Aw, we was in a tornado, in the church and we all got under the benches and prayed. It was awful it just came right over to us."

Some focus group participants discussed that praying has its own emotional utility including comfort and the hope on which they can rely. As one participant commented:

Some people are religious. . . Some people have faith in God. . . They just pray and that's what gives them comfort. . . Maybe if they're huddled up in their basement and they're covering their head and they got 4 or 5 kids beside 'em. . . You're down to the end of your rope, maybe a prayer would make you feel better.

Study 2: Survey

Following up on the rich qualitative findings, we conducted survey research to further answer our research questions and test the hypothesis. Survey research allows us to test to what extent findings about religious and emotional coping generalize to the population of interest.

Method

Procedures. Guided by study 1 (the focus groups), the researchers designed study 2 (a survey). As noted above, focus groups revealed importance of religiosity in how Southeast U.S. residents respond to tornadoes; the study's original design only included emotional coping. Between July and August 2016, 1,495 residents in the Southeast U.S. were surveyed by a large survey company (Qualtrics) based upon a quota to obtain a representative sample of the region's Census demographics. Participants were compensated for their time in accordance with IRB guidelines through the survey company.

The median time to complete the survey was 19.36 minutes ($M = 35.52$, $SD = 237.95$, $Min = 4.57$, $Max = 53112.58$). Responses under 30% of the median time were eliminated from the analysis, as were responses more than three standard deviations above the median to eliminate questionable data. Responses over three standard deviations were cut for the same reason. After these data cleaning procedures, 1,484 cases remained for analysis, with a mean completion time of 25.17 minutes ($SD = 31.21$, $Median = 19.35$, $Min = 5.88$, $Max = 564.47$).

Participants. Of the survey sample, 68.1% identified as Caucasian, 23.4% as African American or Black, 2.1% as Asian, 7.6% as Hispanic, with the rest choosing not to identify. Gender identification was relatively balanced with 49.6% of participants identifying as male, 50.0% as female, and the remainder choosing not to respond. Just over a third of all respondents had young dependents (children under the age of 18) living with them (36.8%), with the majority of those participants having one or two kids in the house (81.4%). Participants' ages ranged from 18 to 89 with 44.89 being the average age ($SD = 16.94$, $Median = 42$).

Measures.

Tornado emotions. To explore positive and negative emotions, we used the modified differential emotions scale (Izard, 1977) and asked the question "If you are in an area under a tornado warning, how often do you feel _____ about tornados?" on a 1-5 scale ranging from "never" to "most of the time." This scale covers the following emotions: anger, anxiety, apprehension, confusion, contempt, disgust, embarrassment, fear, guilt, sadness, shame, surprise, sympathy, gratitude, hope,

relief, uneasiness. Prior crisis communication studies also have employed this scale (Fredrickson et al., 2003; Jin et al., 2010; Jin et al., 2016) or a similar question (Coombs & Holladay, 2005; Jeong, 2010; Kim & Cameron, 2011).

Religiosity. We used the modified centrality of religiosity scale developed by Huber and Huber and applied in more than 100 studies in 25 countries (Huber & Huber, 2012). Religiosity is assessed by measuring the general intensities of five core dimensions of religiosity on a 1-5 scale ranging from “never” to “always:” public practice, private practice, religious experience, ideology, and intellectual dimensions. This religiosity measure is a global measure independent of the research context, meaning that the items are not specific to disasters. Cronbach’s α was very high ($\alpha = .893$) and Principal Component Analysis (PCA) indicated a one-factor solution. A scale was created for religiosity by averaging participants’ answers for the five religiosity dimensions.

Prayer during a tornado. To further explore the effects of religiosity specifically in a disaster context, we included prayer as a separate measurement item of religious coping behavior. The study’s focus groups found that prayer was an important response to tornado threat messages for some participants. For the survey, we were interested in whether prayer during a tornado may impact taking shelter and gathering supplies. We asked the following questions: “When you took action, what did you do first?” and “When you took action, did you do anything else? (Choose all that apply),” and re-coded the responses for prayer to a dummy variable of whether the individual prayed during tornadoes with “yes” and “no” options.

Threat message received. To assess whether survey respondents received a tornado threat message we asked participants to reflect on their prior experience with tornadoes through the following question: “Did you receive a watch or warning about the tornado?” with options, such as “watch,” “warning,” “both,” “I did not receive a message,” and “I do not recall.” This question is used to identify those who received tornado threat messages. That way, the researcher can examine whether their religiosity, prayer during a tornado, and emotional coping impacted their physical action taking (e.g., sheltering in place or compiling supplies) for those who received the threat message. We define a tornado threat message as a watch or a warning. Prior research found that members of the public often cannot distinguish between watches and warnings, especially in communities outside of tornado alley in the Midwest U.S. (Brotzge & Donner, 2013; Sherman-Morris, 2010). Therefore, we included tornado watches and warnings in our study of tornado threat messages.

Actions taken during tornadoes. To explore the effects of emotions and religiosity on a broad range of actions, we included actions taken during tornadoes drawn from our focus group findings and asked three questions. First, we asked: “Did you take action (have a physical response - like going to a safe place in your home or collecting supplies) after receiving the message?” with options, such as “Yes,” “No” or “I do not recall.” Second, we asked: “When you took action, what did you do first?” with examples such as “sought shelter inside home,” “took protective action, like seeking shelter,” “went outside to see the storm,” “brought in the children,” “charged cell phone,” “gathered emergency supplies,” and “prayed.” Lastly, we asked: “When you took action, did you do anything else? (Choose all that apply)” with the same options as previous question. Although participants could choose all other actions, most participants chose only one other option.

Results

Emotional coping and tornadoes: Anxiety, fright, and sadness (H1). H1 predicted that a tornado would induce anxiety (H1a), fear (H1b), and sadness (H1c). Survey results revealed that *anxiety* ($M = 3.25, SD = 1.27$) and *fear* ($M = 3.19, SD = 1.28$) were the emotions over median on the 1-5 scale ($Mdn = 2.5$), while *sadness* ($M = 2.28, SD = 1.33$) was below the median (See Table 2). Therefore, H1a and H1b are supported, but H1c is not supported.

[Insert Table 2 about here]

Emotions and protective action taking (RQ2). RQ2 asked how crisis emotions affect how people respond to government’s tornado threat messages during a disaster. To answer this question, hierarchical logistic regression analysis was conducted (See Table 3). Specifically, the independent variables were the various emotions tested in this study. The dependent variable was whether individuals took physical action (e.g., taking shelter and gathering supplies). Control variables were participants’ age, gender, race, income, the state where they live in the Southeast U.S., and whether they have children. Although results showed that multicollinearity was not a concern, the emotion variables were standardized to clear potential issues of multicollinearity between the emotion variables and other variables. Results from the full regression model indicate that fear, $Exp(B) = 1.413, p < .01$, and hope, $Exp(B) = 1.255, p < .05$, were significant predicting variables for taking physical action (e.g., collecting supplies or sheltering in place), controlling for demographics, $Cox \& Snell R^2 = .204$, $Nagelkerke's R^2 = .276, \chi^2 = 196.494, p < .001$ with $df = 37$.

[Insert Table 3 about here]

Since only fear and hope were significant among various emotions tested with religiosity, the researchers reduced the model (See Table 4). Results from the reduced model indicate that fear, $Exp(B) = 1.393$, $p < .001$, and hope, $Exp(B) = 1.307$, $p < .01$ were significant predicting variables for taking physical action (e.g., collecting supplies and sheltering in place), controlling for demographics, $Cox \& Snell R^2 = .187$, $Nagelkerke's R^2 = .255$, $\chi^2 = 193.717$, $p < .001$ with $df = 21$.

[Insert Table 4 about here]

Religion and tornadoes (RQ3). RQ3 asked how, if at all, people employ religion in response to tornado. Results revealed that praying is the third most common action that participants take in response to a tornado. The most common action is “sought shelter inside home” (15.9%), followed by “confirmed the storm through another source” (10.4%), “attempted to get to a shelter away from home” (8.4%), and “prayed” (8.4%) (See Table 5). It is important to note that most participants opted to choose only one response in response to a tornado out of the sixteen responses developed from the focus groups.

[Insert Table 5 about here]

Religiosity and tornado protective action (RQ4). RQ4 asked how, if at all, religiosity affects how people respond to government’s tornado threat messages. To answer this question, hierarchical logistic regression analysis was conducted (see Table 3). Specifically, the independent variables were religiosity and prayer during a tornado. Recall that religiosity is a global measure of spirituality independent of the context whereas prayer during a tornado is an expression of religiosity specific to the disaster context. The dependent variable was whether individuals took physical action like sheltering in place or gathering supplies. Control variables were the individuals’ age, gender, race, their income, the state where they live in the Southeast U.S., whether they have children, and emotions. Although results showed that multicollinearity was not a concern, the religiosity variable was standardized to clear potential issues of multicollinearity between religiosity and the other variables. Results from the full regression model indicate that religiosity, $Exp(B) = 1.429$, $p < .001$, significantly predicted physical action taking, controlling for demographics, $Cox \& Snell R^2 = .204$, $Nagelkerke's R^2 = .276$, $\chi^2 = 196.494$, $p < .001$ with $df = 37$. Prayer during a tornado was not statistically significant in predicting physical action taking, $p > .05$.

Again, since religiosity was one of few significant variables, the researchers reduced the model (See Table 4). Results from the reduced regression model indicate that religiosity, $Exp(B) = 1.419$, $p < .001$, significantly predicted physical action taking (e.g., sheltering in place and gathering supplies), controlling for demographics, $Cox \& Snell R^2 = .187$, $Nagelkerke's R^2 = .255$, $\chi^2 = 193.717$, $p < .001$ with $df = 21$. Religiosity showed higher regression coefficient than fear and hope.

Discussion and Conclusion

The two studies' findings add to our limited body of knowledge on the simultaneous roles of religious and emotional coping during disasters. In doing so, the study provides implications for crisis communicators and emergency managers.

Findings Summary

This study uncovered individuals' emotional coping and the role of religiosity in how they respond to threat messages during a tornado. For emotional coping, participants expressed anxiety and fear strongly, and to a lesser extent sadness. Controlling for demographics, fear and hope significantly predicted individuals' protective behavior. When participants felt more fear and hope, they were more likely to take physical protective actions such as sheltering in place and gathering supplies.

Religiosity helped participants interpret, understand, and respond to tornado threat messages. Focus group participants shared that praying during a tornado provides comfort and hope and that some participants often pray after taking other actions like sheltering in place. Religiosity also helped focus group participants make sense of tornadoes after they occurred, in line with prior research on hurricanes (Pecchioni et al., 2011).

In the survey, praying during a tornado was the third most common action that participants took first in response to tornado threat messages. Controlling for demographics and emotions, religiosity significantly predicted physical action taking like sheltering in pace and gathering supplies. Prayer during a tornado was not a statistically significant factor for predicting physical action taking.

Emotions and Action Taking

The study's findings support the extended parallel process model's (EPPM) proposition that fear is the emotion that drives responses to risks (So, 2013; Witte, 1992; Witte & Allen, 2000). The study's findings also support the integrated crisis mapping (ICM) model's proposition that anxiety is the default

emotion in crises (Jin et al., 2007). The study's findings further suggest that sadness comes in to play after tornadoes, not during tornadoes. More specifically, results indicate that tornado threat message recipients may feel the most sadness after tornadoes occur, rather than when they receive a threat message. Focus group participants emphasized sadness for losses after tornadoes and for actions they did not take. For the survey respondents, sadness was not a significant predictor of physical action taking during tornadoes. It may be that the ICM model needs to be revised to consider how emotions evolve throughout a crisis, in line with health communication research on emotional flow (Nabi & Green, 2015).

The ICM model predicts that for disasters the two dominant emotions are sadness and fright (Jin et al., 2007). This study adds that anxiety remains an important emotion at least for tornadoes. This study also adds that fear and hope appear to be the dominant emotions that predict protective behaviors like sheltering in place and gathering supplies rather than sadness and anxiety, as theorized by the ICM model.

These results partially support the EPPM's proposition that anxiety and fear are the emotions that drive responses to risks (So, 2013; Witte, 1992; Witte & Allen, 2000). One explanation for the findings that anxiety does not trigger physical action taking may be the short timeframe for the risk. On average, there are only 13 minutes between when a tornado warning is issued and a tornado touchdown (NOAA, n.d.). With such a short time frame to respond, individuals simply may not have time to experience anxiety if they are focused on appropriate action taking like quickly gathering supplies and sheltering in place.

The findings about hope may align with the EPPM's proposition that higher self-efficacy and response efficacy are needed than perceived threat to activate protective action taking. Prior research found that hope and self-efficacy are positively correlated, but not identical in the case of general well-being (Magaletta & Oliver, 1999). Studies also found that hope generated different results than fear appeals in the case of climate change and financial security (Chadwick, 2015; Underhill, 2012). It is clear from our findings that emotions affect whether individuals take action during tornadoes. Only one found prior study also connected individuals' emotional coping with their action taking during disasters (Jin et al., 2016). Future research needs to unpack what other emotions might motivate individuals to take protective actions in response to a variety of disasters.

In terms of practical implications, the study's findings indicate that simply providing the recommended protective action of shelter in place may not sufficiently motivate people to take action, depending upon their emotional responses. Tornado threat messages need to include content that invokes fear and hope to motivate people to respond to tornado messages, if future research supports our findings. For example, threat messages can include maps and images to induce emotions, as previous research suggested (Liu et al., 2017). Also, messages of fear and hope could show what happens to residents who do and do not heed government shelter in place warnings. These threat messages can also be complimented with ongoing preparedness campaigns. Furthermore, post-tornado crisis communication could address sadness from tornado losses through survivor testimonials, which could motivate people to heed future tornado watches and warnings. Such testimonials could be communicated via public service announcements, billboard advertisements, social media messages, or even formal memorials. For instance, the Oklahoma City National Memorial for the 1995 terrorist attack provides opportunities for the public to learn about terrorism by sharing grief and sadness (Veil, Sellnow, & Heald, 2011).

Religion, Religiosity, and Prayer during Disasters

The studies' results align with previous research that found religiosity is a coping strategy utilized by individuals facing threats (Adams et al., 2011; Schuster et al., 2001) and that religiosity positively correlates with psychological outcomes (Ano & Vasconcelles, 2005; Helgeson et al., 2006; Kline, 2011; Prati & Pietrantonio, 2009). The studies' results provide the case for a positive relationship between religiosity and taking physical action during a disaster (e.g., sheltering in place and gathering supplies). Yet, the positive relationship between religiosity and taking actions can be interpreted in different ways. Religion may be positively associated with conformity, as religious priming may activate conformity to a message (Saroglou et al., 2009; Van Cappellen et al., 2011). More religious individuals also are more effective than non-religious individuals in regulating their emotions and behaviors (Carter et al., 2012; Koole et al., 2010) by changing the meaning of emotion through cognitive reappraisal (Vishkin et al., 2016). Future research can examine how religiosity affects a variety of protective action taking.

In terms of practical implications, understanding religiosity helps us better communicate about tornadoes in the Southeast U.S. Effective communication starts from understanding individuals and their cultures. The findings about religiosity point to the importance of emergency managers partnering with

faith-based organizations to communicate about tornadoes across crisis phases. So far, only a few other researchers have argued for these faith-based partnerships with specific recommendations, such as asking survivors if they use prayer or bringing local clergy to aid in faith-based coping (e.g., Lachlan & Spence, 2011; McGeehan & Baker, 2017; Spence et al., 2005, 2007). For tornado communication, emergency managers could provide religious leaders with educational materials to share during worship events. Emergency managers also could build relationships with faith-based nonprofits to promote protective behaviors like purchasing NOAA weather radios. After tornadoes, first responders can invite local religious leaders to assist with faith-based coping, so that emergency managers can focus on other areas of crisis recovery. Additional efforts could ensure that all communication about tornado threats reaches faith-based media outlets. By tapping into religious leaders, crisis communicators can use their social capital, resources, and networks to share information and support, as previous research suggested (e.g., McGeehan & Baker, 2017). Invoking religiosity may help individuals respond to tornado threats, which future research could test. However, the findings also indicate that non-religious individuals may need additional assistance, given that they are less likely to respond to tornado threat messages than religious people, and these individuals will be unlikely to respond to disaster messages that invoke religiosity.

In terms of prayer during a tornado, we found that prayer was not a statistically significant predictor of sheltering in place and gathering supplies. We return to the focus group findings to interpret these findings: Participants shared that they pray during a tornado after taking other actions like sheltering in place. Participants may have understood the prayer as formal behavior, not just seeking spiritual support in their minds. Also, individuals took only a few actions during tornadoes. Again, although prayer was the third most common response that participants took during tornadoes, survey participants opted to choose only one or two responses out of the sixteen responses developed from the focus groups. We may have generated different results if we had asked a separate question about whether survey participants prayed or employed religious coping in other ways during tornadoes. Additional research is needed to understand the role of prayer and other forms of religious coping, as others have noted (Lachlan & Spence, 2011). Such knowledge can help crisis communication practitioners understand when religious-themed community events might improve disaster resilience vs. potentially backfire.

Limitations

This study is limited by multiple factors. First, the study only examined one type of religious coping behavior, prayer during a tornado. Second, longitudinal survey research needs to examine how individuals respond to threats like tornadoes over time. Third, the findings cannot be generalized to other regions of the U.S., other countries, other religions, or other disaster types, which future research can examine. Fifth, the study examined self-reported measures that can be affected from retrospective bias, in particular in crises (Fischhoff, Gonzalez, Small, & Lerner, 2005). Finally, the study only examined coping during a disaster and future research can examine coping before and after disasters.

Conclusion

Improving tornado crisis communication in the Southeast U.S. is critical. Killer tornadoes in this region are more frequent compared to the overall number of tornadoes throughout the country (NOAA, 2017) and the most tornado fatalities have occurred in the Southeast (Ashley, 2007). Over the past several decades, the National Weather Services has made significant progress in better predicting tornadoes (Kain et al., 2017). Similar progress has not been made in improving how the Weather Service communicates about tornadoes when they occur. Findings from this study indicate that people's emotional coping and religiosity affect how they respond to tornado threat messages. Results further indicate that a wide variety of emotions and religiosity can play important roles in whether people take appropriate physical actions in response to tornado threat messages (e.g., sheltering in place or gathering supplies). The next step is to integrate these findings into message testing so that organizations can issue tornado messages that have the highest chance of saving lives.

References

- Adams, T., Anderson, L., Turner, M., & Armstrong, J. (2011). Coping through a disaster: Lessons from Hurricane Katrina. *Journal of Homeland Security and Emergency Management*, *8*(1), 1-15.
doi:10.2202/1547-7355.1836
- Ahmadi, F. (2006). *Culture, religion and spirituality in coping: The example of cancer patients in Sweden*. Uppsala, Sweden: Acta Universitatis Upsaliensis.
- Ai, A., Cascio, T., Santangelo, L. K., & Evans-Campbell, T. (2005). Hope, meaning, and growth following the September 11, 2001, terrorist attacks. *Journal of Interpersonal Violence*, *20*, 523-548.
doi:10.1177/0886260504272896

- Allen, M., Titsworth, S., & Hunt, S. K. (2009). *Quantitative research in communication*. Thousand Oaks, CA: Sage.
- Ano, G. G., & Vasconcelles, E. B. (2005). Religious coping and psychological adjustment to stress: A meta-analysis. *Journal of Clinical Psychology, 61*(4), 461-480. doi:10.1002/jclp.20049
- Ashley, W. S. (2007). Spatial and temporal analysis of tornado fatalities in the United States: 1880–2005. *Weather and Forecasting, 22*(6), 1214–1228. doi:10.1175/2007WAF2007004.1
- Aten, J. D., O'Grady, K. A., Milstein, G., Boan, D., & Schrubba, A. (2014). Spiritually oriented disaster psychology. *Spirituality in Clinical Practice, 1*, 20-28. doi:10.1037/scp0000008
- Avery, E., & Park, S. (2016). Effects of crisis efficacy on intentions to follow directives during crisis. *Journal of Public Relations Research, 28*(2), 72-86. doi:10.1080/1062726X.2016.1165681
- Bakker, M. H., van Bommel, M., Kerstholt, J. H., & Giebels, E. (2018). The interplay between governmental communications and fellow citizens' reactions via twitter: Experimental results of a theoretical crisis in the Netherlands. *Journal of Contingencies and Crisis Management*. Advance online publication. doi:10.1111/1468-5973.12252
- Berg, B. L. (2009). *Qualitative research methods for the social sciences* (7th ed.). Boston, MA: Allyn & Bacon.
- Brotzge, J., & Donner, W. (2013). The tornado warning process: A review of current research, challenges, and opportunities. *Bulletin of the American Meteorological Society, 94*(11), 1715-1733. doi:10.1175/BAMS-D-12-00147.1
- Brummette, J., & Sisco, H. F. (2015). Using Twitter as a means of coping with emotions and uncontrollable crises. *Public Relations Review, 41*(1), 89-96. doi:10.1016/j.pubrev.2014.10.009
- Carter, E. C., McCullough, M. E., & Carver, C. S. (2012). The mediating role of monitoring in the association of religion with self-control. *Social Psychological and Personality Science, 3*(6), 691-697. doi:10.1177/1948550612438925
- Chadwick, A. E. (2015). Toward a theory of persuasive hope: Effects of cognitive appraisals, hope appeals, and hope in the context of climate change. *Health communication, 30*(6), 598-611. doi:10.1080/10410236.2014.916777

- Chester, D. K., Duncan, A. M., & Dibben, C. J. L. (2008). The importance of religion in shaping volcanic risk perception in Italy, with special reference to Vesuvius and Etna. *Journal of Volcanology and Geothermal Research*, *172*, 216-228. doi:10.1016/j.jvolgeores.2007.12.009
- 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. doi:10.1080/10627260802557506
- 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. doi:10.1057/palgrave.crr.1550049
- Coombs, W. T. (2016). Reflections on a meta-analysis: Crystallizing thinking on SCCT. *Journal of Public Relations Research*, *28*(2), 120-122. doi:10.1080/1062726X.2016.1167479
- Coombs, W. T., & Holladay, S. J. (2005). Exploratory study of stakeholder emotions: Affect and crisis. In Ashkanasy, N. M.; Zerbe, W. J.; & Hartel, C. E. J., (Eds.), *Research on Emotion in Organizations: Volume 1: The Effect of Affect in Organizational Settings*. (271-288). New York, NY: Elsevier.
- Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.
- Danbolt, L. J., & Stifoss-Hanssen, H. (2011). Public disaster ritual in the local community: A study of Norwegian cases. *Journal of Ritual Studies*, *25*, 25-36. doi:10.1111/dial.12355
- Entwistle, D. N., Moroney, S. K., & Aten, J. (2018). Integrative reflections on disasters, suffering, and the practice of spiritual and emotional care. *Journal of Psychology and Theology*, *46*, 67-81. doi:10.1177/0270091647117750658
- FEMA. (2011). *Tornado risks and hazards in the southeastern United States*. Retrieved from https://www.fema.gov/media-library-data/20130726-1801-25045-0298/ra1_2011_tornado_risks_tagged_011912.pdf
- Fischhoff, B., Gonzalez, R. M., Small, D. A., & Lerner, J. S. (2005). Evolving judgments of terror risks: Foresight, hindsight, and emotion. *Journal of Experimental Psychology: Applied*, *11*(2), 124-139. doi:10.1037/1076-898X.11.2.124.

- Folkman, S. (2013). Stress: appraisal and coping. In *Encyclopedia of behavioral medicine* (pp. 1913-1915). New York, NY: Springer.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American psychologist*, *56*(3), 218-226. doi:10.1037/0003-066X.56.3.218
- Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, *13*(2), 172-175. doi:10.1111/1467-9280.00431
- Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11, 2001. *Journal of Personality & Social Psychology*, *84*(2), 365–376. doi:10.1037/0022-3514.84.2.365
- Glock, C. Y. (1962). On the study of religious commitment. *Religious Education*, *57*, 98-110. doi:10.1080/003440862057S407
- Guest, G., & MacQueen, K. M. (Eds.). (2008). *Handbook for team-based qualitative research*. Lanham, MD: Rowman Altamira.
- Guha-Sapir, D., Hoyois, P., Wallemaq, P., & Below, R. (2017, October). *Annual disaster statistical review 2016: The numbers and trends*. Centre for Research on the Epidemiology of Disasters. Retrieved from <https://reliefweb.int/report/world/annual-disaster-statistical-review-2016-numbers-and-trends>
- Hackney, C. H., & Sanders, G. S. (2003). Religiosity and mental health: A meta-analysis of recent studies. *Journal for the scientific study of religion*, *42*(1), 43-55. doi:10.1111/1468-5906.t01-1-00160
- Heath, R. L., Lee, J., & Ni, L. (2009). Crisis and risk approaches to emergency management planning and communication: The role of similarity and sensitivity. *Journal of Public Relations Research*, *21*(2), 123-141. doi:10.1080/10627260802557415

- Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74*(5), 797-816. doi: 10.1037/0022-006X.74.5.797
- Holladay, S. J. (2009). Crisis communication strategies in the media coverage of chemical accidents. *Journal of Public Relations Research, 21*(2), 208-217. doi:10.1080/10627260802557548
- Huber, S., & Huber, O. W. (2012). The centrality of religiosity scale (CRS). *Religions, 3*(3), 710-724. doi:10.3390/rel3030710
- Islam, R. R. (2012). Believing to recover: The role of religion in the recovery phase of natural disasters. *Anthropos, 107*, 209-271. doi:10.1108/DPM-10-2017-0238
- Izard, C. E. (1977). *Human emotions*. New York, NY: Plenum Press.
- Jeong, S. (2010). Public support for Haitian earthquake victims: Role of attributions and emotions. *Public Relations Review, 36*(4), 325–328. doi:10.1016/j.pubrev.2010.08.003
- 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, 10*(4), 289-308. doi:10.1080/1553118X.2016.1160401
- Jin, Y., Park, S., & Len-Ríos, M. (2010). Strategic communication of hope and anger: A case of Duke University's conflict management with multiple publics. *Public Relations Review, 36*(1), 63–65. doi:10.1016/j.pubrev.2009.08.015
- Jin, Y., Pang, A., & Cameron, G. T. (2007). Integrated crisis mapping: Towards a publics-based, emotion-driven conceptualization in crisis communication. *Sphera Publica, 7*(1), 81-96.
- 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. doi:10.1080/1062726X.2012.676747
- Johnson, T., Aten, J., Madson, M., & Bennett, P. (2006, August). *Alcohol use and meaning in*

life among survivors of Hurricane Katrina. Paper presented at the 2006 International Conference on Personal Meaning: Addiction, Meaning, & Spirituality, British Columbia, Canada.

- Kain, J. S., Willington, S., Clark, A. J., Weiss, S. J., Weeks, M., Jirak, I. L., Coniglio, M. C., Roberts, N. M., Kartsens, C. D., Wilkinson, J. M., Knopfmeier, K. H., Lean, H. W., Ellam, L., Hanley, K., North, R., & Sun, D. (2017). Collaborative efforts between U.S. and U.K. to advance prediction of high impact weather. *Bulletin of the American Meteorological Society*, *98*(5), 937-948. doi:10.1175/BAMS-D-15-00199.1
- Kim, H. J., & Cameron, G. T. (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. doi:10.1177/0093650210385813
- Kim, H. K., & Niederdeppe, J. (2013). The role of emotional response during an H1N1 influenza pandemic on a college campus. *Journal of Public Relations Research*, *25*(1), 30–50. doi:10.1080/1062726X.2013.739100
- Kline, S. L. (2011). Communicating spirituality in healthcare: A case study on the role of identity in religious health testimonies. *Journal of Applied Communication Research*, *39*(4), 334-351. doi:10.1080/00909882.2011.608698
- Koole, S. L., McCullough, M. E., Kuhl, J., & Roelofsma, P. H. (2010). Why religion's burdens are light: From religiosity to implicit self-regulation. *Personality and Social Psychology Review*, *14*(1), 95-107. doi:10.1177/1088868309351109
- Lachlan, K. A., & Spence, P. R. (2011). Crisis communication and the underserved: The case for partnering with institutions of faith. *Journal of Applied Communication Research*, *39*(4), 448-451. doi:10.1080/00909882.2011.608692
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- making. *Annual Review of Psychology*, *66*(1), 799-823. doi:10.1146/annurev-psych-010213-115043

- Liu, B. F., & Kim, S. (2011). How organizations framed the 2009 H1N1 pandemic via social and traditional media: Implications for US health communicators. *Public Relations Review, 37*(3), 233–244. doi:10.1016/j.pubrev.2011.03.005
- Liu, B. F., Wood, M. M., Egnoto, M., Bean, H., Sutton, J., Mileti, D., & Madden, S. (2017). Is a picture worth a thousand words? The effects of maps and warning messages on how publics respond to disaster information. *Public Relations Review, 43*(3), 493-506. doi:10.1016/j.pubrev.2017.04.004
- Lunt, P., & Livingstone, S. (1996). Rethinking the focus group in media and communications research. *Journal of Communication, 46*(2), 79-98. doi:10.1111/j.1460-2466.1996.tb01475.x
- Magaletta, P. R., & Oliver, J. M. (1999). The hope construct, will, and ways: Their relations with self-efficacy, optimism, and general well-being. *Journal of Clinical Psychology, 55*(5), 539-551. doi:10.1002/(SICI)1097-4679(199905)55:5<539::AID-JCLP2>3.0.CO;2-G
- Marks, L. D., Cherry, K. E., & Silva, J. L. (2009). Faith, crisis, coping, and meaning making after Katrina: A qualitative, cross-cohort examination. In Cherry, K. (Eds.), *Lifespan perspectives on natural disasters* (pp. 195-215). New York, NY: Springer.
- McGeehan, K. M., & Baker, C. K. (2017). Religious narratives and their implications for disaster risk reduction. *Disasters, 41*(2), 258-281. doi:10.1111/disa.12200
- McElroy-Heltzel, S. E., Davis, E. B., Davis, D. E., Aten, J. D., Hook, J. N., Van Tongeren, D. R., & Hwang, J. (2018). Benevolent theodicies protect against PTSD following a natural disaster. *Journal of Psychology and Christianity, 37*, 6-16.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative data analysis: A methods sourcebook*. Thousand Oaks, CA: Sage.
- Nabi, R. L., & Green, M. C. (2015). The role of narrative's emotional flow in promoting persuasive outcomes. *Media Psychology, 18*(2), 137-162. doi:10.1080/15213269.2014.912585
- NOAA. (2017). *The national severe storms laboratory VORTEX Southeast*. Retrieved from <http://www.nssl.noaa.gov/projects/vortexse/>
- NOAA (n.d.). *Tornadoes 101: An essential guide to tornadoes – Stay alert to stay alive*. Retrieved from <http://www.noaa.gov/stories/tornadoes-101>

- O'Grady, K. A., Orton, J. D., Stewart, C., Flythe, W. W., Snyder, N., & Desius, J-P. (2018). Resilience in the wake of disasters: A two-wave qualitative study of survivors of the 2010 Haiti earthquake. *Journal of Psychology and Christianity, 37*, 453-56.
- Pargament, K. I. (1997). *The psychology of religion and coping: Theory, research, and practice*. New York, NY: Guilford Press.
- Pecchioni, L. L., Edwards, R., & Grey, S. H. (2011). The effects of religiosity and religious affiliation on trauma and interpretations following Hurricanes Katrina and Rita. *Journal of Communication & Religion, 34*(1). 37-58.
- Pew Research Center. (2014). *Religious landscape study*. Retrieved from <http://www.pewforum.org/religious-landscape-study/>
- Prati, G., & Pietrantonio, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A meta-analysis. *Journal of Loss and Trauma, 14*(5), 364-388.
doi:10.1080/15325020902724271
- Rezaeian, M. (2008). The adverse psychological outcomes of natural disasters: How religion may help to disrupt the connection. *The Journal of Pastoral Care & Counseling, 62*, 289-292.
- Riggio, H. R., Uhalt, J., Matthies, B. K., Harvey, T., Lowden, N., & Umana, V. (2018). Explaining death by tornado: Religiosity and the god-serving bias. *Archives for the Psychology of Religion, 30*, 32-50.
doi:10.1163/15736121-12341349
- Saroglou, V., Corneille, O., & Van Cappellen, P. (2009). "Speak, Lord, your servant is listening": Religious priming activates submissive thoughts and behaviors. *The International Journal for the Psychology of Religion, 19*(3), 143-154. doi:10.1080/10508610902880063
- Schuster, M. A., Stein, B. D., Jaycox, L. H., Collins, R. L., Marshall, G. N., Elliott, M. N., Zhou A. J., Kanouse D. E., Morrison J. L., & Berry, S. H. (2001). A national survey of stress reactions after the September 11, 2001, terrorist attacks. *New England Journal of Medicine, 345*(20), 1507-1512.
doi:10.1056/NEJM200111153452024
- Sherman-Morris, K. (2010). Tornado warning dissemination and response at a university campus. *Natural Hazards, 52*, 623-638. doi:10.1007/s11069-009-9405-0

- Smith, B., Pargament, K., Brant, C., & Oliver, J. (2000). Noah revisited: Religious coping by church members and the impact of the 1993 Midwest flood. *Journal of Community Psychology, 28*, 168–186. doi:10.1002/(SICI)1520-6629(200003)28:2%3C169::AID-JCOP5%3E3.0.CO;2-I
- So, J. (2013). A further extension of the Extended Parallel Process Model (E-EPPM): Implications of cognitive appraisal theory of emotion and dispositional coping style. *Health Communication, 28*(1), 72–83. doi:10.1080/10410236.2012.708633
- Spence, P. R., Westerman, D., Skalski, P. D., Seeger, M., Ulmer, R. R., Venette, S., & Sellnow, T. L. (2005). Proxemic effects on information seeking after the September 11 attacks. *Communication Research Reports, 22*(1), 39-46. doi:10.1080/00036810500057930
- Spence, P. R., Lachlan, K. A., & Burke, J. M. (2007). Adjusting to uncertainty: Coping strategies among the displaced after Hurricane Katrina. *Sociological Spectrum, 27*(6), 653-678. doi:10.1080/02732170701533939
- Sturges, D. L. (1994). Communicating through crisis: A strategy for organizational survival. *Management Communication Quarterly, 7*(3), 297-316. doi:10.1177/0893318994007003004
- Underhill, J. C. (2012). *Examining the effects of hope and fear appeals on cognitive processing* (Doctoral dissertation). Retrieved from <http://hdl.handle.net/1903/13196>
- Van Cappellen, P., Corneille, O., Cols, S., & Saroglou, V. (2011). Beyond mere compliance to authoritative figures: Religious priming increases conformity to informational influence among submissive people. *The International Journal for the Psychology of Religion, 21*(2), 97-105. doi:10.1080/10508619.2011.556995
- van Dijk, D. E., Zebel, S., & Gutteling, J. M. (2018). Integrating social media features into a cell phone alert system for emergency situations. *Journal of Contingencies and Crisis Management*. Advance online publication. doi:10.1111/1468-5973.12251
- Veil, S. R., Sellnow, T. L., & Heald, M. (2011). Memorializing crisis: The Oklahoma City national memorial as renewal discourse. *Journal of Applied Communication Research, 39*(2), 164-183. doi:10.1080/00909882.2011.557390

Vishkin, A., Bigman, Y. E., Porat, R., Solak, N., Halperin, E., & Tamir, M. (2016). God rest our hearts: Religiosity and cognitive reappraisal. *Emotion, 16*(2), 252-262. doi:10.1037/emo0000108

Witte, K. (1992). Putting the fear back into fear appeals – The extended parallel process model. *Communication Monographs, 59*(4), 329-349. doi:10.1080/03637759209376276

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*(5), 591-615. doi:10.1177/109019810002700506

Table 1. Focus Groups Dates and Number of Participants

Location	Date	Number of participants	Tornado experience
		7	Experienced tornadoes: 66% ($n = 20$)
Tuscaloosa, AL	February 10, 2016	6	Exposed to tornado watches, warnings, aftermath, but not actual tornadoes: 8% ($n = 2$)
		7	
		3 ¹	Did not experienced tornadoes: 4% ($n = 1$)

¹ This focus group included only mobile home residents because we wanted to ensure that their voices were included in the study. The professional research firm struggled to recruit these participants.

		9	Experienced tornadoes: 50% ($n = 13$)
Lexington, KY	February 8, 2016	10	Exposed to tornado watches, warnings, aftermath, but not actual tornadoes: 7% ($n = 2$)
		8	Did not experienced tornadoes: 42% ($n = 11$) ²
Winston-Salem, NC	February 12, 2016	9	Experienced tornadoes: 62% ($n = 17$)
		8	Exposed to tornado watches, warnings, aftermath, but not actual tornadoes: 3% ($n = 1$)
		10	Did not experienced tornadoes: 33% ($n = 9$)
Total Participants		77	

Table 2. Emotions for Tornado

Emotions for Tornado Threat Message	Mean	Std. Deviation	Median	Mode
Anxiety	3.25	1.27	3	4

² One focus group questionnaire from Lexington, KY was missing.

Fear	3.19	1.28	3	3
Uneasiness	3.19	1.31	3	4
Apprehension	2.94	1.25	3	3
Hope	2.61	1.41	3	1
Surprise	2.41	1.36	2	1
Sadness	2.28	1.33	2	1
Confusion	2.22	1.25	2	1
Sympathy	2.12	1.32	1	1
Relief	2.07	1.28	1	1
Anger	1.95	1.24	1	1
Contempt	1.91	1.20	1	1
Gratitude	1.89	1.22	1	1
Disgust	1.83	1.17	1	1
Shame	1.63	1.07	1	1
Guilt	1.64	1.11	1	1
Embarrassment	1.62	1.07	1	1

Table 3. Hierarchical Logistic Regression Analysis Predicting Protective Action via Demographics and Tornado Emotions – Full model.

Predictor	<i>B</i>	<i>SE B</i>	e^B
Block 1 Age	-0.025***	0.005	0.975

Gender	0.093	0.160	1.098
Children	0.814***	0.176	2.258
Income	0.093**	0.031	1.098
Race_Caucasian			
Race_Black	-0.394	0.328	0.674
Race_Asian	-0.532	0.351	0.588
Race_Hispanic	-0.161	0.574	0.852
State_Alabama			
State_Arkansas	0.655	0.739	1.944
State_Florida	0.418	0.763	1.519
State_Georgia	-0.315	0.67	0.73
State_Kentucky	0.297	0.694	1.346
State_Louisiana	-0.072	0.723	0.931
State_Mississippi	-0.169	0.739	0.844
State_N.Carolina	0.274	0.794	1.315
State_S.Carolina	-0.223	0.693	0.8
State_Tennessee	0.033	0.746	1.033
State_Virginia	0.782	0.725	2.186
State_WestVirginia	0.171	0.694	1.186
<i>Cox & Snell R² = .133, Nagelkerke's R² = .180</i>			

*B**SE B**e^B*

Block 2	Emtn_anger	-0.18	0.123	0.836
	Emtn_anxiety	0.022	0.134	1.022
	Emtn_apprehension	-0.12	0.126	0.887
	Emtn_confusion	0.132	0.118	1.141
	Emtn_contempt	-0.014	0.139	0.986
	Emtn_disgust	0.116	0.137	1.123
	Emtn_embarrassment	0.04	0.158	1.041
	Emtn_fear	0.346**	0.126	1.413
	Emtn_guilt	-0.046	0.154	0.955
	Emtn_sadness	0.005	0.121	0.995
	Emtn_shame	0.165	0.155	1.179
	Emtn_surprise	-0.063	0.105	0.939
	Emtn_sympathy	-0.001	0.116	0.999
	Emtn_gratitude	0.175	0.125	1.191
	Emtn_hope	0.227*	0.108	1.255
	Emtn_relief	-0.128	0.123	0.88
	Emtn_uneasiness	0.039	0.115	1.04
	Prayer	0.239	0.303	1.269
	Religiosity	0.357***	0.092	1.429
<i>Cox & Snell R² = .204, Nagelkerke's R² = .276</i>				

e^B = exponentiated B. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4. Hierarchical Logistic Regression Analysis Predicting Protective Action via Demographics and Tornado Emotions – Reduced model.

	Predictor	<i>B</i>	<i>SE B</i>	e^B
Block 1	Age	-0.024***	0.005	0.976
	Gender	0.189	0.154	1.208
	Children	0.778***	0.17	2.177
	Income	0.104***	0.03	1.11
	Race_Caucasian			
	Race_Black	-0.41	0.324	0.664
	Race_Asian	-0.47	0.345	0.625
	Race_Hispanic	-0.1	0.565	0.905
	State_Alabama	*		
	State_Arkansas	0.816	0.697	2.263
	State_Florida	0.881	0.713	2.413
	State_Georgia	-0.115	0.63	0.892
	State_Kentucky	0.409	0.656	1.505
	State_Louisiana	0.163	0.685	1.177
	State_Mississippi	-0.003	0.697	0.997
	State_N.Carolina	0.519	0.754	1.68
	State_S.Carolina	-0.114	0.655	0.892
	State_Tennessee	0.093	0.705	1.097

State_Virginia	0.933	0.682	2.541
State_WestVirginia	0.272	0.654	1.312

Cox & Snell R² = .126, Nagelkerke's R² = .171

	<i>B</i>	<i>SE B</i>	<i>e^B</i>
Block 2 ■ Emtn_fear	0.332***	0.084	1.393
Emtn_hope	0.268**	0.083	1.307
Religiosity	0.35***	0.078	1.419

Cox & Snell R² = .187, Nagelkerke's R² = .255

e^B = exponentiated *B*. **p* < .05. ***p* < .01. ****p* < .001.

Table 5. The Protective Action Taken in Response to Tornado Threat Messages.

The first protective action taken	Frequency	Valid Percent
Sought shelter inside home	207	15.9
Confirmed the storm through another source	135	10.4
Prayed	109	8.4
Attempted to get to a shelter away from home	109	8.4
Attempted to get home	102	7.8
Went to the window to see if the storm was visible	90	6.9
Brought children inside	75	5.8
Contacted family and friends	74	5.7
Gathered supplies	59	4.5
Charged mobile device(s)	43	3.3

Locked pets inside home	32	2.5
Went outside to view the storm	27	2.1
Went online to check social media	19	1.5
Put away lawn furniture	19	1.5
Checked on neighbors	17	1.3
Moved vehicles/cars away from trees	15	1.2
Other	171	13.1
Total	1303	100