

EXAMINING THE IMPACT OF EFFICACY AND THREAT-BASED MESSAGING ON
EMERGENCY PREPAREDNESS

by

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ABSTRACT

Effective emergency response relies upon the public's preparedness for potential threats. The emergency preparedness literature suggests that individuals with previous experience in an emergency have higher threat perceptions and are more likely to be prepared. This experience-preparedness link indicates that threat-based messages could be useful in encouraging emergency preparedness in some situations; however, questions remain about the value and predictability of fear appeals.

The extended parallel process model (EPPM) explains the variability in responses to fear appeals by relating it to efficacy. Once some type of threat piques an individual's interest, they then conduct an efficacy assessment. If perceived efficacy is greater than threat, the person will engage in danger controlling responses and be more likely to follow recommended behaviors to reduce their threat. In contrast, if the threat is stronger than perceived efficacy, the person is more likely engage in fear controlling strategies such as avoidance or denial.

Based on the EPPM, the research described herein proposed that people with previous experience in a disaster would be more likely to be in a fear-controlling mode

due to their higher perceived threat and therefore would be more susceptible to efficacy-based messages. People without previous experience would likely have lower threat levels and would be more susceptible to fear-based messages that would prompt a subsequent efficacy assessment.

To test this, participants answered questions to determine their baseline levels of threat and efficacy before they reviewed fact sheets on emergency preparedness specially designed to manipulate the two constructs. Participants reviewed both fact sheets and then selected the one that would be more likely to encourage them to prepare. Chi-square tests allowed for comparison of fact sheet preferences with indicators for perceived threat and efficacy and found limited support for the hypotheses. This paper describes the interpretation of these results in terms of designing emergency preparedness campaigns.

INDEX WORDS: Extended Parallel Process Model, EPPM, Emergency Preparedness, Risk Communication, Threat, Efficacy, Risk Behavior Diagnosis Scale, RBD Scale

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Chapter 1: Introduction and Statement of Purpose

The risk of an individual facing a natural disaster at some point during their lifetime is sizeable (Norris, 1992). Certain populations, such as chronically ill, physically disabled, or racial/ethnic minorities may also be disproportionately affected by the impact of a disaster (Andrulis, Siddiqui, & Gantner, 2007; Brodie, Weltzien, Altman, Blendon, & Benson, 2006; Fothergill, Maestas, & Darlington, 1999; Hutchins, Fiscella, Levine, Ompad, & McDonald, 2009; P. S. Wang, Kendrick, Lurie, Springgate, & Kessler, 2007) due to complex issues such as socioeconomic differences, culture or language barriers, lower threat perceptions, lack of preparation, and reliance on informal sources of information (Andrulis et al., 2007).

From 1900 to 2006, there were over 15,000 natural disasters worldwide (Lowrey et al., 2007). A 1983 study estimated that annually two million U.S. households face a natural disaster causing injuries or damage (Rossi, Wright, Weber-Burdin, & Perina, 1983). As a result of population growth in areas prone to earthquakes, tornados, and in coastal areas likely to experience hurricanes, it is likely that the number of households facing this risk has grown considerably since 1983 (Strategic Foresight Initiative, 2011). In the instance of Hurricane Katrina alone, 5.8 million people in three states experienced the effects of the storm (Gabe, Falk, McCarty, & Mason, 2005). In addition to natural disasters, continuing threats of terrorism (Perl, 2006) and infectious disease outbreaks such as the 2009 novel influenza pandemic add to an individual's overall risk of experiencing an emergency.

As was demonstrated by hurricanes Katrina, Rita, and Wilma in 2005 as well as in the aftermath of the terrorism of September 11, 2001, effective emergency response relies heavily upon the public's appropriate reaction to and preparedness for potential threats. The U.S. Department of Health and Human Services' *National Health Security Strategy of the United States* (NHSS) considers building community resilience a national goal, and includes the objective of fostering informed, empowered individuals and communities as a way to meet this goal (2009). This strategy defines national health security as "a state in which the Nation and its people are prepared for, protected from, and resilient in the face of health threats or incidents with potentially negative health consequences" (p. 3).

Among the many recommendations for building this resiliency that have emerged from past disaster responses is the need for pre-incident preparedness, specifically the need to prepare to "shelter in place" for 3 to 6 days (M. J. Gibson, 2006). These preparedness actions may include creating a personal emergency preparedness kit with food, water, and medication; organizing medical information; and learning about relevant evacuation routes. These actions reflect an "all-hazards" approach to preparedness.

Traditionally, emergency preparedness has focused on natural disasters such as hurricanes, earthquakes, and tornados. In fact, prior to the 1984 Bhopal toxic gas spill, the National Response Plan (NRP) focused almost solely on natural disasters. Since 2001, terrorism, and more recently pandemics, have ascended in national importance, and consequently in the NRP. This new awareness of the wider variety of potential threats stirred the issuance of Homeland Security Presidential Directive 5 (HSPD-5) in

2003. HSPD-5 orders the U.S. Department of Homeland Security to develop a cohesive national plan for response that integrates preparedness, prevention, response, and recovery plans into a single discipline, referred to as all-hazards (U.S. Department of Homeland Security, 2003).

The 2004 edition of the NRP, since renamed the National Response Framework (NRF), refers to the national threat as “not only the traditional spectrum of manmade and natural hazards- wildland and urban fires, floods, oil spills, hazardous material releases, transportation accidents, earthquakes, hurricanes, tornados, pandemics, and disruptions to the Nation’s energy and information technology infrastructure- but also the deadly and devastating terrorist arsenal of chemical, biological, radiological, nuclear and high-yield explosive weapons” (U.S. Department of Homeland Security, 2004). In 2006, Congress codified this approach into law with the enactment of the Pandemic and All Hazards Preparedness Act (PL 109-417).

With multiple types of hazards in mind, nearly half (47%) of the U.S. public believe they are vulnerable to a major disaster within the next five years (Redlener, Abramson, Stehling-Ariza, Grant, & Johnson, 2007). Despite the high perception of vulnerability to a threat, only 34% of the public have started to prepare for such a disaster and an additional 43% have no intention to initiate preparedness behaviors (Redlener et al., 2007). When specifically asked about the threat of a terrorist attack, 60% of respondents perceived a risk, but only 37% considered themselves to be prepared (Eisenman et al., 2006). A similar study revealed that 64% of the sample had not even started to develop a single plan for stockpiling needed all-hazards emergency supplies or for evacuation and communication with family members (Murphy, Cody, Frank, Glik,

& Ang, 2009). The Public Readiness Index, a national measure that scores preparedness behaviors and knowledge on a scale of 0 to 10 (low to high), remains low (3.31) in the United States (The Council for Excellence in Government, 2006).

A survey of persons displaced by Hurricane Katrina living in a Houston shelter indicated that prior to the hurricane only 29% had developed emergency plans to help them mitigate a disaster and 42% had prepared an emergency kit with three days' worth of supplies prior to the disaster (The Henry J. Kaiser Family Foundation, 2005).

Residents of Baton Rouge, Louisiana took additional steps after Hurricane Katrina to prepare for the next major disaster (Blendon et al., 2007), suggesting that recent experience affects preparedness. Further research across other types of disasters has also supported the importance of recent previous experience on preparedness (Comstock & Mallonee, 2005; Hausman, Hanlon, & Seals, 2007; Knocke & Kolivras, 2007; Norris, Smith, & Kaniasty, 1999), even indicating that those with previous disaster experience are twice as prepared as those without a similar history (Hausman et al., 2007).

These studies provide support for enhanced preparedness after a *recent* disaster experience with the assumption that the preparedness effect wears off over time and people again slip into complacency. There is no specified timeline for this effect, although it may vary due to the level of direct personal impact of the incident and its severity. Severity of the experience by itself is also linked to preparedness behaviors (Akason, Olafsson, & Sigbjornsson, 2006; Boscarino, Adams, Figley, Galea, & Foa, 2006; Boscarino, Figley, & Adams, 2003; Comstock & Mallonee, 2005; Hausman et al.,

2007; Lindell & Hwang, 2008; Norris, 1992), possibly as even the most important determinant of perceived risk (Witte & Allen, 2000).

This experience-preparedness link suggests that previous severe experience makes people feel more susceptible to a future incident that they hope to mitigate through their own preparedness. Witte refers to the combination of perceived susceptibility and severity as perceived risk (1992). The literature indicates that an increase in perceived risk leads to preparedness. Combined, this suggests a perception that preparedness behaviors help to mitigate the personal impact of a disaster. The belief that the recommended action will prevent or impede the threat is termed response efficacy, believed to be a very important factor in predicting behavior (Rippetoe & Rogers, 1987).

When asked during a non-emergency time, people typically display a strong future intent to comply with official recommendations made during an emergency (Blendon, Benson, DesRoches, Raleigh, & Taylor-Clark, 2004; Blendon et al., 2003; SteelFisher et al., 2011; Stevens et al., 2009). Since some theories propose a predictive link between behavioral intent and behavior (Ajzen, 1991), supporters of these theories would argue that people will perform the intended behaviors during an emergency. Evidence has shown that in an emergency, people will engage in problem solving (Mileti & Peek, 2000) while seeking as much information as possible to assist in coping (Perry & Lindell, 2003).

Emergencies are likely to cause elevated stress levels (Mileti & Peek, 2000), but the completely disorganized behaviors referred to as panic that many believe occur in emergencies are unlikely (Perry & Lindell, 2003). Reports of panic in emergencies often misclassify appropriate behavioral responses as panic (Sandman & Lanard, 2005),

leading to a misperception of how common panic is in disasters. Sandman and Lanard (2005) cite media reports after the devastating 2004 Asian tsunami that widely referenced “panicked” individuals fleeing for higher ground, a behavior considered rational and appropriate during such an emergency but misidentified as panicky. Senses of powerlessness and isolation are factors influencing true panic behavior (Sandman & Lanard, 2005). During large emergencies, the senses of isolation and impotency can be mitigated by the shared community experiencing the disaster, thus reducing the likelihood for panic (Donald & Canter, 1992; Drury, Cocking, & Reicher, 2009) and increasing the problem solving (Mileti & Peek, 2000) and coping responses (Perry & Lindell, 2003).

Based on the intent to comply, the theorized likelihood of compliance, and evidence of actual compliance during an emergency, there is a disparity with the low rates of preparedness behaviors occurring prior to an emergency. Greater perceived risk or threat is a factor that encourages people to take preparatory action (Boscarino et al., 2006; Tang & Wong, 2003) and may explain the disparate behavioral response from pre-emergency to emergency. It is possible that the difference between people’s intention to comply with behavioral recommendations during an emergency is different from compliance with pre-emergency preparedness actions because of the lack of a perceived immediate threat. Since the assumption that actions during an emergency and post-emergency are both predicated on increased risk perception, this also suggests a relationship between pre-emergency risk perception and emergency preparedness, and thus the first hypothesis of this research is

H1: There is a relationship between perceived threat and emergency preparedness.

Based on these assumptions, emergency preparedness campaigns should focus on delivering credible messages that increase risk perception and ensure that the public is aware of the threat of emergencies. Messages that understate the threat may not trigger a person to perceive that the situation needs attention, and the person may therefore ignore the messages. Overly fear-based messages may increase the person's perception of threat so much that they are too frightened to act rationally, and panic as a result.

According to the extended parallel process model (EPPM) (Witte, 1992), fear messages need to be balanced with efficacy messages in order to be effective. According to the model, when exposed to a fear-based message, people will first engage in a threat appraisal, and then in an efficacy appraisal if the threat threshold was reached. As a result of these appraisals, the person will either try to control the threat or control their fear of the threat (Witte, 1992, 1994). People should feel enough fear to get their attention, but then should also be able to gain some sense of control over the presented threat through efficacy messages that encourage simple actions. In terms of the constructs of the EPPM, efficacy can be broken into two components: self-efficacy (an individual's belief that they can perform the recommended behavior) and response efficacy (a belief that the recommended behavior will mitigate the threat).

Whereas practical evidence indicates the importance of risk perception in encouraging emergency preparedness, theory drives the inclusion of efficacy messages into a preparedness communications effort. Based on its importance in the EPPM, the

relationship of efficacy and preparedness behaviors needs to be further tested. To parallel Hypothesis 1, the second hypothesis of this research is

H2: There is a relationship between efficacy and emergency preparedness.

With a mixture of practical and theoretical evidence supporting the value of these constructs in emergency preparedness communications campaigns, a gap remains in identifying the relative thresholds of each of these constructs needed to develop persuasive messages for use in preparing people for an emergency. The ideal balance between threat and efficacy messages needed to ensure an appropriate behavioral response remains unclear with conflicting results about the importance of each (Hubbell, 2006; Morman, 2000; Wright, French, Weinman, & Marteau, 2006).

With evidence of enhanced preparedness in those previously affected by disasters (The Henry J. Kaiser Family Foundation, 2005), further questions arise about the importance of these constructs in relation to previous experience. Since the experience-preparedness link suggests that people who have experienced a disaster also have a higher risk perception, it may not be necessary to provide these groups with messages to increase their perceived threat. In cases where there is already a high level of threat, fear-based messaging may be counterproductive and drive the recipients to a fear controlling response (Witte, Cameron, Lapinski, & Nzyuko, 1998). According to the EPPM, this population would need messages targeting efficacy to move them into a healthier danger control response in which they heed the recommended behavior.

Health communicators can use results of further exploration of the relative weights of these constructs to develop messages appealing to the most important constructs,

therefore enhancing the effectiveness of health promotion campaigns. This leads to the third and fourth hypotheses

H3: Efficacy-based messages are more effective in communications directed to individuals with previous disaster experience.

H4: Threat-based messages are more effective in communications directed to individuals without previous disaster experience.

This research aimed to test these hypotheses using fact sheets focused on manipulating efficacy and threat perceptions. Participants answered preliminary questions to assess their starting threat and efficacy perceptions, preparedness levels, and their previous experiences with emergencies. Participants then reviewed two fact sheets, one that is high in efficacy messaging while weakly describing the threats and the other that strongly highlighted the threats and lightly included efficacy messaging. Participants then selected which fact sheet they found to be of greater influence in encouraging their preparedness behaviors. The purpose of this study was to provide risk communicators a theoretically based means to improve emergency preparedness message targeting with an ultimate goal of enhancing the nation's overall resiliency.

Chapter 2: Review of the Literature

From the available literature on emergency preparedness and response, it is apparent that there is great difficulty in developing a traditional experimental design to test behavioral responses to an emergency. For obvious reasons, researchers do not subject participants to real emergencies. Therefore, the primary method of research is cross-sectional and gathers either pre-emergency perceptions or post-emergency perceptions, but rarely from the same group of people. Research designs generally present hypothetical situations to which many participants express their intent to comply, but when the emergency occurs, perceptions of efficacy and vulnerability change. While it is possible to develop pre-emergency questions about threat perception (Barr et al., 2008), the challenge seen throughout previously documented research is the ability to follow-up with how valid compliance intent is since it requires an emergency to occur. Therefore, the primary limitation in the existing literature is that there is minimal ability to measure beyond a person's intent to comply, recognized by some theories as a possible predictor of actual compliance (Ajzen, 1991).

With this limitation in mind, this chapter reviews the literature relevant to encouraging emergency preparedness behaviors, behavioral intent during an emergency, and their relationship with threat perception. The first section details the factors influencing preparedness and response, describing them in terms of both contextual or experiential dynamics and demographic characteristics. Since perceived risk is a factor that encourages action-taking (Boscarino et al., 2006; Tang & Wong,

2003) needed for preparedness, the second section describes the literature related to this function and its relationship as a critical component in the extended parallel process model (EPPM). The second section goes on to further describe some of the existing support of the EPPM as well as its identified limitations.

Factors Influencing Preparedness

Upon reviewing the literature for factors that influence preparedness, it becomes clear that there is no standard definition of preparedness. There are nearly as many definitions of preparedness as there are articles on the subject. For example, some articles focus solely on the ability to stockpile certain materials (Blendon et al., 2008; Brodie et al., 2006; Paek, Hilyard, Freimuth, Barge, & Mindlin, 2008; Page, Rubin, Amlot, Simpson, & Wessely, 2008; Quinn, Kumar, Freimuth, Kidwell, & Musa, 2009), which would clearly limit the number of people able to comply simply by financial circumstances. Other definitions focus more on knowledge of things such as information sources, evacuation routes, or establishing a plan for communication with family (Balluz, Schieve, Holmes, Kiezak, & Malilay, 2000; Blando et al., 2007; Comstock & Mallonee, 2005; Eisenman, Cordasco, Asch, Golden, & Glik, 2007; Lee & Lemyre, 2009; Meredith, Eisenman, Rhodes, Ryan, & Long, 2007; Ram et al., 2007). A few studies use measures of both to form a more comprehensive definition of preparedness (S. Gibson, Lemyre, Clement, Markon, & Lee, 2007; Murphy et al., 2009; Ronan & Johnston, 2003; Williams & Magsumbol, 2007). Yet other definitions focus equally on avoidance behavior and denial in response to fear related to an emergency (Eisenman et al., 2009; Rubin, Brewin, Greenberg, Simpson, & Wessely, 2005).

Regardless of these differences in definitions, there are several similar factors mentioned in the literature that serve as predictors of preparedness behaviors and potential for compliance during an incident. For the purposes of the present research, these key factors are referred to as contextual (those that have been caused by experience or situation), and as demographic. These factors are useful in developing more effective public information campaigns and interventions that promote preparedness behaviors and help risk communicators in better providing information to affected populations during an emergency. The next two sub-sections will describe the contextual and demographic characteristics related to emergency preparedness and threat perception.

Contextual factors. Many studies have shown strong correlations between recent disaster experience and levels of preparedness (Comstock & Mallonee, 2005; Hausman et al., 2007; Knocke & Kolivras, 2007; Norris et al., 1999), especially if the disaster experience was severe (Akason et al., 2006; Boscarino et al., 2006; Boscarino et al., 2003; Comstock & Mallonee, 2005; Hausman et al., 2007; Lindell & Hwang, 2008; Norris, 1992). Individuals who have previously experienced a disaster are more attentive to news reports, a preparedness behavior (Sattler, Kaiser, & Hittner, 2000). Residents of Baton Rouge, Louisiana report taking additional steps after Hurricane Katrina to prepare for another major disaster (Blendon et al., 2007), indicating that disaster survivors have learned the importance of preparedness. Hausman, et al. (2007) indicate that people with previous exposure to disaster had preparedness scores that were twice the scores of those without a previous history.

Many studies on emergency preparedness and response focus on natural disasters since they tend to be more predictable. In geographic areas where natural disasters are more frequent, people are more likely to acknowledge that a personal threat exists (Lindell & Perry, 1992), and correlations exist between personal perceptions of risk and the experts' risk assessments (Siegrist & Gutscher, 2006). Those perceiving a greater threat are more likely to take action by becoming more aware and prepared (Boscarino et al., 2006; Tang & Wong, 2003).

The support in the literature for previous experience being associated with increased risk perception makes sense for natural disasters. If an individual lives in a disaster-prone area, they are more likely to have experience with a natural disaster, and as long as they continue to live in this area, they are likely to expect future occurrences. People living in high-risk areas are also more likely than those who live in less disaster-prone areas to take self-protective measures (Faupel, Kelly, & Petee, 1992) such as adhering to public warnings (Drabek & Boggs, 1968). Challenges with compliance exist if incomes or jobs are compromised (Blendon et al., 2008) or if there is not adequate information, such as about the evacuation route or appropriate place to receive countermeasures (Blando et al., 2007; Eisenman et al., 2004). Comstock and Mallonee (2005) determined that warning time is also correlated with protective actions and that those who had more time were better able to comply with directives.

Interestingly, another study indicates that a close miss with an emergency or disaster is also as effective in causing preparedness behavior as a direct hit (Norris et al., 1999). Norris et al. made comparisons between residents of the mid-Atlantic coast directly hit by a storm with others in nearby counties who experienced storm damage,

but not at the magnitude of those who were directly in the path of a hurricane (1999). The behavioral responses were quite similar, though the study does acknowledge that the severity of personal experience influences behavior still more strongly than experience at the community level. As was evidenced in the 2004 Florida hurricane season, even with multiple storms bearing down, the public became complacent in their preparedness and response behavior (X. Wang & Kapucu, 2008) and did not act to protect themselves as they may have if the threats were equally as severe but less commonplace. There may be a paradoxical effect and some disaster survivors may not perceive a need for preparation based on a previous disaster experience. This optimistic bias is evident in people who refused to evacuate during a flood because previous floods were not as bad as predicted and their prior lack of preparation caused them no harm (Lindell & Perry, 1992).

In contrast to the optimistic bias, a study about the 2009 H1N1 influenza pandemic showed that many respondents feel more vulnerable than average (Paek et al., 2008). This represents a possible difference in perception of risk between natural disasters and infectious disease. Further differences in risk perception between biological agents and natural disasters exist in public opinion about anthrax. When compared to a national survey, data collected from respondents in the metropolitan statistical area (MSA) of New York City validated the previous research by reporting a greater perceived threat of a new anthrax attack in the next 12 months (SteelFisher et al., 2011). In contrast, and in contradiction to previous threat perception research, polling conducted concurrently in Washington, DC and Trenton/Mercer, NJ (the site of the 2001 anthrax postal facility)

reported a lower perceived threat even though there was a previous history with the threat.

The results of this polling indicate a possible difference in perception of risk between disease and natural disasters. Previous research on natural disaster risk perception indicates that prior exposure to a disaster predicts perceived vulnerability to a future disaster, a contradiction to results from the anthrax polling in two of the three affected MSAs. In the case of a widespread anthrax attack, the public health recommendation would be to receive antibiotics in a short time period. The divergence in risk perception of a disease outbreak may reduce the public's compliance with such an emergency health directive during the critical timeframe.

Aside from the importance of previous experience in a disaster, receiving some type of educational intervention associated with nearby common hazards was also an important predictor of preparedness and increased risk perception (Balluz et al., 2000; Karanci, Aksit, & Dirik, 2005; Ram et al., 2007). The Boscarino, et al. (2006) study of World Trade Center survivors, showed an increase in perceived risk in those that have an extreme fear of death; experienced a severe, traumatic disaster that caused post-traumatic stress disorder; and those who have experienced other negative life events. Other authors also found correlations between threat perception and social capital (Hausman et al., 2007) and social support (Benight, 2004). Confidence in the government's ability to respond (Elder et al., 2007; S. Gibson et al., 2007; Lee & Lemyre, 2009) is related to threat perception, and may be linked with honesty and consistency of information.

Meredith, et al. (2007) found that study respondents look for consistency across multiple sources of information and trusted, credible messengers. The credibility of official sources that are providing this information is critical for compliance (Andrulis et al., 2007; Brodie et al., 2006; Quinn et al., 2009). Ensuring that spokespersons can relate to the target audience as trusted sources of emergency and emergency preparedness information is important in gaining their trust (Hutchins et al., 2009; Vaughan & Tinker, 2009). The triadic model (Suls, Martin, & Wheeler, 2002), suggested as part of social comparison theory (Festinger, 1954), supports this idea by expressing the concepts of “similar experts.” Similar experts that share current preferences, beliefs, and future preferences with the target audiences could be very useful to health promotion practitioners in disseminating health information, especially to vulnerable populations.

However, the public expresses mixed reviews concerning whether or not they will trust the government as a credible, prepared source. Several authors report high trust in the government ability to handle the support for various preparedness actions (Paek et al., 2008), though others indicate that the public believes that the government is not prepared to respond to emergencies (S. Gibson et al., 2007), particularly in certain racial and ethnic groups (Eisenman et al., 2004). The public does, however, express a general trust in emergency responders (Carter-Pokras, Zambrana, Mora, & Aaby, 2007; S. Gibson et al., 2007), and will look to their physicians as role models (Blendon et al., 2003).

Demographic factors. Multiple studies indicate that populations routinely defined as vulnerable (chronically ill, physically disabled, racial/ethnic minorities) are

disproportionately affected by disasters (Brodie et al., 2006; Fothergill et al., 1999; Hutchins et al., 2009; P. S. Wang et al., 2007). Emergencies may unduly affect vulnerable populations because of underlying health issues and disparities. Lack of access to care, cultural or social isolation, or limited language proficiency may cause further barriers in implementing emergency precautions and preparedness actions (Blendon et al., 2008; Blumenshine et al., 2008; Bouye et al., 2009). Possibly, due to these factors, threat perception among vulnerable populations also tends to be higher (Eisenman et al., 2009).

The most commonly referenced demographic factor that served as an indicator of perceived threat is age (Armas, 2006; Barr et al., 2008; Boscarino et al., 2006; Paek et al., 2008; Tang & Wong, 2003). Even more specifically, Boscarino's study (2006) indicates that those between the ages of 30 and 64 perceive the greatest threats. Younger populations (Eisenman et al., 2006; Knocke & Kolvras, 2007), those presumed to have less exposure to previous disasters (Norris et al., 1999), were less engaged in preparedness behaviors.

Previous history and experience has demonstrated that advance preparation is critical for the aging population and those with chronic health conditions. Disaster conditions may take a greater toll on the health of the elderly and make them more susceptible to stress, dehydration, and infectious diseases. Further, changes in the environment that sometimes accompany emergencies could jeopardize the care they receive for certain acute or chronic diseases since approximately 80% of adults over age 65 have at least one chronic condition (Aldrich & Benson, 2008). Seniors are often being treated for multiple health issues and taking several medications that may not be

widely available during an emergency (Feret & Bratberg, 2008). Information about these medication regimens may not be available to those who act as their caregivers during such a situation.

As an example of their vulnerability, approximately 73% of the deaths associated with Hurricane Katrina were in those over the age of 60, even though they accounted for only 15% of the total population of New Orleans (M. J. Gibson, 2006). It is estimated that 88,000 people over age 65 were displaced during Hurricane Katrina (Gabe et al., 2005) and 200,000 people with chronic diseases lacked ready access to their medications and regular medical care providers (Aldrich & Benson, 2008). Although there was no elevation of mortality rates post-hurricane, a study of Medicaid Advantage enrollees over age 65 showed a morbidity increase of 12.6% among Hurricane Katrina survivors (compared with the matched sample's increase of 3.4%) in the year following the disaster (Burton et al., 2009).

Age-related vulnerabilities were also present during other types of catastrophes. Approximately 25,000 older adults were living near the World Trade Center in New York City at the time of the terrorism attack in 2001. Many of these individuals, confined to their homes for several days without electricity, were also unable to refill medications or restock food staples and other necessities. Many were isolated because their routine home visitation services were not able to reach them (Aldrich & Benson, 2008). The discontinuation of home services and inability to restock supplies might also become problematic during a severe influenza pandemic where vulnerable individuals are encouraged to stay at home for an extended period as a public health precaution to minimize the spread of disease.

Many challenges are associated with emergency preparedness and compliance during emergencies for elderly individuals and persons with disabilities or with chronic diseases. Fortunately, individuals with disabilities tend to be (Balluz et al., 2000; Blando et al., 2007; Blendon et al., 2003; Eisenman et al., 2007; Knocke & Kolivras, 2007; Ram et al., 2007; Williams & Magsumbol, 2007) more prepared than the general population due to the need for advance planning for life sustaining equipment or intricacies in evacuation (Eisenman et al., 2006; McGuire, Ford, & Okoro, 2007).

Minority, non-white populations were also found to have higher threat perceptions (Boscarino et al., 2006; Eisenman et al., 2006; Hausman et al., 2007; Paek et al., 2008; Quinn et al., 2009). Hausman (2007) specifically linked ethnic populations with the risk perceptions acquired through social capital and social support. Those populations with less education (Armas, 2006; Boscarino et al., 2006; Paek et al., 2008) and a lower socioeconomic status (Barr et al., 2008; Lindell & Hwang, 2008; Paek et al., 2008) were also more likely to have a higher risk perception.

Although populations with less education in general were likely to demonstrate a higher perceived threat, it was also shown that those that received an intervention including hazard-specific education demonstrated greater risk appraisals (Karanci et al., 2005; Page et al., 2008; Ronan & Johnston, 2003). Lack of knowledge about potential threats and hazards contributes to a lower perception of risk and compliance (Balluz et al., 2000; Blando et al., 2007; Blendon et al., 2003; Eisenman et al., 2007; Knocke & Kolivras, 2007; Ram et al., 2007; Williams & Magsumbol, 2007), although stated knowledge and understanding does not guarantee compliant behavior because people may not fully understand the situation (Knocke & Kolivras, 2007).

Other important factors associated with an increase in threat perception are lower self-rated health status (Barr et al., 2008), a rural population (Barr et al., 2008); and religious affiliation (Rubin et al., 2005). The effect of gender was mixed with some studies finding that females are likely to have a higher risk perception (Enarson & Scanlon, 1999; Hausman et al., 2007; Lindell & Hwang, 2008) and Barr, et al. (2008) finding no link with gender nor households with children.

Extended Parallel Process Model

Since the previous section describes various contextual and demographic characteristics that play a role in increased perceptions of risk of facing an emergency, this section further describes the literature related to the extended parallel process model since it seeks to explain the mechanism by which increased threat perception is supposed to influence action.

Fear appeals, messages designed to elicit fear by describing bad outcomes that occur if people do not adhere to behavioral recommendations, have long been used to persuade people to adopt certain recommended behaviors. Research has been contradictory on the success of fear-inducing health messages (Blumberg, 2000; Ruiter, Abraham, & Kok, 2001; Witte & Allen, 2000; Witte, Cameron, McKeon, & Berkowitz, 1996). In some instances, fear is enough to encourage adoption of the recommended behavior, but in other cases, the recipient will have the opposite reaction. An early study on this relationship from a marketing perspective showed a curvilinear effect of fear and behavioral intention (Ray & Wilkie, 1970). Up to a certain intensity of fear, the message recipient is likely to adopt the recommended behavior; however, once threat exceeds the threshold, the behavioral likelihood decreases.

The affect associated with fear appeals was the focus of research until the “cognitive revolution,” when a shift occurred to further study the cognitive aspects (Popova, 2011), ultimately leading to the development of the EPPM by building upon the parallel process model (Leventhal, 1970) and protection motivation theory (PMT) (Maddux & Rogers, 1983; Rogers, 1975). The parallel process model was proposed to explain that fear works because of both cognitive and emotional processes (Leventhal, 1970), thus separating emotion from cognition. In this model, the two processes are danger control (cognitive) and fear control (emotional). The danger control process leads a message recipient to accept the fear and perform the recommended behavior to reduce danger; in essence, people are trying to control the threat. In the fear control process, a person attempts to control their emotional response to the threat and may begin to avoid or deny related information as a defense mechanism.

The PMT builds upon the danger control process described in the parallel process model (Popova, 2011), defining motivation for self-protection as the combination of threat and coping appraisals (Maddux & Rogers, 1983; Rogers, 1975). A threat appraisal is a maladaptive response that occurs when risk perception, made up of perceived severity (the degree of a negative health impact) and vulnerability (risk of being affected by a bad outcome), is greater than internal and external benefits of performing the recommended behavior. An individual’s coping appraisal is an adaptive response based on efficacy being greater than the real or perceived costs of the recommended behavior (such as time or money). In the PMT, efficacy includes response efficacy (belief that the targeted behavior will provide some protection from the threat) and self-efficacy.

The EPPM further seeks to explain fear appeals using components from its predecessors, including the parallel process and the PMT's danger control response. The EPPM posits that when confronted by a threat, people will first engage in a threat appraisal, and then in an efficacy appraisal if the threat threshold was reached. As a result of these appraisals, they will either try to control the threat or control their fear of the threat (Witte, 1992, 1994) as shown in Figure 1. Fear is an emotional reaction to the perception of threat, a cognitive response (Witte & Allen, 2000). Fear-based messages focus on increasing threat perception.

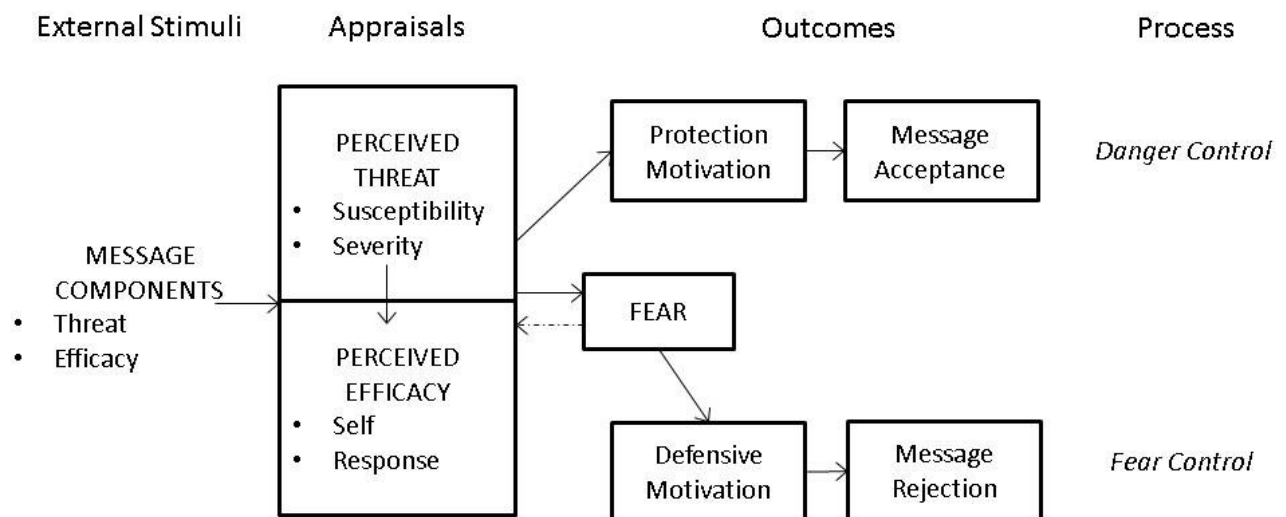


Figure 1: The extended parallel process model, adapted from Witte (2007)

Messages that arouse threat may lead to fear control processes or danger control processes (Blumberg, 2000; Witte, 1992). Fear control processes arise when changes in behavior reduce threat without eliminating it. Danger control processes occur when the suggested behaviors eliminate the problem. In accordance with the EPPM, the

difference between promoting fear and danger control processes is efficacy. When an individual perceives high threat and high efficacy, he is motivated to adhere to recommended behaviors, an action associated with danger control. If threat is high and efficacy is low, a fear control reaction occurs and the individual is more likely to become defensive or deny the threat. In other words, fear control causes maladaptive behaviors such as taking no action or acting only to reduce the fear, not the danger. People must feel susceptible to the threat and efficacious about its response to be motivated to take proper actions.

A mild amount of fear may be functional in a message, as long as it also includes a good behavioral recommendation (Ruiter et al., 2001). Messages that also include strong efficacy reinforcement are more effective (Blumberg, 2000; Witte & Allen, 2000). Research shows that people perceive pre-incident preparedness as mitigating the impact of a natural disaster (Boscarino et al., 2006; Comstock & Mallonee, 2005; Hausman et al., 2007; Knocke & Kollivras, 2007; Norris et al., 1999; Tang & Wong, 2003), thus affirming the associated response efficacy. Those living in high-risk areas are more likely to demonstrate response efficacy by taking measures to protect themselves (Faupel et al., 1992), and adhere to public warnings (Drabek & Boggs, 1968).

In contrast, many people feel that preparation for a terrorist attack is unrealistic and could cause paranoia, or conversely, apathy (S. Gibson et al., 2007). Emergency risk communicators need to be cognizant of the importance of including efficacy messages along with the fear messages that might lead to paranoia or apathy (Witte, 1992, 1994; Witte & Allen, 2000). Without providing an efficacy message, the recipient of the

information may feel that they have no control over the situation, and therefore end up with an unhealthy fear controlling response (Blumberg, 2000; Witte & Allen, 2000).

During an emergency, it is preferable for the affected individuals to develop a danger control response so that they take the actions to protect themselves (Blumberg, 2000; Witte & Allen, 2000). They will only develop this type of response if they feel they have the needed efficacy.

These recommendations are consistent with the paradigm supported by crisis and emergency risk communication research that has indicated that in a crisis, public messages need to include action messages (Centers for Disease Control and Prevention, 2002). The purpose of action messages is to enhance efficacy and show people that they have the ability and choice to respond. If the recommended behaviors reduce the perception of freedom by seeming impossible or out of control, psychological reactance may occur (Brehm, 1966; Dillard & Shen, 2005), thus further decreasing the probability of voluntarily adopting the recommended behavior.

Developing health message campaigns using tenets of the EPPM have empirically shown utility in promoting behavior change across a variety of subjects, including smoking cessation (Wong & Cappella, 2009; Wright et al., 2006), self-exams for both testicular and breast cancer (Hubbell, 2006; Morman, 2000), HIV/AIDS and other sexually transmitted infections (Roberto, Zimmerman, Carlyle, & Abner, 2007; Witte, 1994; Witte et al., 1998), electromagnetic fields (McMahan, Witte, & Meyer, 1998), physician recommendation for kidney testing (Roberto & Goodall, 2009; Roberto, Goodall, West, & Mahan, 2010), meningitis (Gore & Bracken, 2005), and influenza immunizations (Cameron et al., 2009; LaVela, Smith, & Weaver, 2007). Not surprisingly,

some of the most direct evidence in support of the EPPM comes from Witte's studies directly intended to test and apply the model in different settings. Empirical testing of the EPPM in the context of testing AIDS messages supports that cognitions and emotions are related to the posited separate parallel processes. Evidence supports that the danger control process is primarily cognitive and that fear control is emotional (Witte, 1994).

Witte et al., provide further evidence through the evaluation of an HIV/AIDS prevention campaign on the roadsides of Kenya (1998). Through qualitative and quantitative data collection and analysis, it was determined that fear-based roadside signs were less effective than brochures because they did not include efficacy messages (Witte et al., 1998). Campaign brochures were heavily weighted toward efficacy messages and were deemed more useful (Witte et al., 1998). Interestingly, during this evaluation it was also determined that study participants already had a high HIV/AIDS threat perception and that the fear-based posters may have actually pushed the audience's fear levels above the threshold, therefore decreasing the likelihood of an appropriate behavioral response. Similarly, individuals with preexisting danger controlling responses retained their danger control when exposed only to efficacy messaging (Gore & Bracken, 2005).

Also in concordance with the EPPM, research on electromagnetic fields (McMahan et al., 1998), testicular self-exams (Morman, 2000), meningitis (Gore & Bracken, 2005), and smoking cessation (Wong & Cappella, 2009) showed that high threat and high efficacy messages promoted stronger danger control responses (with behavioral intent) and weaker fear control responses. The study on electromagnetic fields showed that

danger control messages promoted the strongest intentions toward safety behaviors and lower threat messages with strong efficacy promoted weaker intentions (McMahan et al., 1998), providing support for the ordering of the appraisals, as the threat was not raised high enough to engage in the efficacy appraisal. Wong and Capella (2009) found a positive two-way interaction effect between threat and efficacy on intent to seek help for smoking cessation. They also found efficacy to be the most important to smokers with a high readiness to quit, as is consistent with the stages of change construct of the transtheoretical model (Prochaska & Velicer, 1997) where efficacy becomes more important with stage progression.

Further expansion of the EPPM within the interpersonal domain was seen in a study on taking protective action against rape (Morrison, 2005). Even though not personally susceptible to a fear appeal, people may become motivated to persuade someone else, especially someone for whom they care. This study showed evidence that men felt indirectly susceptible to rape because of their relationships with women, and that indirect threats may actually cause more anxiety because of uncertainty of being able to influence another person's behavior (possibly related to perceptions of efficacy).

Based on evidence that perceived threat to others may serve as a motivating factor, Roberto and others studied physicians' decisions to test patients for kidney disease (Roberto & Goodall, 2009; Roberto et al., 2010). Physicians that perceived a greater threat to their patients and efficacy in recommending testing followed through on making the recommendation for testing as is consistent with the EPPM.

Although there is considerable evidence supporting the EPPM, some studies have yielded inconsistent results or results that highlight gaps in the body of literature. Even

Witte and Allen's meta-analysis of the fear appeals literature (2000) suggests that engendering fear may not be essential to engaging the danger control process. Additional research has shown that efficacy (Floyd, Prentice-Dunn, & Rogers, 2000), specifically response efficacy (Rippetoe & Rogers, 1987), is the best predictor of behavioral intention regardless of fear level. Furthermore, a fear control process is possible even if the efficacy level is high (Witte & Allen, 2000).

In terms of other inconsistent findings, a study assessing the impact of providing genetic risk information on smoking cessation found little evidence that gene-positive results caused fear control responses (Wright et al., 2006). Additionally, and in direct contradiction to the EPPM, perceptions of threat decreased as self-efficacy increased in the group that did not receive information about their test results. This is in direct opposition to EPPM because it suggests that the threat component is not important in encouraging behavior change.

Similarly, in a study of protective behaviors for breast cancer, the combination of perceptions of susceptibility and severity was more strongly related to behaviors than was perceived self-efficacy (Hubbell, 2006). Unfortunately, the breast cancer study did not examine response efficacy, said to be the strongest predictor of behavior (Rippetoe & Rogers, 1987), but these results further raise the question about the balance between threat perception and efficacy needed to produce a behavioral response.

This survey of the literature illuminates several discrepant findings related to the relationship between fear and efficacy in messages that the research proposed here seeks to address. One of the hypotheses of this research is that the type of messaging needed to encourage an appropriate response depends upon other message recipient

characteristics, and in particular, the effect of previous experience. This research will further explore that question as another step in defining characteristics that may improve the model for emergency preparedness communication.

Although not unique to the EPPM, additional criticism of the model focuses on measurement of the key constructs (Brewer, Weinstein, Cuite, & Herrington, 2004; Miles, 2010). Further research and validation have attempted to standardize collection of the four construct measures through the Risk Behavior Diagnosis (RBD) scale (Witte et al., 1996). The purpose of this scale is to serve as a quick screening tool to determine whether a person is in danger or fear control to allow health educators to tailor appropriate messages to their audience dependent upon their orientation. The original design of the RBD scale was for clinics specializing in STD and HIV testing. In these clinics, a client would complete the form as part of routine medical screening forms. A practitioner could then review the responses, categorize clients as to control mechanism, and adjust the counseling and information session accordingly. Since its inception, researchers and practitioners have broadened the RBD scale for applicability to other health issues and settings. Health communicators can also use the scale in message development research to identify fear/danger control preferences in a random sample of a target audience. The development of this tool seeks to provide additional guidance on measuring theoretical constructs, and is a step forward in addressing some of the critics' concerns.

A wide body of literature across multiple domains provides support for the EPPM, though several studies have also shown inconsistencies and gaps that remain. The research conducted here builds upon the existing literature by exploring the role of

previous experience in the effectiveness of threat and efficacy-based messaging and by expanding the model to the context of emergency preparedness to explore its applicability in a new domain. Through mixed results of hypothesis testing, this study is able to contribute further to the development of a framework for communicating emergency preparedness. Information of this type is critical to risk communicators in a practical manner as they develop and target messages to encourage preparedness without promoting an overwhelming level of fear.

Chapter 3: Methods

To further investigate the need for fear in messaging as well as other factors associated with threat perception, a repeated measures study was conducted in which participants were exposed to two experimental stimuli, fact sheets that promote preparedness by manipulating either efficacy or threat perceptions. Prior to exposure to the stimuli, participants responded to questions designed to assess current efficacy and threat perceptions, current preparedness status, and previous experience in a disaster. This following section describes the study population, measures, and data collection procedures.

Participants

Given the evidence that vulnerable populations are disproportionately affected by disasters (Brodie et al., 2006; Fothergill et al., 1999; Hutchins et al., 2009; P. S. Wang et al., 2007), these groups made ideal participants for this study. Using a population with an increased risk improved the likelihood that the sample included the wide range of previous emergency experience needed to test the study's third and fourth hypotheses.

The Kentucky Outreach Information Network (KOIN), a person-to-person network developed to improve crisis-related communications with hard-to-reach populations (Kentucky Department for Public Health, 2011), helped to recruit participants meeting the established criteria. Established by the Kentucky Department for Public Health, the KOIN is a network of organizations designed to encourage preparedness by using

trusted sources within the community to spread information. Public health professionals use this network for routine health communications, for message testing, and for ensuring the inclusion of these populations in emergency response planning.

Organizations participating in the KOIN represent populations with disabilities, hearing and visual impairments, limited English proficiency (low literacy and non-English speaking populations), economic disadvantages, and cultural or social isolation, as well as the frail elderly.

KOIN member organizations invited participants using their typical methods of communications using email and word of mouth. Participants who received the email invitation from the KOIN agency were also encouraged to share the invitation with others who might be interested as a way of snowball sampling that relied upon already existing community networks. Text from the email invitation is included in Appendix A. Participating KOIN agencies were offered paper-based copies of survey materials and return envelopes at their service locations so that persons without internet access were able to participate. Agencies serving limited English proficiency populations did not participate since the fact sheet and materials were only available in English. Only adults over the age of 18 years who can read English were included in this research.

Upon initially opening the research survey link, the web page displayed the consent letter where participants had to verify that they were over the age of 18 years. The consent letter, survey, and experimental stimuli were in English at an approximately sixth grade reading level. In accordance with the internet research guidelines of the University of Georgia's Institutional Review Board, the consent document included a customized confidentiality disclaimer indicating that the researcher cannot ensure

confidentiality during the actual Internet communication procedure. The text from the consent page is in Appendix B.

In total, 166 participants initiated the online survey by clicking on the survey link; 140 participants answered the first question and 128 participants completed the entire survey. All responses were from the online survey with no paper-based participation. Participants were primarily female (73.8%), white (93%), educated with college degrees or above (73.8%), and earned more than \$46,000 per year (73.2%). Table 1 shows a further breakdown of the sample characteristics.

Experimental Stimuli

Participants reviewed two specially designed fact sheets on the importance of emergency preparedness. Each fact sheet highlighted one element of the EPPM, either efficacy or threat. A group of three health communications experts familiar with the theoretical constructs, but unaware of the study's hypotheses, validated these fact sheets for their appropriate manipulation of the constructs.

These experts read both of the fact sheets in their paper-based forms and wrote their thoughts and suggested changes on the drafts. Experts used the questionnaire in Appendix C to rank the fact sheets on a scale of 1 to 10 on how strongly the fact sheets addressed the constructs to assure that the efficacy fact sheet truly represented a high level of efficacy compared to the threat-based fact sheet and that the opposite was true for the threat-based fact sheet. The form also included space for experts to provide feedback on the equivalency of fact sheet style and format to reduce the likelihood of bias associated with factors not studied in this research. Overall, the experts validated that the fact sheets were similar in style and format and provided no suggestions for

Table 1: Demographic Characteristics of Sample With Preparedness, Efficacy, and Threat Scores

Demographics	n (%)	Preparedness Score			Efficacy Score			Threat Score		
		<i>M</i>	<i>SD</i>	<i>F</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>M</i>	<i>SD</i>	<i>F</i>
Sex										
Male	34 (26.2)	4.56	1.02	4.60*	22.94	5.07	0.002	25.12	4.57	0.33
Female	96 (73.8)	4.06	1.20		22.90	4.78		24.63	4.23	
Age in years (mean \pm SD)	48.65 \pm 12.36			3.01*			0.39			0.25
< 30	5 (4.3)	3.80	0.84		22.20	2.77		23.80	2.68	
30 to 39	30 (25.6)	3.77	1.17		23.07	3.79		25.27	3.40	
40 to 49	24 (20.5)	4.50	1.25		23.96	5.32		25.50	3.96	
50 to 59	35 (29.9)	4.23	1.06		22.51	4.77		24.91	3.81	
\geq 60	20 (19.7)	4.70	0.82		23.26	5.20		25.39	5.01	
Race										
				1.49			0.75			0.77
White	119 (93.0)	4.24	1.18		22.76	4.89		24.66	4.29	
Black, African American	4 (3.1)	4.75	0.50		20.75	6.13		24.00	4.08	

American Indian, Alaska Native	1	(0.8)	--	--	--	--	--	--
Asian	1	(0.8)	--	--	--	--	--	--
Other	3	(2.3)	3.33	0.58	22.80	4.87	24.76	4.28
Education					0.19		0.24	0.30
High school graduate	4	(3.1)	4.00	1.41	22.75	3.59	25.75	5.32
Some college credit, no degree	18	(13.8)	4.06	1.21	23.61	5.29	24.61	4.90
Associate degree	12	(9.2)	4.08	1.38	22.17	6.08	23.83	4.04
Bachelor's degree	48	(36.9)	4.31	1.09	23.06	5.22	24.56	4.58
Graduate degree or higher	48	(36.9)	4.19	1.21	22.52	4.17	25.13	3.88
Income					1.57		0.42	1.09
Less than \$30,000	10	(8.1)	3.5	1.78	22.80	4.26	23.50	4.17
\$30,000 to \$45,999	23	(18.7)	4.34	1.34	23.87	4.92	25.74	4.89
\$46,000 or more	90	(73.2)	4.2	1.07	22.91	4.52	24.94	3.77

Note. * $p < .05$

improvement in that manner. Expert suggestions for improving the manipulation of the constructs included revising the pictures to demonstrate personal impacts of the disaster by showing anguished faces on the threat-based fact sheets and comfortable families on the efficacy-based fact sheets. Experts also suggested the inclusion of specific hints to break down the preparedness process on the efficacy fact sheet, such as encouraging people to collect items for their kit one pay period at a time. Fact sheets were refined based upon these suggestions and the final versions are included in Appendix D.

Additionally, prior to data collection, KOIN representatives used their knowledge of the populations they serve to review the draft questionnaire and fact sheets to more accurately determine the appropriateness of content and literacy level of the materials for this target audience. As part of their routine functions, KOIN representatives develop educational materials their populations. Although no formal process existed for this review, KOIN representatives read the study materials to ensure that they aligned with considerations taken during routine communications. This group identified no concerns that required addressing.

The anticipated time to complete the entire survey process was 25 to 30 minutes.

Measures

The 40-item questionnaire used in this study included measures of threat perception, efficacy, current preparedness, demographic characteristics, previous experience, and fact sheet preference. Most of these measures were adapted from pre-existing scales and instruments. The questionnaire is included as Appendix E. To assist participants with responding, text in the survey included the definition of emergency as any event

that caused them to be isolated at home or displaced from their home for at least three days. This might include natural disasters such as hurricanes, tornados, floods, ice storms, disease outbreaks, or man-made disasters such as explosions, terrorist events, or blackouts.

Threat perception. The entire Risk Behavior Diagnosis (RBD) scale (Witte et al., 1996) was used as part of the survey tool, including six items to measure threat perception. The fact sheets included three questions on each of the facets of perceived threat, perceived severity and perceived susceptibility, prior to exposure to the experimental stimuli. The template version of the RBD scale was modified to be suitable for assessing emergency preparedness activities. In accordance with the original RBD scale, participants rated each of these items on a Likert-type five-point scale. Per the EPPM's additive framework, the sum of the two dimensions comprise the measure of perceived threat. Witte, et al. (2001) report an adequate internal consistency level for this scale with alpha coefficients greater than 0.70. As described in Chapter 4, the modified version of the RBD scale used in this study showed Cronbach's alphas greater than 0.80. Participants also answered two of these same questions following exposure to the experimental stimuli, one to represent perceived severity and one to represent perceived susceptibility. The sum of the responses to these questions served as a manipulation check to see if the experimental stimuli changed the participants' threat perceptions.

Efficacy. Six additional modified items from the RBD scale measured efficacy prior to exposure to the experimental stimuli. Three of these questions measured self-efficacy and the remaining three measured response efficacy related to preparedness

behaviors. Participants rated each of these items on a five-point Likert-type scale. Per the EPPM's additive framework, the sum of the two dimensions comprise the measure of perceived efficacy. Participants also answered two of these same questions following exposure to the experimental stimuli, one to represent self-efficacy and one to represent response efficacy. The sum of the responses to these questions served as a manipulation check to see if the experimental stimuli changed the participants' efficacy perceptions.

Current preparedness. The participants' current level of preparedness were measured using a subset of the general preparedness module of the 2010 and 2011 Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS questionnaire has been previously validated for use with general adult populations (Nelson, E., Town, & Kovar, 2003; Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001). To assess the appropriateness of using this measure in its abridged state, the preparedness measure from this study sample was compared with data obtained from the large national sample ($N = 18,670$) used in BRFSS who answered these same questions. The seven items included from the BRFSS include a general self-assessment of preparedness scored on a Likert-type three-point scale (ranging from not prepared at all through well prepared) as well as an assessment of the person's current stockpile of water, nonperishable food items, prescription medications, and additional emergency supplies (flashlight, radio), and household communication and evacuation plans. The six questions about supplies and planning are dichotomous (yes/no) in nature. The sum of the "yes" answers created a numerical score ranging from 0 to 6 to represent the preparedness measures taken. Since not every household had someone requiring prescription medications ($n = 13$),

this question included an option to represent that status which was represented as a “yes” in summing the scores. The “I prefer not to answer” and “Don’t know/Not sure” options were coded as “no” in the summation of the current preparedness measure.

Demographic characteristics. Through six items on the questionnaire, participants shared certain demographic characteristics that the literature shows as influencing preparedness behaviors. The demographic characteristics included in the survey to control for possible moderating factors were age, race/ethnicity, education, socioeconomic status, and gender. Table 1 summarizes the demographic characteristics for the final sample of participants.

Previous experience. Eight possible items (with skip patterns) on the questionnaire assessed whether the participants have previously experienced the impact of an emergency. Since previous experience in an emergency or disaster has been shown to affect preparedness (Comstock & Mallonee, 2005; Hausman et al., 2007; Knocke & Kolivras, 2007; Norris et al., 1999), the first item was used to identify the respondent’s personal previous experience. The second item, based on research showing that risk perception may be affected by interpersonal factors (Morrison, 2005; Roberto & Goodall, 2009; Roberto et al., 2010), asked about the previous disaster experience of close family and friends. Questions about previous experience were dichotomous (yes/no) and treated as nominal variables.

Additional questions in this series for those who answered yes to the first questions asked participants about the type and severity of these previous experiences since this is an important factor in risk perception and has been shown to play a role in disaster preparedness (Akason et al., 2006; Boscarino et al., 2006; Boscarino et al., 2003;

Comstock & Mallonee, 2005; Hausman et al., 2007; Lindell & Hwang, 2008; Norris, 1992). Questions about severity were on a five-point Likert scale from strongly disagree to strongly agree. Finally, participants provided year of the most recent experience to determine how important recent experience is in the threat assessment.

Fact sheet preference. Participants selected which fact sheet they felt was most likely to change their emergency preparedness behavior. There were three questions on this subject and both fact sheets were available for review during this process. The first question asked for the participant's overall opinion on whether either of the fact sheets would persuade them to adopt emergency preparedness behaviors. The second, dichotomous question asked participants to select the most effective of the two fact sheets in encouraging them to improve their preparedness. The third question was an open-ended question seeking a brief explanation for why the participant thought one fact sheet was more effective. This question also helped to explore whether additional message content besides the efficacy and threat portions were important in the preference decision.

Procedure

Starting on April 23, 2012, participating KOIN agencies emailed the survey invitation through their mailing lists. Since the nature of this network is to share information through trusted leaders within their respective communities, email recipients were encouraged to share the invitation with others as a form of snowball sampling. KOIN agencies also sent several additional reminder emails over the next few weeks until data collection closed on June 1, 2012. Recipients of the email who were interested followed an internet link embedded in the email on which they saw the internet informed

consent letter (Appendix B). On this web page, they had the opportunity to consent and verify that they were over the age of 18 years. If they declined, the survey tool displayed a thank you page and their window closed without any data collected.

Participants who acknowledged their agreement on the consent page continued to the first page of the survey that included an emergency preparedness-customized version of the RBD scale. Participants could then advance through the pages of the survey to complete the rest of the baseline survey sections that included a subset of the general preparedness module of the BRFSS, questions about their previous emergency experience, and basic demographic information. Each of these sections was on its own page, but participants had the ability to return to previous sections. For the majority of questions, answers were required to move on to the next page.

After completing the baseline questionnaire, the participants read the fact sheets and a message on the screen instructed participants to read both fact sheets carefully. To avoid any effects of fatigue or the contamination of knowledge gained from the first fact sheet, the order of presentation of the fact sheets was counterbalanced. One-half of the participants viewed the threat-based fact sheet first, and the other one-half viewed the efficacy-based fact sheet first.

Following their review of the fact sheets, participants answered a short series of questions addressing their fact sheet preference based on which they felt was more likely to encourage them to adopt emergency preparedness behaviors. Participants also had an opportunity to provide a short qualitative response on why they thought their preferred fact sheet was better. Smaller versions of the fact sheets were available on

this page as a reminder. Participants also had the ability to go back to the previous pages that contained the fact sheets and review them in their full-size forms.

The final section of the survey included a shorter version of the RBD scale that repeated four questions from the first section to assess the participants' post-stimuli responses to the EPPM dimensions. These questions served as a manipulation check to see if the fact sheets changed perceptions of threat and efficacy. The average time it took participants to complete the survey and read the fact sheets was just under 12 minutes.

At the completion of the survey, participants had the option of including contact information to enter a drawing for an American Red Cross emergency preparedness kit. The survey tool collected contact information on a separate page that was not associated with the rest of the survey responses. As explained in the consent letter and email invitation, participation in the survey was not required to enter the drawing and those requesting to enter the drawing had several additional opportunities to participate without completing the survey. There was one incentive available for every 50 respondents. Based upon the 166 participants who started the survey, four people who entered the drawing won prizes. Winners received emails to arrange for shipment of the prizes.

Data Analysis Strategy

Due to the online nature of the survey tool, participants were required to answer most questions before progressing to the next portion of the survey. Since participants had the option to "prefer not to answer" and they could also close the online survey window prior to completion of the survey, there were still some incomplete surveys. In

conducting analyses, missing items were not statistically imputed. Analyses, conducted using SPSS version 17 (SPSS Inc, 2009), were conducted only on the available responses for each question. The majority of missing data was in the latter questions because some participants did not complete the survey. In all, 140 participants answered at least the first question and 128 participants completed the survey through the end. The twelve participants that did not follow through until the end dropped off at varying points in the survey causing 5% of possible questions to remain unanswered.

Alpha (α) was set to .05 *a priori*. Table 1 describes the population's demographic characteristics based on their calculated descriptive statistics (means, standard deviations, and percentages), as appropriate. The rest of this section describes hypothesis tests using correlations, *t*-tests, chi-square analyses, and analysis of variance. Additionally this section explains the techniques used to assess relationships between variables and to assess validity of the survey tool.

The first two hypotheses are about the relationship between the EPPM constructs and current preparedness. To test these, data were plotted on a graph to examine the slope and then tested for normality and outliers. As a measure of dependence between the EPPM constructs and current preparedness, Pearson's product-moment correlation coefficient was calculated. Threat perception and efficacy measures were each correlated with the current preparedness measure to test the null hypothesis that the correlation coefficient is equal to zero ($H_0: \rho = 0$). Using a *t*-test, the current preparedness measure was then compared with data available from the national BRFSS data set assess the comparability of the study sample with a large national sample that answered the same questions.

The third and fourth hypotheses are that previous experience determines which type of messages are most persuasive for a target audience, positing that persons with previous experience are more likely to act upon efficacy messages because their threat level is already high and that persons without previous experience will need some fear-based messaging to facilitate their efficacy assessment. Chi-squares compared previous experience with fact sheet preference and examined the influence of perceived severity on previous experience (based on categories of no experience/low-perceived severity, medium perceived severity, and high-perceived severity) on preparedness.

Additionally, principal axis factoring evaluated whether or not the modified items from the RBD scale validly measured the intended dimensions. Chapter 4 describes the results of the exploratory factor analyses and other statistical tests described herein.

Chapter 4: Results

Four hypotheses were tested in this research. The first two hypotheses explore the existence of a relationship between current emergency preparedness and levels of perceived threat and efficacy. The third and fourth hypotheses, based on the extended parallel process model (EPPM), relate to a person's preference for threat or efficacy-based messaging depending upon their prior experience. The hypotheses are that people with prior experience in disaster are more likely to prefer efficacy-based messages because their threat levels are already high (Hypothesis 3). People without previous disaster experience need threat-based messages to increase their threat threshold enough to conduct an efficacy assessment (Hypothesis 4). Based on these hypotheses, one may presume that message preference relates to severity of the previous disaster experience since experience to a low severity disaster may not raise perceived threat above the theorized threshold.

Assessment of the Modified RBD Scale

Prior to hypothesis testing, principal axis factoring (PAF) examined the relationships between the individual measures of threat and efficacy obtained through survey responses (manifest variables) and validated the modified RBD scale. In anticipation of these analyses, the items from the modified RBD scale were assessed for normality. There is generally a negative skew to the test items, likely due to a ceiling effect. Although the Shapiro-Wilk tests showed non-normal data, further analysis of the items did not show severe enough deviations from normal to which the following analyses

would not be robust. In addition to visual examination of Q-Q plots and histograms, statistics for skewness and kurtosis were divided by their standard errors to determine that all items were within $z \pm 3.29$ ($p < .001$) as described by Tabachnick & Fidell (2007). For exploratory factor analysis, normality is important only to the extent that skew and outliers impact correlations (Leech, Barrett, & Morgan, 2005).

The purpose of conducting a PAF was to evaluate the validity of the scale by ensuring that the items measure the intended dimensions. Table 2 shows the 12 items included in the RBD scale and Table 3 shows the correlations between the scale items. Correlations between all of the items were examined and all items were correlated with at least one other item (at least .30), suggesting factorability. With a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .84 and a significant Bartlett's test of sphericity ($\chi^2(66) = 922.43, p < .001$), the items were again considered appropriate for exploratory factor analysis. Sample size was also considered adequate based on several criteria, including the rule of 100 (Gorsuch, 1983; MacCallum, Widaman, Zhang, & Hong, 1999) and the five participants (Gorsuch, 1983) and ten participants (Nunnally, 1978) per variable recommendations.

The initial eigenvalues showed that the first four factors explained 43.4%, 14.8%, 12.4%, and 7.4% of the variance, respectively, accounting for approximately 78% of the overall variance. Although the fourth component's eigenvalue did not meet the criteria for Kaiser's rule at 0.88, the four-factor solution was selected for extraction because of the high proportion of explained variance, the flattening of the scree plot at that point, and the theoretical support for the model as described.

Table 2: RBD Scale Items Modified for Emergency Preparedness

Construct	RBD Scale Item
RE 1	Emergency preparedness is effective in preventing the damaging effects of a large-scale disaster or emergency.
RE 2	Emergency preparedness is effective in preventing the damaging effects of a large-scale disaster or emergency.
RE 3	If I prepare for an emergency, I am less likely to experience the damaging effects of a large-scale disaster or emergency.
SE 1	I am able to prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.
SE 2	I have the skills and time to prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.
SE 3	I can easily prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.
SEV 1	I believe that the effects of a large-scale disaster or emergency are severe.
SEV 2	I believe that a large-scale disaster or emergency has serious negative consequences.
SEV 3	I believe that a large-scale disaster or emergency is extremely harmful.
SUSC 1	It is likely that I will be affected by a large-scale disaster or emergency.
SUSC 2	I am at risk for experiencing a large-scale disaster or emergency.
SUSC 3	It is possible that I will experience a large-scale disaster or emergency.

Note. RE, SE, SEV, and SUSC are response efficacy, self-efficacy, severity, and susceptibility, respectively.

Table 3: Correlation Matrix of RBD Scale Items Used

(N = 140)

Item	RE 1	RE 2	RE 3	SE 1	SE 2	SE 3	SEV 1	SEV 2	SEV 3	SUSC 1	SUSC 2	SUSC 3
RE 1	1.0	.72	.50	.50	.38	.40	.45	.40	.50	.18	.23	.14
RE 2		1.0	.54	.44	.39	.35	.49	.48	.52	.25	.21	.21
RE 3			1.0	.36	.28	.35	.38	.33	.36	.20	.13	.09
SE 1				1.0	.69	.76	.36	.34	.39	.30	.25	.26
SE 2					1.0	.57	.32	.31	.35	.32	.30	.30
SE 3						1.0	.26	.21	.30	.21	.19	.20
SEV 1							1.0	.69	.75	.30	.28	.32
SEV 2								1.0	.80	.31	.31	.38
SEV 3									1.0	.27	.27	.31
SUSC 1										1.0	.62	.63
SUSC 2											1.0	.64
SUSC 3												1.0

Due to the expected correlations between the items, orthogonality was not assumed and a PAF with four factors was conducted using a direct oblimin rotation to aid in interpretation. The primary loadings were greater than .65 for all items except for the third response efficacy item (.58). The third response efficacy item still clearly fits with this factor better than with the other factors because its next highest loading was .06 on self-efficacy. The highest cross-factor loading overall for all factors was .09. This analysis supports that the 12 items on the modified RBD scale measured their intended dimensions without measuring other dimensions. Table 4 shows the factor-loading matrix for the four-factor solution.

Cronbach's alphas were used to examine internal consistency for each of the subscales: response efficacy, self-efficacy, perceived severity, and perceived susceptibility. All were above accepted standards for internal consistency, at .81, .86, .90, and .84, respectively. Eliminating the third response efficacy question would have produced a slightly higher alpha coefficient (.84), but none of the other scales would benefit from eliminating items. The alpha for the entire modified RBD scale was .87. No increase in alpha could have resulted from the elimination of any items when looking at the whole RBD scale, and therefore all of the original items were retained in the subsequent analyses.

Relationships Between EPPM Constructs and Preparedness (Hypotheses 1 and 2)

The sample's threat and efficacy scores allowed calculation of a mean RBD score and determined the sample's initial fear (negative RBD score) or danger (positive RBD score) controlling orientation. Results from analyses of overall preparedness scores and

the characteristics related to preparedness combined with the RBD scores to test the first two hypotheses. This section describes the results of these analyses.

Table 4: Factor Loadings and Communalities Based on Principal Axis Factoring with Direct Oblimin Rotation for RBD Scale Items

(N = 140)

Item	Response Efficacy	Self-Efficacy	Severity	Susceptibility	Communality
RE 1	.81	.04	.00	-.01	.68
RE 2	.88	-.08	-.03	.05	.76
RE 3	.58	.06	-.02	-.02	.39
SE 1	.00	.94	-.04	-.03	.89
SE 2	.01	.66	-.04	.12	.55
SE 3	.02	.82	.04	-.04	.65
SEV 1	.09	.00	-.74	.03	.66
SEV 2	-.02	-.03	-.87	.06	.75
SEV 3	-.01	.05	-.95	-.07	.87
SUSC 1	.05	.03	.03	.77	.61
SUSC 2	.05	-.02	.03	.79	.62
SUSC 3	-.11	.02	-.10	.80	.68

Note. Some factor loadings are bolded for emphasis of grouping.

As expected because of the statistical non-normality of the individual items, the overall threat and efficacy scores were also non-normal according to the Shapiro-Wilk test. Threat, efficacy, and preparedness scores were negatively skewed, likely due to a ceiling effect. Upon examination of skewness, kurtosis, the Q-Q plots, and the histograms, using the same criteria as described above (Tabachnick & Fidell, 2007) it did not appear that the degree of non-normality would impact tests that assume normality. The overall RBD scale scores were normally distributed according to the Shapiro-Wilk test.

Threat, efficacy, and RBD scale scores. As shown in Table 1, there were no statistically significant differences in mean threat or efficacy scores based on demographic characteristics. As shown in Table 5, summed threat ($M = 24.80$, $SD = 4.20$) and efficacy scores ($M = 23.09$, $SD = 4.80$) were used to calculate a score aligned with the RBD scale to determine the sample's danger or fear controlling orientation. This calculation used the efficacy minus threat formula described by Witte, et al. (1996) to determine a mean of -1.71 ($SD = 4.46$), indicating that the sample is in fear controlling mode. RBD scale scores were normally distributed as indicated by a Shapiro-Wilk test ($p = .10$). A paired samples t -test revealed a statistically reliable difference between threat and efficacy scores, $t(139) = -4.55$, $p < .001$, $d = .38$.

Additionally, participants who indicated they had previous experience in an emergency demonstrated a statistically higher mean threat score ($M = 25.74$, $SD = 4.36$) than those without previous experience in an emergency ($M = 24.01$, $SD = 4.01$), $t(133) = 2.40$, $p < .01$, $d = .42$, one-tailed. An elevated threat level was also associated with people with family members or close friends that experienced an emergency ($M =$

25.65, $SD = 3.70$) when compared with those whose family and friends did not experience an emergency ($M = 23.47$, $SD = 4.89$), $t(129) = 2.89$, $p < .01$, $d = .51$, one tailed. When participants with personal experience are removed, a t -test failed to find a statistically significant difference in the threat scores of people whose family or close friends experienced a disaster ($M = 25.00$, $SD = 2.87$) and those without the familial or close friends' experience ($M = 23.47$, $SD = 4.48$), $t(67) = 1.52$, $p = .13$. Table 6 summarizes the relationships between threat perception and previous experience.

Table 5: Efficacy, Threat, and Preparedness Scores

Construct	N	M	SD	<i>t</i>	<i>d</i>
Efficacy	140	23.09	4.80	-4.55*	.38
Threat	140	24.80	4.20		
RBD Score	140	-1.71	4.46		
Preparedness Score	138	4.18	1.18	0.44	
BRFSS Preparedness Scores	18,670	4.22	1.10		

Note. * $p < .001$. Threat and efficacy are each the summed score of six indicators, each indicator ranging from 1 to 5 for a possible summed range of 6 to 30. RBD Score is the difference of efficacy minus threat. Both preparedness scores are the sum of affirmative responses to six yes/no questions for a possible range of 0 to 6.

Table 6: Relationships between Experience and Threat Perception

Type of Experience Reported	Threat Perception			<i>t</i>	<i>d</i>
	<i>N</i>	<i>M</i>	<i>SD</i>		
Personal Experience	65	25.74	4.36	2.40*	.42
No Personal Experience	70	24.01	4.01		
Family/Friend Experience	80	25.65	3.70	2.89*	.51
No Family/Friend Experience	51	23.47	4.89		
Family Experience & No Personal Experience	24	25.00	2.87	1.52	
No Family Experience & No Personal Experience	45	23.47	4.48		

Note. * $p < .01$, one-tailed

Preparedness. The sample's mean preparedness score ($M = 4.18$, $SD = 1.18$) was also calculated based on the mean of the sums of the six preparedness indicators and compared with the mean preparedness score of the large BRFSS sample that responded to the same questions. As shown in Table 6, a *t*-test failed to reveal a statistically reliable difference between the mean preparedness scores obtained from this study's sample and the scores from the large BRFSS sample, $t(18,806) = 0.44$, $p = .66$, indicating comparable preparedness levels.

A one-way between groups analysis of variance (ANOVA) explored the impact of age on preparedness. For this analysis, participants were grouped according to their age (less than 30 years old, 30 to 39 years old, 40 to 49 years old, 50 to 59 years old, and 60 years or older). A statistically significant difference in preparedness scores for

the five age groups was present with a relatively large effect size, $F(4, 112) = 3.01$, $p = .02$, $\eta^2 = .10$. Tukey's HSD post hoc comparisons of the five groups indicate that the group with the highest mean preparedness score (60 years or older, $M = 4.70$, 95% CI [3.86, 4.59]) had significantly higher preparedness scores than the 30 to 39 year old group ($M = 3.77$, 95% [2.76, 4.84], $p = .02$). The remainder of the age bracket contrasts failed to yield statistically significant results. A significant difference between preparedness scores of males ($M = 4.56$, $SD = 1.02$) and females ($M = 4.06$, $SD = 1.20$) was identified, $t(128) = 2.15$, $p = .03$, $d = .38$. In a five by two factorial ANOVA, there was no significant interaction effect on preparedness score between age group and sex, $F(4, 106) = 1.06$, $p = .38$).

There was no statistically significant difference in preparedness between the rest of the demographic characteristics that were recorded, including racial group ($F(5) = 1.49$, $p = .20$), educational background ($F(5) = 0.19$, $p = .97$), and income bracket ($F(3) = 1.57$, $p = .20$). Table 1 shows the relationship of preparedness scores with demographic characteristics.

Tests of hypotheses 1 and 2: EPPM constructs and preparedness. Pearson's product-moment correlation coefficients (PCC) assessed the proposed relationship between the EPPM constructs and emergency preparedness. The PCC between threat and emergency preparedness did not reveal a significant correlation, indicating that the null hypothesis cannot be rejected and failing to find support for Hypothesis 1, $r(138) = .09$, $p = .30$. In contrast, the second hypothesis about the existence of a relationship between efficacy and emergency preparedness was supported in that the PCC yielded a modest statistically significant positive correlation to indicate that higher efficacy

scores were associated with higher levels of preparedness $r(138) = .17, p = .04$. Threat and efficacy were also positively correlated, $r(140) = .52, p < .001$.

Message Preference and Previous Experience (Hypotheses 3 and 4)

The third and fourth hypotheses are that previous experience determines which type of message is most persuasive for a target audience. The third hypothesis posits that persons with previous experience are more likely to act upon efficacy messages because their threat level is already high. The fourth hypothesis suggests that persons without previous experience will need some fear-based messaging to initiate their efficacy assessment.

Previous disaster experience. Almost one-half (47%) of participants acknowledged a personal experience in an emergency and over one-half (59%) indicated that a family member or someone close to them has experienced an emergency. The dates of these experiences ranged from as far back as 1969 to as recently as 2012. The most frequently listed disaster year was 2009, accounting for 34% of personal disasters and 27% of the disasters experienced by family members or close friends. Almost half (48%) of respondents indicated that they perceived the disaster they personally experienced to be severe or very severe, compared with 71% of the disasters faced by their family members or close friends. The primary type of personal emergency experienced was recorded as ice storm ($n = 50$) followed by flood ($n = 21$) and tornado ($n = 18$). The same three types of emergencies were also the top three affecting participant families and close friends ($n_s = 54, 21, \text{ and } 33$, respectively).

Manipulation checks. Fact sheets were tested to determine their effectiveness in manipulating the threat and efficacy constructs. Mean efficacy and threat scores from

the four RBD scale questions post exposure were compared with responses to the same questions obtained prior to exposure. A paired samples *t*-test revealed a statistically reliable difference between the mean pre ($M = 7.71, SD = 1.76$) and post ($M = 8.27, SD = 1.66$) scores for efficacy, $t(127) = -4.65, p < .001, d = .33$. A statistically significant difference between the mean pre ($M = 8.23, SD = 1.50$) and post ($M = 8.54, SD = 1.51$) scores for threat was also found, $t(127) = -3.01, p < .005, d = .21$. Although not validated as its own scale, the mean of the posttest RBD scale score ($M = -0.27, SD = 1.52$) made up of one item from each dimension was significantly different from the mean pretest full RBD scale score ($M = -1.98, SD = 4.41$), $t(127) = -5.31, p < .001, d = .43$. The posttest RBD scale score was also different from an abridged version of the pretest RBD scale score ($M = -0.52, SD = 1.65$) that contained only a subset of matching questions, $t(127) = -2.03, p = .045, d = .16$.

When separated by fact sheet preference, manipulation was significant for all cases with the exception of the threat construct for those who preferred the efficacy fact sheet. In this case, the data indicate that there is no significant change in threat perception from pre ($M = 8.36, SD = 1.30$) to post stimuli ($M = 8.45, SD = 1.48$), $t(65) = -.76, p = .45$. Table 7 summarizes the results from these manipulation checks.

Tests of hypotheses 3 and 4: Fact sheet preference. Chi-square tests were used to compare previous disaster experience with fact sheet preferences. Fact sheet preference was not affected by previous personal experience ($\chi^2(1, N = 127) = 1.28, p = .26$), nor the experience of family or close friends, $\chi^2(1, N = 126) = 0.07, p = .80$.

Table 7: Pre and Post Stimuli Scores for Efficacy and Threat

(N = 128)

Test Scores	<i>M ± SD</i>	<i>t</i>	<i>d</i>
Efficacy (pre)	7.71 ± 1.76	-4.65***	.33
Efficacy (post)	8.27 ± 1.66		
Threat (pre)	8.23 ± 1.50	-3.01**	.31
Threat (post)	8.54 ± 1.51		
RBD full (pre)	-1.71 ± 4.46	-5.31**	.43
RBD partial (pre)	-0.52 ± 1.65	-2.03*	.16
RBD (post)	-0.27 ± 1.52		

Based on Fact Sheet Preference

	Efficacy			Threat		
	<i>M ± SD</i>	<i>t</i>	<i>d</i>	<i>M ± SD</i>	<i>t</i>	<i>d</i>
Efficacy (pre)	7.85 ± 1.51	-2.72**	.31	7.56 ± 1.99	-3.92***	.35
Efficacy (post)	8.32 ± 1.51			8.23 ± 1.82		
Threat (pre)	8.36 ± 1.30	-0.76		8.10 ± 1.69	-3.28**	.33
Threat (post)	8.45 ± 1.48			8.63 ± 1.55		

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Even when perceived severity of the previous experience is taken into account (see Table 8), there was still no significant difference in fact sheet preference for either

Table 8: Cross-tabulations of Fact Sheet Preference with Previous Experience and Control Process

Severity	Fact Sheet Preference, n (%)		χ^2
	Threat	Efficacy	
Personal Experience ($N = 127$)			
Severe to Very Severe	13 (10.2)	14 (11.0)	0.04
Somewhat to Moderately Severe	10 (7.9)	10 (7.9)	
No Experience/Not at All Severe	38 (29.9)	42 (33.1)	
Family Experience ($N = 124$)			
Severe to Very Severe	23 (18.5)	29 (23.4)	0.78
Somewhat to Moderately Severe	7 (5.6)	5 (4.0)	
No experience/Not at All Severe	28 (22.6)	32 (25.8)	
Control Process ($N = 128$)			
Fear Control	38 (29.7)	40 (31.3)	0.18
Neutral	7 (5.5)	9 (7.0)	
Danger Control	17 (13.3)	17 (13.3)	

Note. No χ^2 is statistically significant at the $\alpha = .05$ level.

personal experience ($\chi^2(2, N = 127) = 0.04, p = .98$) or family and close friend experience, $\chi^2(2, N = 124) = 0.78, p = .68$. When examining the effect of recent experience on fact sheet preference, no significant difference existed between participants with experience in the past three years (2009 through 2012) and those with

less recent experience, $\chi^2(2, N = 50) = 0.74, p = .39$. Combined, these results suggest a lack of support for Hypotheses 3 and 4.

Further exploration related to these hypotheses showed no significant difference in fact sheet preference based on current fear or danger control response as indicated by the RBD scale score, $\chi^2(2, N = 128) = 0.18, p = .92$. The mean RBD scale scores of people who preferred the threat fact sheet ($M = -2.19, SD = 4.68$) and people who preferred the efficacy fact sheet ($M = -1.77, SD = 4.18$) were not statistically different, $t(126) = -0.54, p = .59$. Additionally, the order in which the participants viewed the fact sheets showed no significant difference on fact sheet preference ($\chi^2(1, N = 128) = 0.76, p = .39$), indicating that counterbalancing the fact sheets was effective.

As part of the questionnaire, after selecting their preferred fact sheet, participants provided a qualitative response to indicate why they preferred one fact sheet to the other. Analysis of the qualitative rationales for fact sheet preference indicates that the majority of reasons (71%) relate to the theoretical constructs (severity, susceptibility, or efficacy). Theoretically based rationales for fact sheet preference did not significantly differ by the existence of previous personal experience ($\chi^2(1, N = 71) = 0.13, p = .72$), not even when severity of personal experience was taken into account, $\chi^2(2, N = 71) = 1.65, p = .44$. The second largest category of rationale related to layout or readability. Eleven respondents preferred the efficacy fact sheet because of layout or other readability reasons, as compared with only four respondents who preferred the threat fact sheet for the same reason. Table 9 provides sample rationales for fact sheet preference.

Table 9: Sample Qualitative Responses Explaining Fact Sheet Preference

Coded as	Sample Text
Threat (34 comments)	“The stats about the # of events that have happened makes the possibility seem more real.” “makes it seem more POSSIBLE” “It is easy to think that disasters happen in other places so a reminder that it could happen to any of us is needed.”
Efficacy (37 comments)	“Makes the preparation process easier and more ‘doable.’” “It takes what you know you should do and puts it into a simple plan of action.” “It actually makes me what to go home and prepare an emergency kit today and the steps make it look like something I can do in a day. I could also turn it into a family project using this sheet as a tool and get my kids involved in creating a preparedness kit.”
Readability/ Layout (15 comments)	“the layout and visuals” “Easy to understand” “Clearer / less complex”

Summary

The results provided in this chapter demonstrate the validity and reliability of the modified version of the RBD scale used to assess participant’s threat and efficacy perceptions related to emergency preparedness. In terms of their preparedness

behaviors, participants in this study are similar to participants in a large national study, although there were few statistical differences in preparedness or threat perceptions between the different demographic characteristics; only age and gender showed statistically significant differences. Data show only limited support for the four hypotheses. The second hypothesis, regarding the correlation between efficacy and preparedness, is the only one with statistical support to reject the null hypothesis. Chapter 5 further interprets the theoretical and practical implications of these results.

Chapter 5: Discussion

According to the extended parallel process model (EPPM), when exposed to a fear-based stimulus, individuals conduct a threat assessment to determine if further action is required. If the threat is of sufficient magnitude to indicate action is needed, the person will then conduct an efficacy assessment to determine if the recommended action is within their control (self-efficacy) and if it will mitigate the actual threat (response efficacy). Positive efficacy assessments result in a danger controlling response, meaning that the person is more likely to take action because they believe it is within their control and will reduce the actual threat. A negative efficacy assessment results in a fear controlling response, making the person unlikely to act on the recommended behavior and more likely to act to reduce their fear through defensive strategies such as avoidance or denial.

According to the EPPM, too high of an initial threat assessment will also cause a fear controlling response because it will be nearly impossible for the efficacy assessment to outweigh the perceived threat. This suggests that people with preexisting high threat assessments need messages focused on efficacy instead of threat. Persons with threat assessments that do not reach the threshold to cause an efficacy assessment need messaging to increase their threat perception before they are able to take advantage of efficacy messages.

The research described herein further explored this model in the context of emergency preparedness, positing that previous experience in an emergency is a

relevant factor in threat perception. As supported in the emergency preparedness literature, people with previous experience in disaster are more likely to take preparedness actions than people without previous experience (Comstock & Mallonee, 2005; Hausman et al., 2007; Knocke & Kolivras, 2007; Norris et al., 1999). Presumably, experience in a disaster has raised the threat level enough for people to take action, which in EPPM terms means that they have surpassed the hypothetical threat threshold and have conducted a positive efficacy assessment supporting their danger controlling response.

Based on the EPPM literature, combining fear-based messages with an already-existing elevated level of threat perception, as seen in people with previous experience in a disaster, should be counterproductive because it would cause a fear controlling response (Witte et al., 1998). In comparison, individuals with preexisting elevated threat levels will retain their danger control mode when exposed only to efficacy-based messaging (Gore & Bracken, 2005), indicating that there is no harm in providing efficacy messages.

Based on this argument, the research conducted here posited that people with previous experience in a disaster would be more likely to act upon efficacy-based messages because their threat perceptions already exceed the threshold. To parallel this, another premise of this research is that people without previous experience need fear-based messages to ensure that threat perception exceeds the threshold so that they will conduct an efficacy assessment to motivate behavior. As described in this section, there was limited support for these hypotheses.

Relationships between EPPM Constructs and Preparedness

The first step in examining the preferred type of message was to investigate the relationship between the EPPM constructs and preparedness. As supported by the emergency preparedness literature, a higher threat level (as indicated by the perceived severity and susceptibility of an emergency) is important in predicting emergency preparedness behaviors. Supporters of the EPPM would posit that efficacy is also important in encouraging emergency preparedness. In order to comply with the recommended emergency preparedness behaviors, individuals would have to feel that the behaviors are within their control and would be effective in reducing the personal impact of an emergency. This argument was the basis of the first two hypotheses that proposed relationships between perceived threat and emergency preparedness (Hypothesis 1) and between perceived efficacy and emergency preparedness (Hypothesis 2).

Contrary to previous emergency preparedness research, the findings from this study did not support the proposed link between perceived threat and preparedness as stated in the first hypothesis. However, people with previous experience in an emergency did demonstrate higher levels of perceived threat when compared to those without previous experience. Participants who reported that family members or close friends experienced an emergency also demonstrated a higher mean threat perception than those who did not have such associations with an emergency. This suggests the possibility that simply witnessing the impact of an emergency on someone close is sufficient to increase personal perceived threat.

However, when analysis was limited to only those with indirect experience (i.e., through family or close friends), data revealed that indirect or vicarious experience by itself was not sufficient to significantly increase risk perceptions. Personal experience appears to be the main factor driving elevated threat perceptions. This finding runs contrary to some of the newer EPPM-related literature that suggests perceived threats to others may influence protective behaviors by increasing individual or personal threat perception (Morrison, 2005; Roberto & Goodall, 2009; Roberto et al., 2010).

In accordance with the EPPM, if perceived threat is too high, people will enter into a fear controlling response that typically results in a failure to act on the recommended behavior. The sample's overall inclination toward a fear controlling response (indicated by the negative mean RBD scale score) may help explain the lack of support for the first hypothesis. If threat perceptions of participants were too high, the person would not be likely to act on emergency preparedness recommendations. To clarify this as a possibility, further research needs to identify the optimal threat level for this scale. This is a major challenge to the EPPM and other models that seek to explain and predict fear-based communications. How much threat is enough but not too much to supersede any amount of efficacy? Is the ideal level of threat dependent upon the context?

The second hypothesis predicted a relationship between efficacy and emergency preparedness and was supported by the data. This result indicates that efficacy plays an important role in encouraging action on emergency preparedness behaviors. While correlation cannot prove causality, these results do suggest that participants who felt that preparedness was within their control and that it would mitigate the adverse effects of the emergency were more likely to perform emergency preparedness behaviors.

Proponents of the EPPM would expect this result because it indicates that participants took action based upon a positive efficacy assessment.

Message Preference Based Upon Previous Experience

The third and fourth hypotheses were that previous experience determines which type of message is most persuasive for a target audience. Persons with previous emergency experience will prefer efficacy-based messages because their threat level is already high (Hypothesis 3). Similarly, persons without previous experience will need some level of fear in messaging to surpass the threat threshold and initiate efficacy assessment (Hypothesis 4).

Testing these hypotheses was dependent upon having enough participants with prior disaster experience. In this sample, nearly one-half (47%) reported having personally experienced a disaster with many of those (48%) estimating that it was severe or very severe. However, the results showed that individuals with prior disaster experience did not prefer the efficacy-based fact sheet compared to the threat-based sheet. In addition, the existence or severity of previous experience did not appear to matter when the participants selected their preferred fact sheets, indicating a lack of support for both hypotheses. More than one-half (59%) of participants indicated that a family member or close friend experienced a disaster, 71% of which were considered severe or very severe. Still, there were no differences in the preference for fact sheets based upon experience by family members or close friends.

As expected, those who preferred the efficacy-based fact sheet did display negative RBD scores, but their RBD scores were not different from those who preferred the threat-based fact sheet (who also had negative scores). According to the EPPM, people

in a fear controlling mode have already demonstrated high levels of perceived threat, so fear-based messages should not be appropriate. In such instances, efficacy messages are the recommended approach to influencing behavior. In contrast, threat or fear-based messages should be more appropriate for those with low threat perceptions.

The rationale behind developing the RBD scale was to identify the fear or danger controlling status of target audiences so that health educators and communicators can appropriately customize messages. In accordance with the EPPM, participants in the present study should have been more inclined to select efficacy or threat-based fact sheets as most effective based on their respective fear or danger controlling orientation. However, the present results indicate that the prescribed messages may not be effective, or at least that they are not preferred, for encouraging emergency preparedness. With the overall fear-controlling tendency of the sample, supporters of the EPPM would have expected to see an equivalent leaning toward the efficacy-based fact sheets.

There are at least two possible explanations for these discrepant results. The first explanation involves the fact sheets themselves and whether they effectively manipulated the threat and efficacy constructs. If participants did not interpret the fact sheets as strongly encouraging either threat or efficacy, then they would be unlikely to respond in the expected manner. By comparing the RBD scale questions asked prior to fact sheet exposure with the subset of questions asked post exposure, the fact sheets significantly manipulated both threat and efficacy as intended. Due to the design of the study, it was not possible to determine from the manipulation checks which fact sheet

influenced which construct since participants viewed both fact sheets prior to completing the posttest.

As shown in Table 10, the qualitative responses for why participants preferred one fact sheet to the other show that the participants perceived the fact sheets as intended and that the fact sheets manipulated the appropriate constructs. These responses overwhelmingly cited reasons related to the intended constructs, indicating that the participants noticed the difference in the types of messaging between fact sheets. In addition, the experts involved in pretesting the messages used in this study were satisfied with the levels of threat and efficacy presented on each of the fact sheets.

On the other side of this argument, the manipulation checks showed that there were significant changes in threat and efficacy perceptions based on the fact sheets. Although not validated for use as a sub-scale, the abridged posttest RBD scores were significantly different from the pretest scores. In spite of these differences, the posttest scores were still mildly negative, indicating that the participants maintained their overall fear controlling orientation, but they were significantly less negative ($p < .001$ when compared to the full RBD scale and $p = .045$ when the abridged questions were matched) than the pretest scores. Since perceptions of both efficacy and threat changed due to exposure to both fact sheets, participants may not have selected the same fact sheet as if they had maintained their initial fear or danger controlling orientation. The overall change in the balance between threat and efficacy perceptions may have contributed to the lack of support for the third and fourth hypotheses because all participants reviewed both fact sheets.

The second possible explanation for failing to support the hypotheses involves the order of the threat and efficacy assessments. The EPPM proposes that the threat assessment occurs first and is the reason for the efficacy assessment. If the perceived threat does not meet the threshold, there should be no need to conduct an efficacy assessment and efficacy messaging becomes irrelevant. It is possible for a person to have a positive RBD scale score (indicative of the danger control mode) because of a very low or non-existent threat perception. If the efficacy level were marginally higher than the threat level, a person would appear to be in a danger controlling response even if their efficacy level is relatively low. Such a circumstance would not necessarily lead to heightened precautionary behavior, something associated with danger control, because the person's threat assessment may not meet the threshold. Threat-based messaging as prescribed by the EPPM may produce too much fear and engender a fear-controlling mode. Efficacy-only messaging would not seem relevant since the threat is not high enough to cause the efficacy assessment.

A problem with virtually all fear-based theories is that the thresholds for fear and danger control responses lack definition. According to the EPPM, a negative RBD scale score indicates a fear controlling response (threat is greater than efficacy) and a positive score indicates a danger controlling response (efficacy is greater than threat). This model assumes an absolute line of demarcation between the two orientations that occurs at a score of zero. In this study, multiple participants were neutral with a score of zero based on their pretest results and the posttest demonstrates an overall movement of the sample mean toward a zero score. The model does not provide suggestions for messaging to this group, although the assumption is that efficacy is preferred overall

since literature shows it does no harm whereas excess threat can lead to inaction or counter-productive actions (Blumberg, 2000; Ruiter et al., 2001; Witte & Allen, 2000; Witte et al., 1996). As discussed previously, efficacy only messaging is not likely to be useful for those below the threat threshold. Indeed, a fear controlling response could still exist even with a large amount of efficacy (Witte & Allen, 2000).

Further, the RBD scale only distinguishes a single threshold (above or below zero), but does not take into account the distance away from that point. It is reasonable to surmise that some people with scores near the threshold may be more easily persuaded one way or the other depending upon the type or source of information to which they are exposed. It follows that people who are at the far side of the danger or fear control response measured by the RBD scale should be more difficult to influence in the opposite direction.

This argument leads to the inclusion of selective exposure theory (Klapper, 1960) as a rationale for the lack of support for the third and fourth hypotheses. According to selective exposure theory, people avoid cognitive dissonance (Festinger, 1957) by selecting arguments that support an already-existing viewpoint. People are almost twice as likely to select a congenial argument over a contrasting one (Hart et al., 2009). When people encounter information that supports their existing stance, this new information validates their views. People may feel ignorant or misled when they encounter contrasting information and therefore defensively avoid the contradictory information. The defensive motivation for selective exposure is stronger based on attitudinal accessibility and if people have recently expressed their own beliefs or behaviors (Hart et al., 2009; Knobloch-Westerwick & Meng, 2009). Participants in this

study may have been primed for selective exposure based on the increase in attitudinal accessibility associated with having them express their beliefs through answering RBD scale questions and regarding their current level of preparedness.

Since participants were able to recognize the threat and efficacy components in the fact sheets, they may have also intentionally selected one over the other based on preexisting views. This may have been particularly true for those participants in a fear-controlling mode because they were already more prone to defensive mechanisms. This is referred to as a “boomerang effect” because messages have an unintended and sometimes opposite effect (Byrne & Hart, 2009), the possibility of which has long been a criticism of fear-based messages and the rationale for the inclusion of efficacy as a construct in communication models (Blumberg, 2000; Ruiter et al., 2001; Witte & Allen, 2000; Witte et al., 1996).

The EPPM provides a useful framework for estimating the perceptions of threat associated with emergencies. As shown through this research, there seem to be prevailing perceptions of threat associated with emergencies, but this threat did not automatically result in greater emergency preparedness. Since the primary purpose of fear-based messages is to increase threat perception, the observed threat level reduces the need for such fear-based messaging. Considering that there was no correlation between threat perception and preparedness, increasing threat perception appears unlikely to be useful in encouraging preparedness.

It further seems likely that efficacy-based messaging may be useful for encouraging emergency preparedness. People who expressed higher levels of efficacy were also more likely to be prepared. Based on the failure to support the third and fourth

hypotheses, it appears that there is no rationale for audience segmentation based upon previous disaster experience or preexisting threat perceptions. Given that efficacy messages have not been shown to be counter-productive in encouraging the adoption of recommended actions, an argument can be made for focusing on efficacy-based message in the area of emergency preparedness. The present state of research and theory continues to show that threat-based communications may not be necessary in many cases and other cases may lead to unpredictable results.

Limitations

This study shares the inherent limitations of other studies employing cross-sectional designs and self-report data. The obtained findings only represent participant beliefs about which fact sheet would change their behavior; actual behavior outcomes were not examined. The findings would be stronger if participants responded to questions about their current preparedness behaviors at baseline and then again several months later to allow for comparison of results. Assuming no contamination or other intervention (or including a control condition), the influence of the fact sheets on actual emergency preparedness would be measurable and provide a better assessment for the relative effectiveness of the two constructs. Conducting the survey in the present manner enabled a larger sample size and was appropriate given the exploratory purpose of this study.

A second limitation was that it was not possible to identify which fact sheet manipulated which construct to ensure that the participants were getting the intended effects of the stimuli. This issue emerged when exploring the lack of support for the third and fourth hypotheses. The analysis presented here minimized this limitation by using

qualitative data to provide a method of inferring this information. The study design caused this limitation because participants reviewed both fact sheets and then identified the version that was most likely to encourage them to prepare for an emergency. Participants did not independently analyze each fact sheet on how well it manipulated the constructs. Since the balance between efficacy and threat changed after exposure to the fact sheets, this design hindered the ability to determine which fact sheet truly had more impact or if it was because of the combination of both fact sheets.

One suggestion to address this limitation in future studies is to provide a set of manipulation check questions after exposure to each fact sheet. This adjustment would increase the length of participant engagement and likely seem repetitive, possibly decreasing reliability. Alternatively, a future iteration of this research might provide randomized groups of participants with only one of the fact sheets and then assess the participants' threat and efficacy perceptions afterward to determine that the stimulus manipulated the appropriate construct. A problem with this revised design is that a direct comparison of fact sheets would not be possible. Instead, researchers would likely need to implement this design change in combination with a pre, post examination of a true behavioral outcome as previously described.

As with many studies, it is also very difficult to determine if the sample is truly representative of the population. Given the homogeneity of the mostly well-educated, white sample, it seems likely that certain groups are under-represented. However, the comparability of the preparedness score to a large, representative sample may mitigate the lack demographic equality. The similarity shown in this comparison indicates that the sample may be adequately representative on the issues under investigation.

Considering that the intent of this study was to begin building the framework for a model of preparedness communication, the limitations discussed here are not likely to have swayed the results and conclusions. Readers of this study are encouraged to see it as a baseline for further exploration in this field; the results and conclusions are still viable contributors to this emerging framework and should spur future research.

Conclusions

Based on the results and discussion, the following conclusions were drawn:

1. Emergency preparedness behaviors are correlated with efficacy perceptions. Increasing efficacy may be a useful tool in increasing preparedness. Future emergency preparedness campaigns should use efficacy messages to promote the simple practices that can improve preparedness.
2. At the population level, an existing fear of emergencies is present as demonstrated by the sample's overall fear controlling response. The precise role and overall utility of threat-based messaging in emergency preparedness messaging remains unclear and requires further research.
3. One-page fact sheets were effective in manipulating threat and efficacy perceptions of the target audience.
4. The purpose of the RBD scale is to assist communicators with providing targeted messages to their population, but the results of this study showed that this is inconclusive for use for developing messages on a population level. Upon determining the overall fear controlling orientation of the audience, communicators using the EPPM would provide efficacy-only messaging, but the target audience saw equal value in threat-based messaging.

5. Although the EPPM provides recommendations for efficacy-based messages for individuals in fear control and threat-based messages for people with low existing threat levels, target audiences will not necessarily select messages based upon these criteria. Research should continue to explore additional personal and population-level characteristics that would influence emergency preparedness behaviors.
6. Communicating about emergency preparedness is complex. Existing conceptual models, including the EPPM, do not provide clear and consistent guidance for message development.

Future Research

Risk communicators would benefit from future research on a framework for enabling action regarding emergency preparedness. At present, it remains unclear if threat-based messages are important in encouraging emergency preparedness behaviors. The debate about the utility of fear-based messages will continue as long as there are contradictory reports in the literature. The EPPM seeks to address this gap by proposing the importance of the efficacy construct, but in this model, the levels of threat and efficacy required are ill defined. Future research related to the EPPM should seek to identify where the proposed thresholds are so that risk communicators can better develop targeted messages using a tool such as the RBD scale. There appears to be a window rather than a threshold; too little threat does not cause the efficacy initiation whereas too much threat risks a fear controlling response.

Along the same lines, researchers should also seek to assist with interpretation of the RBD scale scores. Although there is guidance that a negative score indicates a fear

controlling response and a positive score indicates a danger controlling response, this study shows that the recommendations for efficacy and fear-based messaging, respectively, are not truly what is needed by the message recipient. Although it is possible to get a zero on the RBD scale, there are no recommendations for messaging to people with this score. A zero score indicates equal levels of threat and efficacy and no inclination toward a danger or fear controlling response.

Similarly, future researchers should explore the different degrees that may exist within the danger and fear controlling response. Some people will likely be near the middle of the scale with others at the far ends. The strength and dosages of messages may vary dependent upon where the target audience falls within this continuum.

Finally, efforts should continue to develop a framework for emergency preparedness communication. Given the results herein, there are additional avenues to explore to improve explanations of why some people will prepare and others will not. This study focused on the balances between threat and efficacy and combined it with the existence and severity of previous personal experience. The challenge is now to build upon these findings and consider other possible reasons for the discrepant behaviors.

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Appendices

A: Invitational Email to Participants from KOIN Agency

You are invited to participate in a research study entitled “**Increasing Emergency Preparedness.**” The purpose of this study is to help researchers understand how to better prepare more people for disasters. You will have the opportunity to win an emergency preparedness kit valued at approximately \$20! Participation in this survey is not required to enter the drawing.

As a volunteer in this study, you will complete a questionnaire about your current emergency preparedness and any previous experience you or your loved ones have had in an emergency. You will also review two short educational fact sheets on preparing for an emergency. Participation in this study is strictly voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled.

You may take this survey online at www.surveymonkey.com/s/improveprep. Please also pass this opportunity along to others who might not have received this invitation. You may also request a paper copy of the survey by replying to this email or by contacting me directly. If you have any questions about this project, please contact me (404-368-2625; lfj4@uga.edu).

Thank you for your time and consideration!

Sincerely,

Laura J. Ross, MPH
PhD Candidate
Department of Health Promotion and Behavior
The University of Georgia

B: Online Consent Page

Thank you for participating in the research study entitled “**Increasing Emergency Preparedness**” conducted by Laura J. Ross under the direction of Dr. David DeJoy in the Department of Health Promotion and Behavior at the University of Georgia. The purpose of this study is to explore emergency preparedness behaviors to help researchers understand how to better prepare more people for disasters.

Participation in this study is strictly voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. As a volunteer in this study, you will complete a questionnaire about your current emergency preparedness and any previous experience you or your loved ones have had in an emergency. You will also review two short educational fact sheets on preparing for an emergency. In total, this will take approximately 25-30 minutes.

No risk to you is expected, except any possible stress or anxiety in answering questions about your previous disaster experience. You will have an option on these questions to indicate that you prefer not to answer them. No personally identifiable information will be collected on the questionnaire, but you will have a separate option to provide an email or mailing address to be entered into a drawing to win an emergency preparedness kit valued at approximately \$20. The address information that you provide will not be associated with your questionnaire responses and will not be used for any further contact. Participation in this survey is not required to enter the drawing. As an online survey, there is a limit to the confidentiality that can be guaranteed due to the technology itself. The researcher cannot ensure confidentiality during the actual Internet communication procedure.

The benefits to you may include the education about emergency preparedness and how to best decrease your personal risk should you face an emergency. The researcher hopes to learn more about risk perception as it impacts preparation for future emergencies to help understand how to better prepare more people for disasters.

By completing this questionnaire, you are agreeing to participate in the above described research project. You may print and keep this letter for your records. If you have any questions about this project or your participation in it, please contact me (404-368-2625; lfj4@uga.edu). Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 629 Boyd GSRC, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.

Thank you for your participation!

Sincerely,
Laura J. Ross, MPH
PhD Candidate
Department of Health Promotion and Behavior
The University of Georgia

C: Fact Sheet Validation Reviewer Feedback

1. Please become familiar with the definitions of the key constructs below.

Threat: Threat is a danger or harm. Individuals may or may not be aware of threats in the environment. Threat has two dimensions:

Severity of Threat: An individual's perception of the seriousness or significance of a threat. Is an emergency serious?

Susceptibility to Threat: An individual's perception of the likelihood of their contracting a disease or being adversely affected by the occurrence of a threat. Are you at-risk of an emergency?

Efficacy: Efficacy is one's perception of the effectiveness, feasibility, and ease with which a recommended response impedes or averts a threat. There are two dimensions:

Response Efficacy: The perceived effectiveness of the recommended response in averting the threat. Do you think preparedness mitigates the effects of an emergency?

Self-Efficacy: The individual's perceived ability to perform the recommended response. Do you think you can prepare for an emergency?

2. Please carefully read the fact sheet labeled with the number 1. Please time how long it takes you to read this fact sheet. Record that time here:
3. Please rank this fact sheet on its ability to manipulate the following constructs:

	Low					High				
Overall threat	1	2	3	4	5	6	7	8	9	10
Severity of threat	1	2	3	4	5	6	7	8	9	10
Susceptibility of threat	1	2	3	4	5	6	7	8	9	10
Overall efficacy	1	2	3	4	5	6	7	8	9	10
Response efficacy	1	2	3	4	5	6	7	8	9	10
Self-efficacy	1	2	3	4	5	6	7	8	9	10

4. Please carefully read the fact sheet labeled with the number 2. Please time how long it takes you to read this fact sheet. Record that time here:
5. Please rank this fact sheet on its ability to manipulate the following constructs:

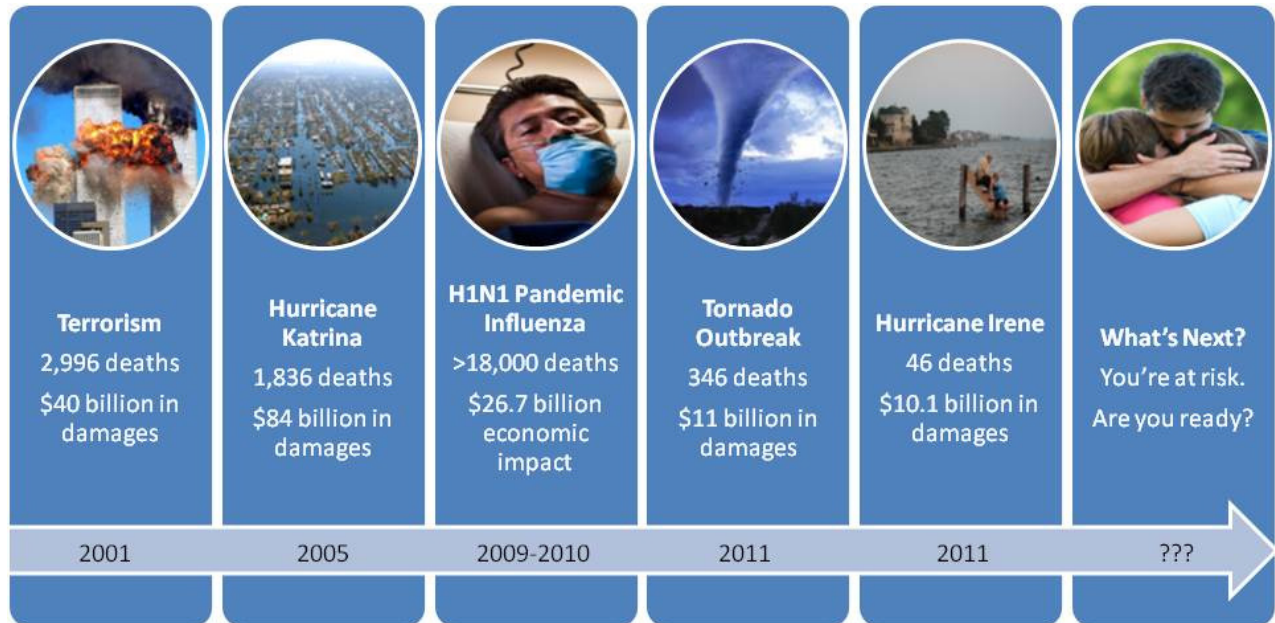
	Low					High				
Overall threat	1	2	3	4	5	6	7	8	9	10
Severity of threat	1	2	3	4	5	6	7	8	9	10
Susceptibility of threat	1	2	3	4	5	6	7	8	9	10
Overall efficacy	1	2	3	4	5	6	7	8	9	10
Response efficacy	1	2	3	4	5	6	7	8	9	10
Self-efficacy	1	2	3	4	5	6	7	8	9	10

D: Fact Sheets

There were 98 major disaster declarations in the U.S. in 2011.

Were you prepared for them?

Disasters strike quickly and can cause serious harm to you and your family. Every year, millions of U.S. families face disasters causing injuries or damage to their homes or communities. As seen in recent hurricanes, tornados, acts of terrorism, and influenza outbreaks, your risk is real. Natural and human-caused disasters can strike suddenly, at any time, and anywhere.



You or your loved ones could be next. Take steps to prepare for the next big one and reduce your risk of death and property damage. Get a kit. Make a plan. Be informed.

GET A KIT

Keep basic supplies on hand.

- ✓ Water- one gallon per person, per day
- ✓ Food- non-perishable, easy-to-prepare items
- ✓ Flashlight
- ✓ Battery-powered or hand-crank radio
- ✓ First aid kit
- ✓ Medications and medical items
- ✓ Copies of personal documents
- ✓ Mobile phone with charger
- ✓ Family and emergency contact information
- ✓ Extra cash
- ✓ Emergency blanket
- ✓ Map(s) of the area
- ✓ Baby supplies
- ✓ Pet supplies

MAKE A PLAN

- ✓ Plan what to do in case you are separated during an emergency.
- ✓ Plan what to do if you must evacuate.
- ✓ Plan ahead for your pets. Keep a phone list of pet-friendly hotels and animal shelters along your route.

BE INFORMED

- ✓ Learn what disasters or emergencies may occur in your area.
- ✓ Identify how local authorities will notify you during a disaster and how you will get information.
- ✓ Know what actions to take to protect yourself during disasters that may occur in areas where you live or travel to.

Emergency Preparedness in Three Simple Steps!

Get a kit. Make a plan. Be informed.

Natural and human-caused disasters can strike suddenly, at any time, and anywhere. You may be at risk for hurricanes, tornados, acts of terrorism, or influenza outbreaks. It is easy to prepare for possible disasters and other emergencies. Protect yourself and your family with 3 simple steps.



GET A KIT

A 'Family Emergency Plan' form with fields for personal information and special needs. The form includes sections for Name, Address 1, Address 2, Home Phone, Cell Phone, DOB, State, Zip, E-mail, and Other E-mail. It also has a section for 'Special Needs, Medical Conditions, Allergies, Important Information' and a 'Ready' checkmark.

MAKE A PLAN



BE INFORMED

Keep basic supplies on hand.

Keep supplies in an easy-to-carry kit that you can take with you if you must leave.

- ✓ Water- one gallon per person, per day
- ✓ Food- non-perishable, easy-to-prepare items
- ✓ Flashlight
- ✓ Battery-powered or hand-crank radio
- ✓ First aid kit
- ✓ Medications and medical items
- ✓ Copies of personal documents
- ✓ Mobile phone with charger
- ✓ Family and emergency contact information
- ✓ Extra cash
- ✓ Emergency blanket
- ✓ Map(s) of the area
- ✓ Baby supplies
- ✓ Pet supplies

If you don't have all of these items now, start getting them one at a time. Try getting one extra item when you're at the store or one each pay period.

Plan what to do in case you are separated during an emergency.

- ✓ Choose two places to meet:
 - Right outside your home in case of a sudden emergency, such as a fire
 - Outside your neighborhood in case you cannot return home
- ✓ Choose an out-of-area emergency contact person. It may be easier to text or call long distance if local phone lines are overloaded or out of service.

Plan what to do if you have to evacuate.

- ✓ Decide where you would go and what route you would take to get there.
- ✓ Practice evacuating twice a year. Take your planned evacuate route and plot alternate routes on your map in case roads are not passable.
- ✓ Plan ahead for your pets. Keep a phone list of pet-friendly hotels and animal shelters along your route.

Learn what disasters or emergencies may occur in your area.

- These may include a home fire or medical emergency, or they may affect your entire community, like a tornado or flood.
- ✓ Identify how local authorities will notify you during a disaster and how you will get information. This may be your local radio, TV, or weather radio stations.
 - ✓ Know what actions to take during disasters that may occur in areas where you live or travel to.
 - ✓ Make sure that at least one member of your household is trained in first aid and CPR and knows how to use an automated external defibrillator (AED). This training is useful in many emergency situations.
 - ✓ Share what you have learned with your family, household, and neighbors.

E: Survey

Section A: Risk Perception and Efficacy

The first series of questions asks about how vulnerable you feel to a large-scale disaster or emergency. By large-scale disaster or emergency, we mean any event that leaves you isolated in your home or displaces you from your home for at least 3 days. This might include natural disasters such as hurricanes, tornados, floods, ice storms, disease outbreaks, or man-made disasters such as explosions, terrorist events, or blackouts.

		Strongly Disagree			Strongly Agree	
1.	Emergency preparedness is effective in preventing the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
2.	Emergency preparedness works to prevent the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
3.	If I prepare for an emergency, I am less likely to experience the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
4.	I am able to prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
5.	I have the skills and time to prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
6.	I can easily prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
7.	I believe that the effects of a large-scale disaster or emergency are severe.	1	2	3	4	5
8.	I believe that a large-scale disaster or emergency has serious negative consequences.	1	2	3	4	5
9.	I believe that a large-scale disaster or emergency is extremely harmful.	1	2	3	4	5
10.	It is likely that I will be affected by a large-scale disaster or emergency.	1	2	3	4	5
11.	I am at risk for experiencing a large-scale disaster or emergency.	1	2	3	4	5
12.	It is possible that I will experience a large-scale disaster or emergency.	1	2	3	4	5

Section B: Current Preparedness

The next series of questions asks about how prepared you are for a large-scale disaster or emergency. Please select the best answer from the choices below.

13. How well prepared do you feel your household is to handle a large-scale disaster or emergency? Would you say...
 - a. Well prepared
 - b. Somewhat prepared
 - c. Not prepared at all
 - d. I prefer not to answer

14. Does your household have a 3-day supply of water for everyone who lives there? A 3-day supply of water is 1 gallon of water per person per day.
 - a. Yes
 - b. No
 - c. Don't know / Not sure
 - d. I prefer not to answer

15. Does your household have a 3-day supply of nonperishable food for everyone who lives there? By nonperishable we mean food that does not require refrigeration or cooking.
 - a. Yes
 - b. No
 - c. Don't know / Not sure
 - d. I prefer not to answer

16. Does your household have a 3-day supply of prescription medication for each person who takes prescribed medicines?
 - a. Yes
 - b. No
 - c. No one in household requires prescribed medicine
 - d. Don't know / Not sure
 - e. I prefer not to answer

17. Does your household have a working battery operated radio and working batteries for your use if the electricity is out?
 - a. Yes
 - b. No
 - c. Don't know / Not sure
 - d. I prefer not to answer

18. Does your household have a working flashlight and working batteries for your use if the electricity is out?
 - a. Yes

- b. No
- c. Don't know / Not sure
- d. I prefer not to answer

19. Does your household have a written disaster evacuation plan for how you will leave your home in case of a large-scale disaster or emergency that requires evacuation?
- a. Yes
 - b. No
 - c. Don't know / Not sure
 - d. I prefer not to answer

Section C: Previous Disaster Experience

The next series of questions asks about your previous disaster experience and the experiences of those closest to you. Please select the best answer from the choices below.

By large-scale disaster or emergency, we mean any event that leaves you isolated in your home or displaces you from your home for at least 3 days. This might include natural disasters, such as hurricanes, tornados, floods, ice storms, disease outbreaks, or man-made disasters such as explosions, terrorist events, or blackouts.

20. I have previously experienced a large-scale disaster or emergency.
- a. Yes
 - b. No (skip to question 24)
 - c. Don't know / Not sure (skip to question 24)
 - d. I prefer not to answer (skip to question 24)

If you answered "Yes" to this question, please answer question 21. Otherwise, please skip to question 24.

21. What type of large-scale disaster or emergency did you experience? Please select all that apply.
- a. Hurricane
 - b. Tornado
 - c. Flood
 - d. Ice storm
 - e. Disease outbreak
 - f. Man-made disaster (explosions, terrorist event, blackout)
 - g. I prefer not to answer
 - h. Other (please specify)

22. How severe was your previous experience in the large-scale disaster or emergency?

- a. Very severe
- b. Severe
- c. Moderately severe
- d. Somewhat severe
- e. Not at all severe
- f. I prefer not to answer

23. In what year was the most recent large-scale disaster or emergency that you experienced? _____

24. Members of my family or close friends have previously experienced a large-scale disaster or emergency.

- a. Yes
- b. No (skip to question 28)
- c. Don't know / Not sure (skip to question 28)
- d. I prefer not to answer (skip to question 28)

If you answered "Yes" to this question, please answer questions 25-27. Otherwise, please skip to Section 4.

25. What type of large-scale disaster or emergency did you experience? Please select all that apply.

- a. Hurricane
- b. Tornado
- c. Flood
- d. Ice storm
- e. Disease outbreak
- f. Man-made disaster (explosions, terrorist event, blackout)
- g. I prefer not to answer
- h. Other (please specify)

26. How severe was the large-scale disaster or emergency experienced by your family member or close friend?

- a. Very severe
- b. Severe
- c. Moderately severe
- d. Somewhat severe
- e. Not at all severe
- f. I prefer not to answer

27. In what year was the most recent large-scale disaster or emergency that your family member or close friend experienced? _____

Section D: Demographics

The next series of questions asks about you for statistical purposes. This information will not be used to identify you. Please fill in the blank with your answer or select the best answer from the choices below.

28. In what year were you born? _____
29. What is your sex?
- Male
 - Female
 - I prefer not to answer
30. Are you of Hispanic, Latino, or Spanish origin?
- No
 - Yes
 - I prefer not to answer
31. What is your race?
- White
 - Black, African American, or Negro
 - American Indian or Alaska Native
 - Asian Indian
 - Asian (Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian)
 - Pacific Islander (Native Hawaiian, Guamanian or Chamorro, Samoan, Other Pacific Islander)
 - Other
 - I prefer not to answer
32. What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.
- No schooling completed
 - Through 8th grade
 - 9th- 12th grade (no diploma)
 - High school graduate
 - Some college credit, no degree
 - Associate degree (for example: AA, AS)
 - Bachelor's degree (for example: BS, AB, BS)
 - Graduate degree or higher (for example: MA, MS, MD, DDS, JD, PhD)
 - I prefer not to answer
33. What is your approximate total household income?
- Less than \$30,000
 - \$30,000 to \$45,999
 - \$46,000 or more
 - I prefer not to answer

STOP.

Please read the fact sheets on the next two pages. Once you have read the fact sheets, please answer the questions in section E. While reading, please pay attention to the title of the fact sheet that is most likely to increase your emergency preparedness behaviors.

Section E: Fact Sheet

The final series of questions asks about your impressions about the two fact sheets you just read.

34. Did either fact sheet change your opinion about emergency preparedness?
 - a. Yes, the fact sheet titled "There were 98 major disaster declarations in the U.S. in 2011."
 - b. Yes, the fact sheet titled "Emergency Preparedness in Three Simple Steps!"
 - c. Yes, both fact sheets
 - d. No, neither fact sheet
 - e. Nothing could change my opinion about emergency preparedness

35. Which fact sheet did you think was more likely to encourage you to prepare for an emergency?
 - a. The fact sheet titled "There were 98 major disaster declarations in the U.S. in 2011."
 - b. The fact sheet titled "Emergency Preparedness in Three Simple Steps!"

36. Please briefly explain why you prefer the fact sheet you chose in the previous question.

Please indicate how strongly you agree or disagree with each of the following statements.

		Strongly Disagree			Strongly Agree	
37.	Emergency preparedness is effective in preventing the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
38.	I am able to prepare for an emergency to prevent the damaging effects of a large-scale disaster or emergency.	1	2	3	4	5
39.	I believe that a large-scale disaster or emergency is extremely harmful.	1	2	3	4	5
40.	It is likely that I will be affected by a large-scale disaster or emergency.	1	2	3	4	5

Thank you for your participation in this survey!

More information about how to get assistance after a disaster and about preparing for an emergency is available through the American Red Cross at <http://www.redcross.org/> or 1 800 RED CROSS (1 800 733 2767).

If you wish to be entered into a drawing for a Red Cross Deluxe Personal Safety Emergency Pack with Bag valued at approximately \$20, please continue to the next page to enter basic contact information.

Your address information will only be used if you are selected as a winner. Address information will be discarded once the researcher has notified the winners. It will not be used for any further contact with you.