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I am submitting herewith a dissertation written by Sejin Park entitled "Development and Validation of a Crisis Self-Efficacy Scale." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Communication and Information.

Elizabeth A. Foster, Major Professor

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(Original signatures are on file with official student records.)

Development and Validation of a Crisis Self-Efficacy Scale

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Sejin Park
May 2016

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Abstract

This study develops a valid and reliable self-efficacy scale specific to the crisis context. The rationale for developing the scale is first to provide a tool for crisis communication researchers to better understand behavioral aspects of crisis. Second, as people have different levels of crisis self-efficacy, it is difficult for crisis managers to develop audience-specific messages and create crisis preparedness programs. A crisis self-efficacy scale enables crisis managers to develop more effective message strategies to protect publics and minimize crisis damage. The scale also provides practitioners a useful longitudinal index of progress in crisis preparedness programs to track changes in public efficacy during the intervention.

The results of the scale development identify four constructs of crisis self-efficacy: action efficacy, preventive efficacy, achievement efficacy, and uncertainty management efficacy. Each construct measures a unique aspect of crisis self-efficacy. Specifically, the action efficacy reflects one's beliefs about his/her ability to take protective actions in crisis, while preventive efficacy is defined as one's beliefs about his/her level of preparedness for crisis. Next, achievement efficacy is defined as one's beliefs about his/her goal accomplishment in crisis, and uncertainty management efficacy is one's beliefs about his/her ability to deal with uncertainties in crisis.

People's demographic information is tested to examine indicators of crisis self-efficacy. Three predictors are identified: gender, household income, and state residency. First, the results reveal that there is a gender difference in crisis self-efficacy; males have higher crisis self-efficacy levels than females. Next, there is a trend in the relationship between household income and crisis self-efficacy; as income goes up, the level of crisis self-efficacy also rises. Finally, state residency predicts individual's crisis self-efficacy when the number of disasters in

participants' states is considered. Theoretical and practical implications are discussed, and directions for future research are identified.

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CHAPTER I

INTRODUCTION

Crisis communication is one of the most rigorously studied areas in communication research (Coombs, 2009); in fact, a large percentage of articles published in communication journals focus on crisis communication (Botan & Taylor, 2004). Although this research has significantly contributed to the understanding of crisis communication, a review of the extant body of crisis literature reveals three major shortcomings therein. First, research on pre-crisis communication is scant compared to the research on post-crisis communication. As scholars argue, current crisis communication studies somewhat overlook the importance of the pre-crisis phase (Fronz, 2012). Considering that the relationship between an organization and its public prior to a crisis critically affects the public's perception of the crisis (Coombs, 2007) as well as the role of preparedness in mitigating damage, increased research efforts should expand the pre-crisis communication literature, and two recent studies on trends in crisis communication support this contention (Avery, Lariscy, Kim, & Hocke, 2010; Ha & Boynton, 2014).

In a study of crisis communication articles published in the past 20 years in communication journals, Ha and Boynton (2014) found that topics on post-crisis such as effects of crisis management, strategic use of media, and evaluation of crisis events are dominant (more than 65%) in the crisis literature. Also, the authors found that among 99 studies using an explicit theoretical framework, more than half of them (61%) utilized post-crisis communication theories such as image restoration, framing, and situational crisis communication theory (SCCT) (Ha & Boynton, 2014). Very similar results were found in a study of crisis communication research in public relations journals. According to Avery et al. (2010), the majority of crisis communication research uses either image restoration theory or SCCT (81%), and 85% of articles in crisis

communication research focus on the post- and/or during crisis stages, while only 3% of the articles concern the pre-crisis stage. Crisis management should not be regarded as reaction to a crisis but, instead, should be considered as a proactive opportunity to prevent and prepare for potential crises (Jaques, 2007). Similarly, researchers have argued that proactive crisis management will minimize possible damages (e.g., Cloudman & Hallahan, 2006; Pauchant & Mitroff, 1992). Therefore, future research in crisis communication needs enhanced focus on the pre-crisis stage.

Second, crisis communication research has been mainly studied from the organization's (i.e., message sender's) perspective (e.g., how effective crisis response messages will be). To illustrate, the two major crisis communication theories (image restoration theory and SCCT) suggest crisis response strategies but do not identify strategies to illuminate cognitive mechanisms underlying public perception and processing of the crisis situation. As Lee (2004) argues, in order to propose more effective crisis communication strategies, more studies should be conducted from an audience perspective instead of the dominant focus on the message sender's perspective.

Also, researchers argue that factors from the crisis communication audience perspective, such as involvement, have become a critical factor in crisis communication research (Choi & Lin, 2009). Audience-oriented crisis communication research is valuable for organizations as it provides insight for understanding the public's reaction to an organizational crisis (Lee, 2004). Although there has been research on the reception of crisis communication such as the effects of emotion in crisis (e.g., Coombs & Holladay, 2004; Kim & Cameron, 2011) and public/stakeholder reactions to crisis messages (e.g., Coombs & Holladay, 2014; Jin, Liu, & Austin, 2014; Lee, 2005; McDonald, Sparks, & Glendon, 2010), more rigorous research is

necessary to develop a richer understanding of audience-centered perspectives of crisis communication.

Lastly, the majority of previous crisis communication studies adopted measures from other research fields such as psychology and sociology, and limited efforts have been made for developing new crisis measurements and constructs. For example, most of studies on image restoration theory and SCCT use pre-existing measures rather than creating scales tailored to the study context. Schwarz (2008) adopted the measurement of attribution to examine the effects of crisis response strategies, and Jin and Cameron (2007) utilized scales on cognition, affect, and conation, which were developed in previous studies in other contexts. More recently, Frisby, Veil, and Sellnow (2014) used existing risk knowledge and illness efficacy scales, and Barnett et al. (2014b) measured attitudes/beliefs using measures developed in prior studies.

Despite the acceptable validity and reliability of adopted measurements, no measurement can be perfectly valid and reliable. Since measuring what a researcher intends to measure is critical, making efforts to find the most optimized measurement is important. For these reasons, developing scales that are tailored and appropriate to the crisis context is a worthwhile endeavor. Although previously validated scales certainly have a useful place in crisis research, assessing audience constructs specific to how they function within the crisis context may be especially valuable, as they likely function differently in routine and crisis contexts.

Purpose and Importance of Study

The current study is designed to address these shortcomings in crisis communication research. As discussed, more efforts are needed to better understand the pre-crisis stage, to build receiver-based research, and to develop measures specific to the crisis context. Among possible topics on pre-crisis and the message receiver's perspective, scholars suggest crisis preparedness

as an area especially in need of more research (e.g., Avery et al., 2010). Likewise, Cloudman and Hallahan (2006) propose that efforts for developing measures of crisis preparedness should be made in the field of public relations.

According to Coombs (2009), “very little research exists that explores ways to improve the development and delivery of instructing information” (p.16). To improve the effectiveness of directives issued and people’s willingness to follow those instructions in crisis, understanding the cognitive processes underlying message processing of crisis preparedness information is essential (Avery & Park, forthcoming).

Self-efficacy is an important predictor of a wide range of behaviors (Bandura, 1977a). Previous research across many contexts reveals that self-efficacy exerts powerful influence on behavioral intentions, which may be important for enhancing audience compliance with directives before and during crisis (Avery & Park, forthcoming). As Barrett (1972) argues, the greatest challenge in survey research is assuring the accuracy of the measurement of the constructs under examination, as measurement issues lead to difficulties in interpreting results (Meyer, Allen & Gellatly, 1990). Since there’s no scale to assess self-efficacy during a crisis situation specifically, a self-report scale gauging “crisis self-efficacy” needs to be developed for the accurate measurement of the construct, which is especially critical given self-efficacy’s strong effect on behavioral intentions.

The current study has much applied and theoretical value. First, this research will yield a tool to use to evaluate and boost people’s crisis self-efficacy levels before a crisis occurs, which significantly affects their behaviors and motivation to comply with directives during crisis. For example, if crisis managers can identify audiences with low levels of self-efficacy (their intent to follow directions in crisis would in turn be low) and bolster their self-efficacy levels prior to a

crisis (or if people can evaluate their own crisis self-efficacy and make efforts toward better preparedness), public safety may improve. Also, as Avery and Park (forthcoming) argue, if a person has a high level of crisis self-efficacy, s/he is more likely to follow crisis protocol issued from officials. Therefore, a crisis efficacy scale to assess public levels thereof and establish a benchmark can benefit both crisis managers and the public.

Second, this research expands our understanding of crisis management by adding crisis self-efficacy as a predictor of individual behavior in crisis situations. Although pre-crisis factors such as reputation and crisis history in SCCT have been studied (Coombs, 2007), these variables are typically evaluated from the message sender's (organizational) perspective; therefore, they are not useful in understanding message receivers' behaviors in crisis situations. This study develops a measurement for predicting crisis behaviors before and during a crisis from the audience perspective by applying Bandura's self-efficacy concept to the crisis context.

Third, the development and validation of a crisis self-efficacy measure is an important initial step in theory development on how self-efficacy levels of the audience affect crisis management. A self-efficacy scale should be domain-specific, as the constructs of self-efficacy differ from context to context (Bandura, 2006). Further, as Cloudman and Hallahan (2006) propose, there have been few efforts to develop context-specific measurements in crisis research, and theoretical advancement has been limited by the lack of valid measurements. Similarly, Bruning and Ledingham (1999) note that developing measurements tailored to the research context not only enriches the literature and theory development but also enables scholars to better predict human perceptions and behaviors. For this reason, this research develops a valid and reliable measure of self-efficacy in the crisis context.

Next, the crisis self-efficacy scale has potential to become a central and valuable variable in crisis communication research. For instance, crisis self-efficacy can be assessed over time in as an evaluation measure of a crisis preparedness campaign, and thus the scale can be utilized to evaluate within-person or between-person longitudinal changes in crisis self-efficacy. Also, it can also be used as a mediating and/or moderating variable of when examining people's behavioral intentions to follow directives issued during crisis.

Lastly, there have been few efforts to measure self-efficacy in crisis. For example, studies on the extended parallel process (EPPM) model suggest that levels of self-efficacy affect the acceptance of fear messages (e.g., Barnett et al., 2014a; Hong, 2011; So, 2013), while research on risk management argues that strategic message strategy is effective in crisis prevention campaigns (Veil, Buehner, & Palenchar, 2011). However, these studies borrowed definitions and scales of self-efficacy from other contexts rather than defining a new concept and developing a new tailored scale; therefore, they did not explore what conceptual domain comprise self-efficacy during crisis. To address this problem, this study is designed to identify underlying constructs of crisis self-efficacy.

CHAPTER II

LITERATURE REVIEW

The damage inflicted by a crisis can be substantially decreased depending on the level of audience preparedness (McEntire & Myers, 2004). Thus, developing a crisis-specific self-efficacy scale is vital as it enables researchers and officials to assess people's levels of crisis preparedness. Further, a valid and reliable self-efficacy measurement enables crisis communication researchers to better predict individual behavior in crisis. This chapter reviews studies on self-efficacy, context-specific self-efficacy scales, and the pre-crisis phase as well as sets the boundaries of the scale to be developed (the crisis self-efficacy scale). First, Bandura's (1977a) original articles on self-efficacy, the definitions of self-efficacy, and the relationships between behavior, efficacy, and outcome are reviewed. Then, this chapter explores existing self-efficacy scales in other contexts to justify the development of a self-efficacy scale in the crisis context. Third, for a sound conceptualization and boundary setting for scale development, research on the nature and level of crisis self-efficacy is discussed. Finally, research questions are asked.

Self-Efficacy

According to Bandura (1977a), knowledge and motivation to complete a task are closely related to one's sense of efficacy, which refers to self-assessment of his or her ability to perform a given behavior. That is, self-efficacy affects decisions about what behaviors to undertake; therefore, it is known as a strong predictor of a wide range of behaviors (Bandura, 1990; Compeau & Higgins, 1995; Rimal & Adkins, 2003; Verroen, Gutteling, & DeVries, 2012).

There are slight variations among definitions of self-efficacy in the literature. First, the germinal work of Bandura (1994) defines the concept as "people's beliefs about their capabilities

to produce designated levels of performance that exercise influence over events that affect their lives” (p. 71). Similarly, Peterson and Stunkard (1992) argue that self-efficacy is one’s expectation of and conviction in his or her ability to perform required work, while Wood and Bandura (1989) define the term as “beliefs in one’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands” (p. 408). Based on those definitions, this study conceptualizes crisis self-efficacy as an individual’s beliefs about whether s/he can successfully complete a given task during a crisis situation.

Bandura (1977a) explains self-efficacy based on the difference between efficacy expectations and outcome expectations. For example, he suggests “efficacy expectations are a major determinant of people’s choice of activities, how much effort they will expend, and of how long they will sustain effort in dealing with stressful situations” (p.194), while outcome expectations are people’s beliefs that a specific behavior yields certain outcomes. For example, “I believe that if I wear a seatbelt, I will not be injured in a car accident” is an outcome expectation; it is what you expect to happen if you behave in a certain way (Witte, Meyer, & Martell, 2001). The notable difference between the two expectations is whether they include one’s belief that s/he can successfully behave to produce the desired outcome. It is possible that one’s outcome expectation is high while the efficacy expectation is low; to illustrate, “I believe that following directives in an emergent crisis situation can save my life (outcome expectation), but I don’t think I can because I would be panicked (efficacy expectation).” According to Bandura (1977a) and Witte et al. (2001), when people behave in a certain way only it reflects high efficacy expectations.

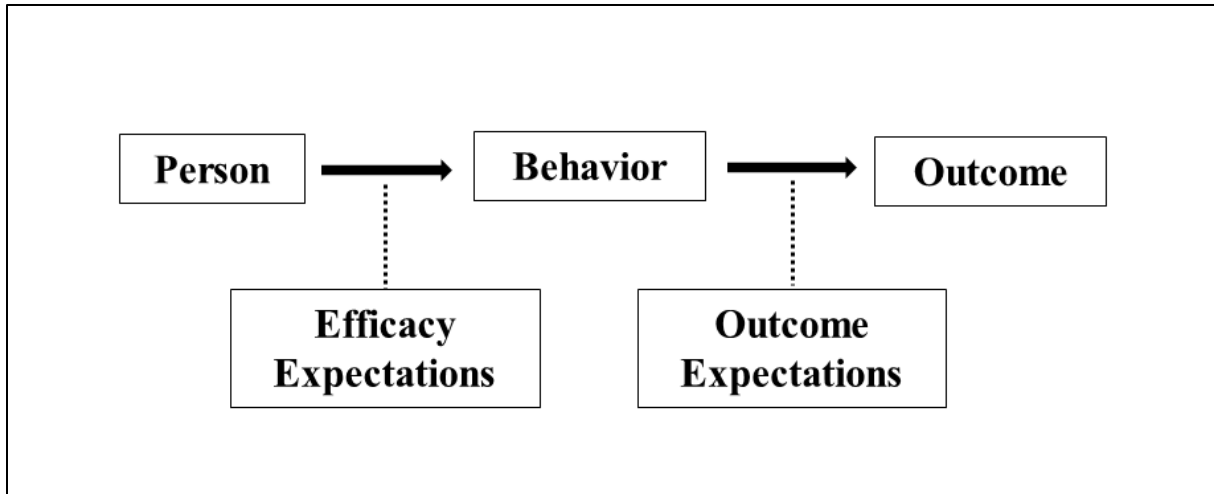


Figure 1. Difference between Efficacy Expectations and Outcome Expectations

Source: Bandura, A. (1977a). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, p.193.

According to social cognitive theory (Bandura, 1977b), efficacy expectations vary on three dimensions: level or magnitude, strength, and generality. The level of efficacy expectation refers to the close relationship between efficacy and the difficulty of a task. For example, one may feel confident in completing an easy task (e.g., lifting a piece of paper) but not confident in performing a difficult task (e.g., moving heavy boxes). The second dimension is generality, which is related to the applicability of one's efficacy to different tasks or situations. For instance, one may feel efficacious across a wide range of behaviors while another believes that his/her efficacy is limited to a specific behavior. Lastly, strength refers to the amount of one's confidence in his or her ability to perform a given task.

Measuring Self-Efficacy

As Bandura (2006) suggests, "There is no all-purpose measure of perceived self-efficacy" (p. 307); therefore, self-efficacy scales "must be tailored to the particular domain of functioning

that is the object of interest” (p.307). For this reason, there have been efforts to measure one’s self-efficacy in various contexts to predict one’s behavior in a specific situation.

Self- efficacy is not just a predictor of behaviors. It includes broader effects, as Bandura (2006) argues:

“Efficacy beliefs influence whether people think erratically or strategically, optimistically or pessimistically. They also influence the courses of action people choose to pursue, the challenges and goals they set for themselves and their commitment to them, how much effort they put forth in given endeavors, the outcomes they expect their efforts to produce, how long they persevere in the face of obstacles, their resilience to adversity, the quality of their emotional life and how much stress and depression they experience in coping with taxing environmental demands, and the life choices they make and the accomplishments they realize”(p.309).

Most of the existing measures of self-efficacy are psychometric scales that require respondents to indicate whether they agree or disagree with a statement. The first self-efficacy scale was created by Sherer et al. (1982). The goal of their study was to “provide a subsequent tool for researchers and therapists” (Sherer et al., 1982, p. 664). In a survey of 376 students, they acknowledge two self-efficacy subscales: a general self-efficacy subscale that includes 17 items (e.g., “When I make plans, I am certain I can make them work.”) and a social self-efficacy subscale with 6 items (e.g., “I do not handle myself well in social gatherings.”). General self-efficacy refers to one’s overall perceived sense of efficacy, which may be used in any behavioral domain, while the social self-efficacy reflects self-efficacy in different social situations (Sherer et al., 1982). At the same time, the authors note that their scale is not developed to measure

specific target behaviors and acknowledge that the scale should be used with caution as it is not context specific (Sherer et al., 1982).

The most widely used general (i.e., non-domain specified) self-efficacy scale is Schwarzer and Jerusalem's (1995) general self-efficacy (GSE) Scale. The German version of this scale was originally developed by Jerusalem and Schwarzer in 1981. The scale included 20 items in the first version and later was reduced to 10 items (Schwarzer, BaBler, Kwiatek, Schroder, & Zhang, 1997). The 10 items are: (1) "I can always manage to solve difficult problems if I try hard enough"; (2) "If someone opposes me, I can find the means and ways to get what I want"; (3) "It is easy for me to stick to my aims and accomplish my goals"; (4) "I am confident that I could deal efficiently with unexpected events"; (5) "Thanks to my resourcefulness, I know how to handle unforeseen situations"; (6) "I can solve most problems if I invest the necessary effort"; (7) "I can remain calm when facing difficulties because I can rely on my coping abilities"; (8) "When I am confronted with a problem, I can usually find several solutions"; (9) "If I am in trouble, I can usually think of a solution"; and (10) "I can usually handle whatever comes my way."

Based on the GSE scale, Chen, Gully, and Eden (2001) developed a modified self-efficacy scale entitled new general self-efficacy (NGSE) Scale. The NGSE is comprised of 8 items, and the authors argue that the reliability and validity of the NGSE scale is higher than the reliability and validity of the GSE (Chen et al., 2001). These 8 items include: (1) "I will be able to achieve most of the goals that I have set for myself"; (2) "When facing difficult tasks, I am certain that I will accomplish them"; (3) "In general, I think that I can obtain outcomes that are important to me"; (4) "I believe I can succeed at most any endeavor to which I set my mind"; (5) "I will be able to successfully overcome many challenges"; (6) "I am confident that I can

perform effectively on many different tasks”; (7) “Compared to other people, I can do most tasks very well”; and (8) “Even when things are tough, I can perform quite well.” The items of GSE and NESE will consist of the initial list of items for the crisis self-efficacy scale.

To apply the GSE and NGSE to other contexts, various modified self-efficacy scales have been developed (see Table 1). For example, Lown (2011) developed the financial self-efficacy scale to measure one’s ability to deal with financial management, and Compeau and Higgins (1995) created a scale named computer self-efficacy to gauge individuals’ beliefs about their abilities to competently use computers. Also, there are a number of modified self-efficacy instruments in the health literature: the osteoporosis self-efficacy scale (Horan, Kim, Gendler, Froman, & Pate, 1998), the medication adherence self-efficacy scale (Ogedegbe, Mancuso, Allegrante, & Charlson, 2003), the health related diet and exercise behaviors self-efficacy scale (Sallis, Pinski, Grossman, Patterson, & Nader, 1988), the arthritis self-efficacy scale (Lorig, Chastain, Ung, Shoor, & Holman, 1989), and the chronic pain self-efficacy scale (Anderson, Dowds, Pelletza, Edwards, & Peeters-Asdouriana, 1995). All of those scales were developed and specifically tailored to measure individual levels of self-efficacy in a particular context for predicting behavior. Several studies have found that self-efficacy predicts future behavior even better than does past behavior (e.g., Bandura, Adams, & Beyer, 1977; Ryckman, Robbins, Thornton, & Cantrell, 1982).

Finally, researchers argue that self-efficacy determines how long people will continue working on a given task, how resilient they will be when they face difficulties, and how much effort they will expend on an activity (Bandura, 1990; Kurbanoglu, Akkoyunlu, & Umay, 2006). A person with high self-efficacy is expected to do his/her best and complete an activity successfully, while individuals with low self-efficacy are likely to give up more easily and fail to

finish challenging activities. For example, Bandura (1997) found that highly efficacious students tend to participate more readily, work harder, and persevere longer when they face difficulties than do those with low self-efficacy. Likewise, Zimmerman (2000) suggests that self-efficacy is highly correlated to students' intrinsic interest in a motoric learning task, and Hackett and Betz (1989) found that self-efficacy is a good indicator of students' choices of majors in college as well as their success in course work. For this reason, self-efficacy measurements are widely used to understand behavior in a wide variety of situations.

The Crisis Self-Efficacy Scale

There are several reasons why developing a crisis-specific self-efficacy scale is important. First, as discussed, a domain-specific self-efficacy scale is desirable (Bandura, 2006). That is, since attributes of self-efficacy vary depending on contextual nuances, it is necessary to have scale items that assess specific behaviors particular to that domain. Similarly, as Eden (2001) and Chen et al. (2001) argue, the power of behavioral predictability for a self-efficacy scale is dependent on the match between the scale and the context. In this regard, a crisis-specific scale to gauge self-efficacy in crisis is essential toward a richer understanding of public response to directives issued before, during, and after crisis.

Nevertheless, no self-efficacy scale has been developed specific to the crisis context, and only scant research explores the role self-efficacy during crisis at all. For example, studies on the EPPM examine individuals' perceived self-efficacy when they are exposed to fear messages (e.g., Hong, 2011; Maloney, Lapinski, & Witte, 2011; McMahan, Witte, K., & Meyer, 1998; So, 2013). In an experiment with 175 college students, Hong (2011) found that perceived severity, response efficacy, and self-efficacy mediate the relationship between exposure to fearful health news and message acceptance. Similarly, Maloney et al. (2011) argue that the

Table 1. Self-Efficacy Scales

Context	Name	Author(s)	Explanation	No. of Items
General	The Self-Efficacy	Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers (1982)	Beliefs in one's ability to perform a variety of tasks	23
General	General Self-Efficacy	Schwarzer & Jerusalem (1995)	Optimistic self-beliefs used to cope with a variety of demands in life	10
General	New General Self-Efficacy	Chen, Gully, & Eden (2001)	One's belief in one's overall competence to effect requisite performances across a wide variety of achievement situations	8
Health	Multicultural Counseling Self-Efficacy	Sheu & Lent (2007)	Self-perceived capability to counsel racially diverse clients	37
Health	Arthritis Self-Efficacy	Lorig, Chastain, Ung, Shoor, & Holman (1989)	Patients' perceived self-efficacy to cope with the consequences of chronic arthritis	20
Health	Medication Adherence Self-Efficacy	Ogedegbe, Mancuso, Allegrante, & Charlson (2003)	Patients' adherence to antihypertensive medications	26
Health	Osteoporosis Self-Efficacy	Horan, Kim, Gendler, Froman, & Pate (1998)	Confidence for behaviors related to physical activity and calcium intake	21
Health	Self-Efficacy for Exercise	Resnick & Jenkins (2000)	Beliefs about personal abilities with regard to carrying out a particular behavior such as dieting or exercise	9
Health	Self-Efficacy for Rehabilitation Outcome	Waldrop, Lightsey, Ethington, Woemmel, & Coke (2001)	Patients' belief to perform behaviors typical in physical rehabilitation for knee and hip surgery	12

Table 1. Self-Efficacy Scales (Continued)

Context	Name	Author(s)	Definition	No. of Items
Health	Smoking Self-Efficacy	Etter, Bergman, Humair, & Perneger (2000)	Confidence of current and former smokers in their ability to abstain from smoking in high-risk situations	12
Health	Chronic Pain Self-Efficacy	Anderson, Dowds, Pelletza, Edwards, & Peeters-Asdouriana (1995)	Chronic pain patients' perceived self-efficacy to cope with the consequences of chronic pain	22
Health	Health related Diet and Exercise Behaviors Self-Efficacy	Sallis, Pinski, Grossman, Patterson, & Nader (1988)	Self-efficacy scales for health-related diet and exercise behaviors in specific situations	73
Health	Patient's Communication Perceived Self-Efficacy	Capone & Petrillo (2014)	Patients' beliefs about their capability to successfully manage problematic situations related to communication with doctor	20
Health	Alcohol Abstinence Self-Efficacy	DiClemente, Carbonari, Montgomery, & Hughes (1994)	A parallel set of items assessed subjects' temptation to drink in each situation.	20
Health	Breastfeeding Self-Efficacy	Dennis & Faux (1999)	Confidence in new breastfeeding mothers	39
Other	Internet Self-Efficacy	Torkzadeh & Van Dyke (2001)	Self-perception held by individuals of their ability to interact with the Internet	17
Other	Computer Self-Efficacy	Compeau & Higgins (1995)	Individual's perception of his or her ability to use a computer in the accomplishment of a job task	10
Other	Financial Self-Efficacy	Lown (2011)	One's ability to deal with financial management	6

Table 1. Self-Efficacy Scales (Continued)

Context	Name	Author(s)	Definition	No. of Items
Other	Strengths Self-Efficacy	Tsai, Chaichanasakul, Zhao, Flores, & Lopez (2014)	The level of one's confidence in her/his ability to practice and apply her/his strengths	11
Other	Counselor Activity Self-Efficacy	Lent, Hill, & Hoffman (2003)	One's ability to perform helping skills, managing the counseling process, and handling challenging counseling situations	41
Other	Career Decision-Making Self-Efficacy	Betz & Luzzo (1996)	Individuals' perceptions of self-efficacy with respect to the skills required in career decision-making	25
Other	Coping Self-Efficacy	Chesney, Neilands, Chambers, Taylor, & Folkman (2006)	One's confidence in performing coping behaviors when faced with life challenges	13
Other	Occupational Self-Efficacy	Schyns & von Collani (2002)	Self-efficacy associated with various professions and various jobs	20
Other	Computer User Self-Efficacy	Cassidy & Eachus (2002)	General computer self-efficacy in an adult student population	30

interaction between perceived threat and perceived efficacy influences the acceptance/denial of fear messages. Despite such endeavors to study self-efficacy in the health context, the authors contend that rigorous research efforts for further development of efficacy assessment in different contexts are necessary (Maloney et al., 2011).

Other crisis communication studies that explore the role of self-efficacy in crisis conceptualize it as people's perceptions of crisis response strategies (e.g., Barnett et al., 2014a; Frisby et al., 2014; Veil et al., 2011). Although it is desirable for measurement of self-efficacy to be context-specific (Bandura, 2006), these studies used existing self-efficacy scales to gauge individuals' self-efficacy during crisis and did not explore the underlying constructs of self-efficacy unique to the crisis context. Finally, one study has developed a crisis-specific self-efficacy scale. Plant, van Schaik, Sliwka, Boscardin, and O'Sullivan (2011) administered a survey to 125 pediatricians and developed a self-efficacy scale to evaluate their crisis resource management (CRM) skills. The authors identified four factors (i.e., situation awareness, team management, environment management, and decision making) and found that self-efficacy in CRM skills is positively related to pediatricians' performance of those skills. However, the authors note that the application of the scale is limited to the medical crisis context; thus, it is not broadly applicable to other crisis communication studies. Plant et al. (2011) also focus on the management, not audience side, limiting the utility of that work in understanding crisis response of publics.

Second, scholars have argued that bolstering the power of theory to predict crisis behaviors is critical. Mileti and his colleagues (Mileti & Fitzpatrick, 1992; Mileti & Sorensen, 1990) identify important factors to consider when communicating with publics in crisis. They argue that for an emergency warning message to be effective, people must: (1) receive the

message, (2) understand the message, (3) recognize that the message is relevant to them, (4) understand the risks they will face if they do not follow instructions provided, (5) determine whether to take action, (6) understand the actions that they need to take, and (7) actually perform the recommended behaviors (Frisby, Sellnow, Lane, Veil, & Sellnow, 2013).

To reveal whether recipients would be able to take the target action, a contextually targeted scale that predicts people's behaviors during crisis is necessary. Considering crisis self-efficacy is likely to be a powerful predictor of people's preparedness for as well as behavior during crisis and is defined as the individual's beliefs about whether s/he can successfully complete a given task in crisis situations, the scale would be a useful tool to inform behavioral prediction of audience action during crisis. In addition, scholars position self-efficacy as an important outcome variable in crisis; both warnings and instructional messages should bolster people's intent to take protective measures (Frisby et al., 2013).

Third, developing a crisis self-efficacy scale enables crisis managers to identify target audiences who need more information and educational intervention in crisis to minimize damages and save lives. As Bandura (1977a) and Zimmerman (2000) propose, the level, strength, and generality of self-efficacy varies widely from person to person. This may be due to different lived experiences in crisis situations or demographic differences such as age, number of children, and geographical location. Further, levels of crisis preparedness differ from person to person (Janoske, Liu, & Sheppard, 2012). In this context, identifying people with low efficacy and low preparedness levels to target and bolster their abilities to cope with crisis is important.

In addition, when a person is lacking self-efficacy during crisis situations, s/he does not manage the situation effectively even if the individual has knowledge on how to behave and/or possesses requisite skills in the situation. This is because the lack of self-efficacy generates

discrepancies between knowledge and action—specifically, the perceived ability to perform that behavior (Bandura, 1990). So, if crisis managers enhance the levels of crisis self-efficacy for those people, it will not only minimize the discrepancies between knowledge and action (therefore, make people more likely to respond in the recommended way) but also decrease possible damage of a crisis.

Lastly, the crisis self-efficacy scale will initiate and inform research efforts to address shortcomings in the crisis literature (i.e., scant research on pre-crisis, audience perspective, and lack of a crisis context-specific scale). As Bandura (1990) suggests, self-efficacy influences every phase of behavioral change including searching for information, how hard people try should they decide to do so, how much they change, and how long they will maintain those changes. Also, research on various preparedness programs demonstrates that there is a close relationship between one's preparedness and his/her self-efficacy (Hoy & Spero, 2005; Paton, 2003; Uhernik, 2008). Therefore, it is expected that the increase of individuals' crisis self-efficacy would increase their sense of crisis preparedness. All in all, the development of a crisis self-efficacy scale could generate rigorous academic debates of people's crisis preparedness and prove to be highly heuristic.

The Scope of the Crisis Self-Efficacy Scale

Although the main purpose of this paper is to develop a scale that could be used in various crisis situations and contexts, the application of the scale does have limitations due to the diversities and uncertainties in crisis situations. Therefore, a clear theoretical conceptualization of the term crisis self-efficacy is critical. To set the boundaries of the scale application and to have a sound theoretical conceptualization, it is imperative to discuss the scope of crisis self-efficacy; thus, the conceptual scope of crisis self-efficacy is reviewed in this section.

First of all, despite its wide use, it is controversial whether self-efficacy is genetic or modifiable (Frisby et al., 2013; Greven, Harlaar, Kovas, Chamorro-Premuzic, & Plomin, 2009). Some scholars contend that self-efficacy is genetic; thus, it is hard to change one's self-efficacy. For example, Greven et al. (2009) found that efficacy (i.e., self-perceived abilities) is more genetic rather than being influenced by environmental factors. To illustrate, the researchers identified that genetic factors (e.g., whether subjects are twins) explain 51% of the variance in self-efficacy while shared environment accounted for only 2% of the variance. On the other hand, other researchers argue that self-efficacy can be modified and directly causes or reflects behavioral changes (e.g., Perkins, Parzynski, Mercincavage, Conklin, & Fonte, 2012). For instance, Perkins et al. (2012) conducted an experimental study with 332 cigarette smokers and found that smokers' daily self-efficacy for abstinence (which changes almost every day) predicted their next-day's abstinence, and the current-day's abstinence status predicted the self-efficacy for abstinence of the next day.

Extensive research in the literature supports the latter argument (i.e., self-efficacy is modifiable). For example, Strecher, DeVellis, Becker, and Rosenstock (1986) found that self-efficacy is closely related to the practices of health, and changes in self-efficacy accompany changes in health behaviors. Specifically, in a meta-analysis of previous studies on self-efficacy and health behaviors, Strecher et al. (1986) argue that one's self-efficacy could be increased or decreased as time goes, and the increased or decreased self-efficacy levels influence health behaviors such as smoking cessation and walking for exercise. Similarly, Marcus, Selby, Niaura, and Rossi (1992) propose that self-efficacy regarding exercise behaviors is a good indicator of the actual participation in physical activity, and shifts in self-efficacy to exercise accompany shifts in physical activity participation. In a study with 1063 government employees and 429

hospital employees, the researchers found that people with low exercise efficacy did not do physical exercise; however, as their efficacy levels increased by participating in a program, their behavioral intentions to exercise as well as their actual participation in physical exercise were also increased. Based on those studies' findings, in this research, it is assumed that crisis self-efficacy is not genetic or stable; thus it is modifiable or changeable. That is, it is expected that certain actions or activities such as participating in crisis response programs could change one's sense of crisis self-efficacy, and such change could alter actual behaviors in crisis situations. Further, the useful scale developed here can be used across different crisis contexts to assess levels, as audiences will likely vary across scenarios.

Next, there are five stages in crisis management. According to studies by the Centers for Disease Control and Prevention (2016), Reynolds and Seeger (2005), and Veil, Reynolds, Sellnow, and Seeger (2008), the five stages in the crisis and emergency risk communication (CERC) model are precrisis, initial event, maintenance, resolution, and evaluation. First, in the precrisis stage, communication and education campaigns are executed to facilitate "specific warning messages regarding some eminent threat" and "monitoring and recognition of emerging risks" (Reynolds & Seeger, 2005, p.52). Second, the communication in the initial event is to establish "empathy, reassurance, and reduction in emotional turmoil" and "reduction of crisis-related uncertainty" (Reynolds & Seeger, 2005, p.52). Next, the focus of the maintenance stage is on facilitating accurate understanding of risks and delivering information about factors and issues that are relevant to the event. Fourth, in the resolution stage, communication is planned to inform the public about recovery and rebuilding efforts and to promote open discussion about "cause, blame, responsibility, and adequacy of response" (Reynolds & Seeger, 2005, p.53). Finally, communication in the evaluation stage should highlight the evaluation and assessment of

the effectiveness of communication and how to link the evaluation to precrisis activities (e.g., preparation for another crisis).

In the CERC model, three of the five stages include self-efficacy as an important factor. In the model, self-efficacy in precrisis, initial event, and maintenance stages means “changes in behavior to reduce the likelihood of harm,” “understanding of self-efficacy and personal response activities (how / where to get more information),” and “ongoing explanation and reiteration of self-efficacy and personal response activities begun in the initial stage” (Reynolds & Seeger, 2005, p.52), respectively. Although the focus of the current study is on people’s preparedness, crisis self-efficacy encompasses self-efficacy in all of the above three stages. That is, the crisis self-efficacy scale developed in this study is about one’s beliefs that s/he can successfully behave to reduce the possibility of damage in the precrisis stage, to perform the required response activity in the initial event stage, and to maintain performance of the response activity in the maintenance stage in the CERC model.

Lastly, it is important to consider whether crisis self-efficacy is a personal-level judgement or a societal-level judgement. According to Cho and Kuang (2014), a personal-level judgement is about one’s decision-making that is solely based on the situation around an event, while societal-level judgement is about making a decision under consideration of social factors (e.g., eyes of others, media coverage, and/or one’s social desirability). In political and societal phenomena/events, societal-level judgement becomes more important than personal-level judgement. For instance, in an environmental crisis such as the BP oil spill, considering the environment and the effects of the crisis on society is critical. Therefore, the effect of media coverage on and/or what the media/others say about the crisis (i.e., the effects of social factors)

could be important criteria in making one's decision due to its impacts on the society (Cho & Kuang, 2014; Park, Scherer, & Glynn, 2001).

However, when it comes to crises such as natural disasters and/or terrorism, the importance of societal effects decreases dramatically, as the crisis is closely related to one's survival (Cho & Kuang, 2014; Park et al., 2001). For instance, in a situation where a person's life is being threatened (e.g., in the middle of a tornado), caring for the social effects of the event and/or for other people's perceptions would not be important. Therefore, in such cases, self-efficacy in crisis situations is an immediate and personal decision rather than a decision that requires time to ponder the social effects of the crisis. Considering that the definition of crisis self-efficacy in this study is "individual's beliefs about whether s/he can successfully complete a given task in crisis situations," crisis self-efficacy is more about one's survival than about one's decision-making due to social pressure. Therefore, crisis self-efficacy is conceptualized and assessed as a personal-level judgement in this study.

Scholars have argued that personal judgement affects and motivates people's behaviors (Cho & Kuang, 2014). The purpose of this scale development is to examine how well individuals perceive that they are able to prepare for crisis by performing recommended preventative behaviors; thus, the scale can be used to minimize crisis damage by identifying people who need intervention (i.e., people who need information and/or instructions to follow for better crisis preparedness). That is, crisis self-efficacy is a scale that measures people's current status of crisis preparedness by predicting people's performance of preventative behaviors before and during crisis.

Research questions

The purpose of the current study is to develop a valid and reliable self-efficacy scale specific to crisis behaviors. The rationale for developing the scale is first to provide a tool for crisis communication researchers to measure audience behavioral aspects of crisis preparation and response. Second, as people have varying levels of crisis self-efficacy, crisis managers face difficulties in developing audience-specific messages and creating crisis preparedness programs. A crisis self-efficacy scale will enable managers to develop better message strategies for mitigating crisis damage. The scale could also provide a useful longitudinal index of progress in crisis preparedness interventions since people's crisis self-efficacy and measure changes during the program. A program may have different effects on increasing crisis self-efficacy among people with high efficacy and those with low efficacy. For example, people who are highly efficacious may be more confident in their abilities to deal with crisis situations, while low efficacious individuals would benefit from increased confidence in their abilities to manage a crisis situation.

To achieve these goals, the following research questions are asked:

RQ1: What are the underlying constructs of crisis self-efficacy?

RQ2: To what extent is the proposed scale of crisis self-efficacy valid and reliable?

RQ2(a): What is the reliability of the scale?

RQ2(b): What is the convergent validity of the scale?

RQ2(c): What is the discriminant validity of the scale?

RQ3: What are the significant predictors of crisis self-efficacy?

RQ3(a): Is there be a gender difference in crisis self-efficacy?

RQ3(b): Is there a difference in crisis self-efficacy among age groups?

RQ3(c): Is there a difference in crisis self-efficacy among ethnic groups?

RQ3(d): Is there a difference in crisis self-efficacy based on marital status?

RQ3(e): Is there a difference in crisis self-efficacy based on household income?

RQ3(f): Is there a difference in crisis self-efficacy based on participants' education levels?

RQ3(g): Is there a difference in crisis self-efficacy based on the number of children living in the house?

RQ3(h): Is there a difference in crisis self-efficacy based on the states in which participants live?

Table 2. Summary of Research Questions and Corresponding Statistical Tests

Research Question	Independent Variables	Dependent Variables	Statistical Test
RQ1: What are the underlying constructs of crisis self-efficacy?	N/A	N/A	Exploratory Factor Analysis Confirmatory Factor Analysis
RQ2(a): What is the reliability of the scale?	N/A	N/A	Cronbach's alphas of items in each construct and in the scale
RQ2(b): What is the convergent validity of the scale?	N/A	N/A	Pearson's correlation coefficient between crisis self-efficacy and self-efficacy
RQ2(c): What is the discriminant validity of the scale?	N/A	N/A	Pearson's correlation coefficient between crisis self-efficacy and social desirability
RQ3(a): Is there a gender difference in crisis self-efficacy?	Gender	Crisis self-efficacy	ANOVA
RQ3(b): Is there a difference in crisis self-efficacy among age groups?	Age Group	Crisis self-efficacy	ANOVA
RQ3(c): Is there a difference in crisis self-efficacy among ethnic groups?	Ethnicity	Crisis self-efficacy	ANOVA
RQ3(d): Is there a difference in crisis self-efficacy based on marital status?	Marital status	Crisis self-efficacy	ANOVA
RQ3(e): Is there a difference in crisis self-efficacy based on household income?	Household income	Crisis self-efficacy	ANOVA
RQ3(f): Is there a difference in crisis self-efficacy based on participants' education levels?	Education level	Crisis self-efficacy	ANOVA
RQ3(g): Is there a difference in crisis self-efficacy based on the number of children in house?	No. of children	Crisis self-efficacy	Regression / ANOVA
RQ3(h): Is there a difference in crisis self-efficacy based on the states participants live in?	State residency	Crisis self-efficacy	ANOVA

CHAPTER 3

METHOD

The purpose of this study is to develop a reliable and valid self-efficacy scale tailored to the crisis context. The second goal of this study is to identify the underlying structures of crisis self-efficacy, while the third goal is to find indicators of crisis self-efficacy. To achieve these goals, first, items that possibly measure people's crisis self-efficacy level are identified through a review of the literature. Then, the items were reviewed by experts to increase face and content validity and by non-experts to examine comprehension of the items. Lastly, two surveys were administered, followed by statistical analyses. This section discusses the details of these steps.

Creation of Items

For the initial creation of items, a literature review was used to generate items; the literature review is one of the most widely used and reliable methods of item generation for scale development in social science (Colton & Covert, 2007). As the first step of the literature review process, Bandura's original articles on self-efficacy were reviewed to conceptualize and operationalize the items in an appropriate manner (e.g., Bandura, 1977a; 1997; 2006).

Next, existing self-efficacy measurements were reviewed, modified, and adapted for creating the crisis self-efficacy scale items. Researchers can reduce the possibility of problems related to face and content validity in scale development by using existing scales (Netemeyer, Bearden, & Sharma, 2003). All of the scales listed in Table 1 were reviewed. First, among three general self-efficacy scales (i.e., Sheer et al., 1982; Schwarzer, & Jerusalem, 1995; Chen et al., 2001), only two recent scales (i.e., Schwarzer, & Jerusalem, 1995; Chen et al., 2001) were modified and adopted, as those scales included most of Sheer et al.'s (1982) scale items. Also, Schwarzer and Jerusalem (1995) and Chen et al. (2001) suggest that their scales are more reliable

and valid than is Sheer et al.'s (1982) scale (Schwarzer, & Jerusalem, 1995; Chen et al., 2001). All items in the two scales were modified and adopted except for one item that was not applicable to the crisis context: "If someone opposes me, I can find the means and ways to get what I want."

Then, items in other self-efficacy scales (e.g., internet self-efficacy) were reviewed, modified, and adopted. However, all items were not adopted, because items in some scales were too context specific to adapt to the crisis context. For example, items in the computer self-efficacy scale (Compeau & Higgins, 1995) start with the sentence "I could complete the job using the software package...", so those items can only be applied to the computer context. In addition, statements following the above sentence were "...if I had never used a package like it before", "...if I had used similar packages before this one to do the same job", etc. Therefore, these items were not added to the initial list. On the other hand, there were items that could be adopted with minor changes. For instance, there were items in the foodborne self-efficacy scale (Frisby et al., 2013) such as "I am certain I can master the skills to protect myself from foodborne illness" and "what I do with the knowledge I have about foodborne illness will keep me safe." These items were added to the list with minimal changes.

Also, measurements related to self-efficacy were reviewed. To find relevant measurements, measures used in developing other self-efficacy scales were identified (e.g., self-confidence, coping strategy, problem solving confidence, outcome expectations, self-esteem, and locus of control). However, not all of those measurements were applicable to the crisis context, as the majority of items were either inapplicable or too context-specific. For example, items such as "I have the ability to solve most problems even though initially no solution is immediately apparent" and "given enough time and effort, I believe I can solve most problems that confront

me” in the problem-solving confidence scale (Heppner & Petersen, 1982) measure similar concepts to self-efficacy; therefore, the items were modified and adopted. On the other hand, items in the self-esteem scale (Heatherton & Polivy, 1991) measure one’s self-concept (e.g., “I am worried about whether I am regarded as a success or failure” and “I am worried about what other people think of me”) rather than measuring one’s beliefs about whether s/he can successfully complete a given task; as a result, those items were excluded.

Lastly, relevant scale items in the crisis context were reviewed and adopted. To find measurement items, articles that used self-efficacy measures in the crisis context were reviewed. Among the measurement items, two items in the measurement of crisis resource management skills (Kim, Neilipovitz, Cardinal, & Chiu, 2009) were modified and adopted (e.g., “I can anticipate likely events” and “I am able to use resources with effectiveness”). All in all, there were 41 items in the initial list (see Table 5).

Pretesting of Items

Once the initial list of items was confirmed to be comprehensive, the list went through two screening processes that were approved by the University’s IRB; screening items in scale development is suggested by scholars since it increases the utility and trustworthiness of a scale (Netemeyer et al, 2003). As the first screening process, the items were reviewed by experts in the field of crisis communication. To select experts, several steps were followed. First, the researcher reviewed articles published in the crisis communication literature and identified 10 articles that used measures of self-efficacy (see Table 3 for the list of articles). Next, the corresponding authors of the articles were contacted and asked to review the items. Among 10

Table 3. The List of Articles Used Self-Efficacy in the Crisis Communication

Authors	Year	Article Name and Journal
Frisby et al.	2013	Instruction in crisis situations: Targeting learning preferences and self-efficacy. <i>Risk Management</i> , 15(4), 250-271.
Barnett et al.	2014	EPPM and willingness to respond: The role of risk and efficacy communication in strengthening public health emergency response systems. <i>Health Communication</i> , 29, 598-609.
Roberto et al.	2009	Raising the alarm and calming fears: Perceived threat and efficacy during risk and crisis. In R. L. Heath & H. D. O'Hair, <i>Handbook of risk and crisis communication</i> , pp.287-303.
Liu et al.	2015	From Virginia Tech to Seattle Pacific U: An Exploratory Study of Perceptions Regarding Risk and Crisis Preparedness Among University Employees. <i>Atlantic Journal of Communication</i> , 23(4), 211-224.
Plant et al.	2011	Validation of a self-efficacy instrument and its relationship to performance of crisis resource management skills. <i>Advances in Health Sciences Education</i> , 16(5), 579-590.
Yip et al.	2013	The role of self-efficacy in communication and emergency response in Chinese limited English proficiency (LEP) populations. <i>Health Promotion Practice</i> , 14(3), 400-407.
Turner et al.	2013	A double dose of fear: A theory-based content analysis of news articles surrounding the 2006 cough syrup contamination crisis in Panama. <i>Risk Management</i> , 15(2), 79-99.
So	2013	A further extension of the extended parallel process model (E-EPPM): Implications of cognitive appraisal theory of emotion and dispositional coping style. <i>Health communication</i> , 28(1), 72-83.
Palenchar and Heath	2002	Another part of the risk communication model: Analysis of communication processes and message content. <i>Journal of Public Relations Research</i> , 14(2), 127-158.
Avery and Park	forthcoming	Effects of crisis self-efficacy on intentions to follow directives during crisis. <i>Journal of Public Relations Research</i> .

experts, 3 experts answered that they would review the items, 3 experts said that they were not available, 3 experts did not respond to the email, and 1 expert responded that s/he does not have expertise in the area. Next, the researcher sent emails to the remaining authors of the articles (i.e., authors of the articles except corresponding authors) and received responses with comments from 2 experts. Lastly, 2 experts who have published crisis communication research articles and serve on researcher's dissertation committee reviewed the items. Before sending emails to the experts, their expertise (i.e., affiliations and whether they were holding a Ph.D. degree) was confirmed (see Table 4 for credentials of expert reviewers).

The recruiting email included information about the researcher, the scale under development, the purpose of scale, incentives, and the 41 initial scale items, etc. (see appendix A for the recruiting email). The researcher asked the experts to make changes and add comments (using MS Word 'track changes' and 'add comments' modes) about the content and face validity of items, suggestions on removing/adding items, wording issues, etc. As a token of gratitude, a \$25 Amazon gift card was given to each expert, unless the expert declined the offer.

As Table 5 shows, two items were added to the initial list because experts suggested that there were two double-barreled items; these items were separated into two different questions. Also, two experts said that some of the items were redundant and irrelevant; as a result, two items were removed from the initial list of items. Each expert made suggestions regarding wording issues. In total, 56 changes were made to the original items. Experts' suggestions regarding conceptualization and operationalization of the scale were addressed both in the literature review and discussion sections. For example, an expert recommended that setting the boundaries of crisis self-efficacy would be critical in the development of the scale. As a result, a

Table 4. Credentials of Expert Reviewers and Their Comments

Reviewer	Credentials of Reviewer	Major comments
1	Received doctorate from Wayne State University. Professor at University of Central Florida. Research interests include risk/crisis communication.	Revise 4 items (wording issues)
2	Received doctorate from West Virginia University. Assistant professor at University of Kentucky Research interests include instructional communication.	Two double-barreled items -> add 2 items Revise 2 items (wording issues)
3	Received doctorate from University of North Dakota. Professor at University of Central Florida. Interests include instructional communication and risk/crisis communication.	Revise 16 items (wording issues)
4	Received doctorate from The Chinese University of Hong Kong. Acting Assistant professor at University of Washington. Interests include health communication and emergency communication.	Revise 16 items (wording issues)

Table 4. Credentials of Expert Reviewers and Their Comments (continued)

Reviewer	Credentials of Reviewer	Major comments
5	Received doctorate from North Dakota State University. Associate Professor at Southern Illinois University. Interests include intercultural communication and health communication.	Define the concept in a conceptually and operationally correct way Avoid redundancy among items
6	Received doctorate from University of Florida. Associate Professor at University of Tennessee. Interests include risk & crisis communication and issues management	One double-barreled items -> add 1 items (same as one of Dr. Frisby's suggestions) Revise 10 items (wording issues)
7	Received doctorate from University of Georgia. Associate Professor at University of Tennessee. Interests include health crisis management and public health campaigns.	Delete 1 redundant item and irrelevant item Revise 8 items (wording issues)

Table 5. Items Adopted and Modified

Origin	Original Item	Modified Item
General Self-Efficacy	I can always manage to solve difficult problems if I try hard enough.	During a crisis, I can solve difficult problems in crisis situations if I try hard enough.
General Self-Efficacy	It is easy for me to stick to my aims and accomplish my goals.	During a crisis, I can stick to my goals. During a crisis, I can accomplish my goals.
General Self-Efficacy	I am confident that I could deal efficiently with unexpected events.	I am confident that I can deal efficiently with unexpected crisis situations.
General Self-Efficacy	Thanks to my resourcefulness, I know how to handle unforeseen situations.	Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis.
General Self-Efficacy	I can solve most problems if I invest the necessary effort.	I can solve most problems during a crisis if I invest the necessary effort.
General Self-Efficacy	I can remain calm when facing difficulties because I can rely on my coping abilities.	During a crisis, I can remain calm when facing difficulties. During a crisis, I can rely on my coping abilities.
General Self-Efficacy	When I am confronted with a problem, I can usually find several solutions.	When I am confronted with a problem during a crisis, I can usually find several solutions.
General Self-Efficacy	If I am in trouble, I can usually think of a solution.	If I am in a crisis situation, I can usually think of a solution.
General Self-Efficacy	I can usually handle whatever comes my way.	During a crisis, I can usually handle whatever comes my way.

Table 5. Items Adopted and Modified (continued)

Origin	Original Item	Modified Item
New General Self-Efficacy	I will be able to achieve most of the goals that I have set for myself.	During a crisis, I can achieve most of the goals that I have set for myself.
New General Self-Efficacy	When facing difficult tasks, I am certain that I will accomplish them.	When facing difficult tasks during a crisis, I am certain that I can complete them.
New General Self-Efficacy	In general, I think that I can obtain outcomes that are important to me.	In crisis situations, I can obtain outcomes that are important to me.
New General Self-Efficacy	I believe I can succeed at most any endeavor to which I set my mind.	In crisis situations, I believe I can succeed at most any endeavor to which I set my mind.
New General Self-Efficacy	I will be able to successfully overcome many challenges.	I will be able to successfully overcome many challenges I face during a crisis.
New General Self-Efficacy	I am confident that I can perform effectively on many different tasks.	During a crisis, I am confident that I can perform effectively on many different tasks.
New General Self-Efficacy	Compared to other people, I can do most tasks very well.	During a crisis, compared to other people, I can do most tasks very well.
New General Self-Efficacy	Even when things are tough, I can perform quite well.	Even when things are tough, I can perform quite well during a crisis.
Foodborne Illness Crisis Efficacy	I am certain I can master the skills to protect myself from foodborne illness.	I am certain I can master the skills to protect myself during a crisis.
Foodborne Illness Crisis Efficacy	I am certain I can figure out how to take action to prevent foodborne illness.	I am certain I can figure out how to take action to prevent crisis.

Table 5. Items Adopted and Modified (continued)

Origin	Original Item	Modified Item
Foodborne Illness Crisis Efficacy	I believe I can do things to protect myself from foodborne illness.	Deleted
Foodborne Illness Crisis Efficacy	I know I can take action to protect myself from foodborne illness.	I know I can take action to protect myself during a crisis.
Foodborne Illness Crisis Efficacy	I am certain I have the ability to take necessary action to protect myself from foodborne illness.	I am certain I have the ability to take necessary action to protect myself during a crisis.
Foodborne Illness Crisis Efficacy	I know that I have the ability to do things in the case of a foodborne illness.	I know that I have the ability to do things to protect myself in case of a crisis.
Foodborne Illness Crisis Efficacy	What I do with the knowledge I have about foodborne illness will keep me safe.	What I do with the knowledge I have about a crisis will keep me safe.
Counselor Activity Self- Efficacy	Help your client to decide what actions to take regarding his or her problems.	I can help others decide what actions to take during a crisis.
Occupational Self-Efficacy	I feel insecure about my professional abilities.	Deleted
Occupational Self-Efficacy	As far as my job is concerned I am a rather self-reliant person.	As far as crisis is concerned, I am a self-reliant person.

Table 5. Items Adopted and Modified (continued)

Origin	Original Item	Modified Item
Occupational Self-Efficacy	If I am in trouble at my work, I can usually think of something to do.	If I am in a crisis, I can usually think of something to do.
Occupational Self-Efficacy	I feel prepared to meet most of the demands in my job.	I feel prepared to meet most of the demands for crisis situations in my job.
Crisis Resource Management Skill	I can consider alternatives in crisis.	I can consider alternatives to solve a problem during a crisis.
Crisis Resource Management Skill	I can anticipate likely events.	I can anticipate likely events during a crisis.
Crisis Resource Management Skill	I am able to use resources with effectiveness.	I am able to use resources effectively during a crisis.
Problem Solving Confidence	I have the ability to solve most problems even though initially no solution is immediately apparent.	In crisis situations I have the ability to solve most problems even though initially no solution is immediately apparent.
Problem Solving Confidence	Many problems I face are too complex for me to solve.	In crisis situations, many problems I face are too complex for me to solve.
Problem Solving Confidence	When I make plans to solve a problem, I am almost certain that I can make them work.	When I make plans to solve a problem during a crisis, I am certain that I can make them work.
Problem Solving Confidence	Given enough time and effort, I believe I can solve most problems that confront me.	Given enough time and effort, I believe I can solve most problems during a crisis.

Table 5. Items Adopted and Modified (continued)

Origin	Original Item	Modified Item
Problem Solving Confidence	When faced with a novel situation I have confidence that I can handle problems that may arise.	When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis.
Problem Solving Confidence	I trust my ability to solve new and difficult problems.	I trust my ability to solve new and difficult problems during a crisis.
Problem Solving Confidence	After making a decision, the outcome I expected usually matches the actual outcome.	After making a decision during a crisis, the outcome I expected usually matches the actual outcome.
Problem Solving Confidence	When confronted with a problem, I am unsure of whether I can handle the situation.	When confronted with a problem during a crisis, I am unsure of whether I can handle the situation.
Coping Strategy	Try to make a plan of action.	During a crisis, I try to make a plan of action.

section titled “The scope of the crisis-self-efficacy scale” was added in the literature review to identify the specific scope.

As the second screening process, the items were revised based on experts’ comments and were reviewed by the general public. Before recruiting participants, an online survey (Qualtrics) pilot test where participants could review the items and provide comments using a dialog box under each question was created. To recruit participants, an online laboring market (Amazon.com’s Mechanical Turk) was used. All data collection methods were IRB approved.

There are two roles of Mechanical Turk. The first role is the “Requester,” who recruits workers and distributes tasks, while the second role is the “Worker,” who completes tasks in return for a monetary reward from the requester (Amazon Mechanical Turk, 2016). For this study, the researcher (i.e., the requester) created tasks and asked 50 workers to review the items and provide comments if they identified problems in items and/or wanted to make suggestions for better comprehension of the items. Before reviewing the items, information about the purpose of the study was provided. Considering the purpose of the screening process, only workers whose native language is English were allowed to participate. As compensation for their time, \$1 was given to each participant via Amazon.

Among 50 workers, 52 % ($n = 26$) were male and 48% ($n = 24$) were female. The average age of workers was 33.62 ($Min. = 18$; $Max. = 64$; $SD = 10.83$), and the most prevalent ethnic group was white (66%, $n = 33$), followed by black/African American (22%, $n = 11$), Asian (6%, $n = 3$), and all others (6%, $n = 3$). Concerning marital status, the majority of them were single (46%, $n = 23$) or married (42%, $n = 21$), while many of the workers held college degrees (50%, $n = 25$), followed by some college (32%, $n = 16$), graduate degree (16%, $n = 8$), and some high school (2%, $n = 1$). Regarding their income, it was quite diverse: less than

\$15,000 (14%, $n = 7$); \$15,000 to less than \$30,000 (16%, $n = 8$); \$30,000 to less than \$50,000 (18%, $n = 9$); \$50,000 to less than \$75,000 (26%, $n = 13$); \$75,000 to less than \$100,000 (8%, $n = 4$); \$100,000 to less than \$150,000 (16%, $n = 8$); and \$150,000 or more (2%, $n = 1$).

41 workers said that they had no problem with understanding the items, while 17 comments were provided by the other 9 workers. The items were revised based on the 17 comments. For example, 3 workers said that the word “aims” in Schwarzer and Jerusalem’s (1995) second item (i.e., “During a crisis, I can stick to my aims.”) should be changed to “goals,” and 2 participants answered that the word “accomplish” in Chen et al.’s (2001) second item (i.e., “When facing difficult tasks during a crisis, I am certain that I can accomplish them”) should be changed to “complete.” As a result, the final version of the items was developed.

Pilot Testing of the Scale

Sampling. As the purpose of this research is to develop a scale applicable to the general public, a sample representative of the entire U.S. population was recruited. One convenient way to get a representative sample is to purchase paid panels (Netemeyer et al, 2003). There are advantages of purchasing survey participants. First, a researcher can have a sample that fits the parameters s/he wants. For example, if a researcher wants responses from teenagers, the researcher can set an age limit, which only enables teenagers to participate in research. Next, there is no cost for printing questionnaires or hiring survey administrators and workers, and a large quantity of people can be reached in an extremely short period of time (Fricker & Schonlau, 2002). Lastly, researchers can collect data while they work on other tasks (Wright, 2005).

At the same time, there are several limitations of a paid panel study. First, as the panelists get monetary compensation for their participation, their responses may be biased. For example, one can fill out the survey quickly at the expense of accuracy to make money rather than to help

the researcher better understand the phenomenon. Also, since paid panel studies usually administer an online survey, people without Internet access or who do not have the ability to use a computer cannot participate in the survey, which may affect the representativeness of the sample (Fricker & Schonlau, 2002; Wright, 2005).

To prevent these problems, several procedures were followed. First, the researcher checked the demographics of participants to be sure they are representative. For example, by default, only participants who are physically residing in the U.S. were able to participate in the study. Demographics of the sample reflected the general population in their distributions (The U.S. Census Bureau, 2016). Also, the time each participant spent answering questions was monitored, and responses from participants who completed the survey in a much shorter amount of time than others (e.g., 3 standard deviations below the mean) were deleted from the data set.

The survey data were used to perform an exploratory factor analysis to identify the underlying structure of crisis self-efficacy, and there are several rules of thumb for sample size for a factor analysis. For example, Comrey and Lee (1992) suggested that 100 cases are poor, 200 are fair, 300 are good, and 500 or more are very good, while DeVellis (1991) suggests that 300 is sufficient for an exploratory factor analysis. Other sample-size recommendations are based on the number of variables being analyzed. For example, Gorsuch (1983) suggested at least 5 cases per variable, and Bentler and Chou (1987) argue that having a ratio of at least 5:1 of participants to each parameter is necessary to obtain acceptable results. As this study conducts exploratory research of crisis self-efficacy (i.e., the researcher does not know how many parameters/variables are ultimately included in crisis self-efficacy), 300 participants were recruited for the pilot survey.

Data Collection. Upon IRB approval, an online survey using Qualtrics was created for data collection. There are several disadvantages of online surveys. First, there is the issue of representativeness of the sample in online surveys. As mentioned above, people without Internet access cannot participate in the survey (Fricker & Schonlau, 2002; Wright, 2005). Also, some technical know-how is required for both participants and researchers (Fricker & Schonlau, 2002; Wright, 2005). For instance, participants should know how to use a computer, while the researcher should be able create questions and arrange navigation correctly using a survey website.

Despite those disadvantages, an online survey was created for the current study, as there are numerous advantages of online surveys. First, researchers can access individuals who would be difficult to reach (e.g., people living in isolated areas), as long as they have Internet access (Fricker & Schonlau, 2002; Wright, 2005). Also, researchers can reach people around the world, although global access is not necessary for this national survey (Fricker & Schonlau, 2002; Wright, 2005). Third, online surveying is efficient. There is no cost for printing the questionnaires, and many people can be reached in a short period of time (Fricker & Schonlau, 2002; Wright, 2005). There is less error in data entry. Lastly, it is convenient. For example, answers can be converted into formats intended for processing in statistical software, and researchers can monitor responses and non-responses while adjusting the pace of the data collection (Fricker & Schonlau, 2002; Wright, 2005).

On the first page of the survey, its purpose was explained, and a note that participants can withdraw at any time was included as well as information about asking questions (through a link to a Twitter account with instructions on how to ask the researcher questions). On the next page, the participants were informed about use of the word “crisis” in the survey as follows:

The term "crisis" in each statement means a crisis in general. In other words, it could be any type of crisis you may face in your life. For example, it could be a natural disaster crisis (e.g., tornado, flood), a public health crisis (e.g., swine flu), or a terrorism crisis (e.g., shooting), etc.

Participants rated each item using a 7-point Likert scale (“1=*Strongly Disagree*” to “7=*Strongly Agree*”), and their demographic information including gender, age, ethnicity, and education level was collected.

Data Cleaning. The data were cleaned following Morrow and Skolits’s (2014) process. First, a codebook that outlines the variable names and labels, citations of sources, and sample size was created. Second, a data analysis plan was developed. In the plan, specific types of analyses as well as the SPSS syntaxes and AMOS graphics were included. Next, a frequency analysis was performed to identify any errors, missing data, and outliers. Fourth, potential coding mistakes were checked. Fifth, new variables (e.g., reverse-coded variables) were created. Sixth, another frequency analysis was conducted to find any errors again. Seventh, outliers were identified and treated properly (ignored, deleted, or transformed). Scatter plots and interquartile range methods were used for outlier detection and the method of treating outliers. Eighth, normality was assessed using SPSS (with the “Explore” command). Ninth, all missing data were deleted from the data set. Tenth, final frequency tests were performed. Lastly, assumption tests such as homogeneity of variance were conducted (multicollinearity, singularity, and sphericity were not tested here because the tests were done during the exploratory factor analysis that followed the data cleaning process). As a result, 10 responses were deleted from the data set, and the final sample ($N = 302$) was used for the analysis.

Validation Testing of the Scale

The same procedure used for pretesting was followed for the validation testing of scale. First, an online survey using Qualtrics was created. The first page included informed consent and explained the purpose of the survey. On the following pages, participants were asked to indicate their levels of agreement with statements and to answer demographic questions. Second, more than 500 participants were recruited via MTurk. As compensation for their participation, participants received a \$1 credit to Amazon. Finally, the data were cleaned following Morrow and Skolits's (2014) process. There were 562 starts with 12 respondents dropping, 11 respondents screening out, and 539 completing. In the data cleaning process, respondents that had multiple missing answers and that finished in a shorter amount of time than others (e.g., 3 standard deviations below the mean) were deleted from the data set; 20 respondents were eliminated, resulting in a final sample of 519 respondents.

Measures

To answer RQ1, items that were retained from the pilot testing were asked of the participants. In other words, participants' crisis self-efficacy was measured by their responses to 14 questions on a 1-7 scale (1 = *Strongly Disagree* and 5 = *Strongly Agree*). The questions included: "I am certain I have the ability to take necessary action to protect myself during a crisis," "I know that I have the ability to do things to protect myself in case of a crisis," "What I do with the knowledge I have about crisis will keep me safe," "I can help others decide what actions to take during a crisis," "I can anticipate likely events during a crisis," "I am able to use resources effectively during a crisis," "Given enough time and effort, I believe I can solve most problems during a crisis," "When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis," "During a crisis, I can stick to my goals,"

“During a crisis, I can accomplish my goals,” “I am confident that I can deal efficiently with unexpected crisis situations,” “Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis,” “During a crisis, I can usually handle whatever comes my way,” and “During a crisis, I can achieve most of the goals that I have set for myself.”

RQ2 explores the reliability and validity of the crisis self-efficacy scale. The American Psychological Association (1985) states that measures should demonstrate content validity, construct validity (i.e. convergent validity and discriminant validity), and internal consistency (reliability). Content validity refers to the adequacy with which a measure assesses the domain of interest. Construct validity is concerned with the relationship of the measure to the underlying attributes it is attempting to assess. Internal consistency refers to the homogeneity of the items in the measure or the extent to which they correlate with the total test score. Therefore, these measures of validity and reliability were examined.

First, Cronbach's alphas for crisis self-efficacy dimensions as well as the scale itself were calculated using SPSS to test the reliability of the scale. Items that decreased the reliability of scale were deleted. The convergent and discriminant validities of the scale were tested by calculating Pearson's correlation coefficients with new general self-efficacy and the social desirability scale, respectively. On a 1-5 scale (1 = *Strongly Disagree* and 5= *Strongly Agree*), participants indicated their levels of agreement on Chen et al.'s (2001) 8 NGSE items (refer to Table 5 for the items). Also, to measure participants' levels of social desirability, a short version (10 items) of the Marlowe-Crowne social desirability scale was adopted (Strahan & Gerbasi, 1972): (a) I'm always willing to admit it when I make a mistake, (b) I always try to practice what I preach, (c) I never resent being asked to return a favor, (d) I am irked when people expressed ideas very different from my own, (e) I have never deliberately said something that hurt

someone's feelings, (f) I like to gossip at times, (g) There have been occasions when I took advantage of someone, (h) I sometimes try to get even rather than forgive and forget, (i) At times, I have really insisted on having things my own way, (j) There have been occasions when I felt like smashing things.

The reliabilities of the measurements were acceptable (Cronbach's $\alpha = .92$ and $.87$, respectively). It was expected that the correlation between NGSE and crisis self-efficacy would be higher than the critical value ($.70$), since most of the crisis self-efficacy items were adopted and revised from the existing self-efficacy scales. On the other hand, the correlation coefficient between social desirability and crisis self-efficacy would not be low and/or insignificant, as the two concepts are different (Bandura, 2006; Zimmerman, 2000).

For RQ3, participants' demographic information was collected. Respondents were asked to indicate their ages (open ended); gender: male or female; race: white, black, Hispanic, Asian, multi-racial, or other; marital status: single, married, widowed, divorced, separated, or other; level of education: some high school, high school diploma, some college, college degree, or graduate degree; number of children in house (open ended); household income: less than \$15,000, \$15,000 to less than \$30,000, \$30,000 to less than \$50,000, \$50,000 to less than \$75,000, \$75,000 to less than \$100,000, \$100,000 to less than \$150,000, and \$150,000 or more; and state residency (open ended; i.e., "What U.S. state do you live in?").

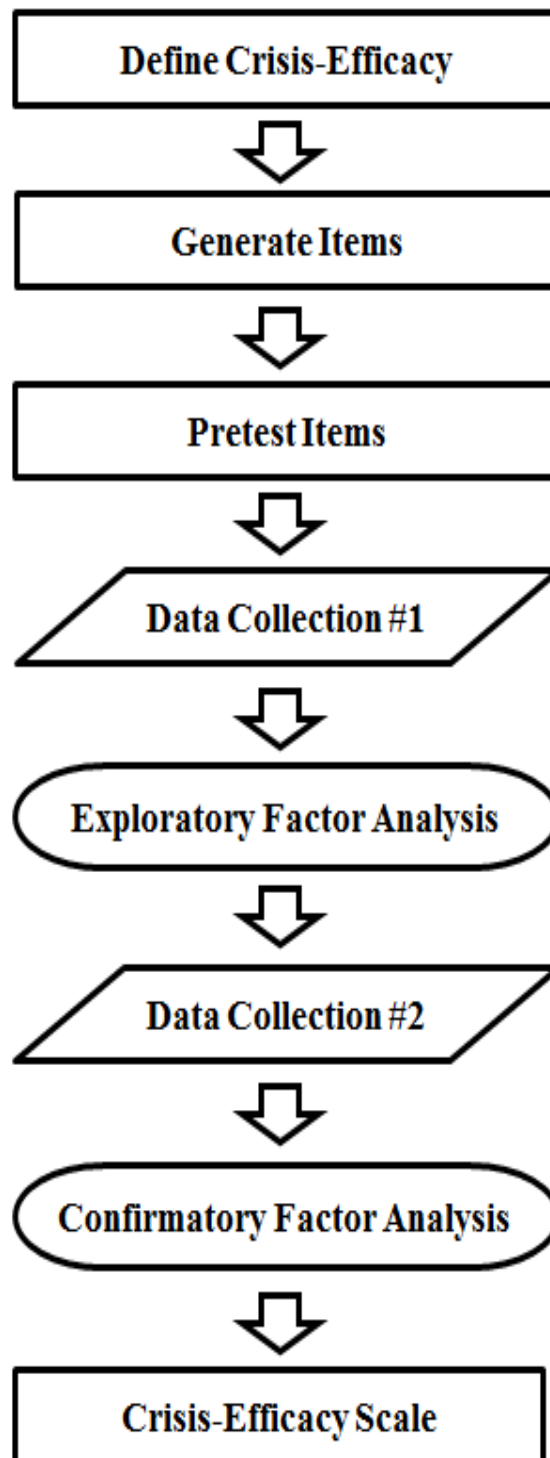


Figure 2. Flow of the Dissertation

CHAPTER 4

RESULTS

Pilot Testing

Sample Profile. Of the 312 responses, 10 responses were dropped as a result of the data cleaning process; therefore, responses from 302 participants were analyzed. The sample ($N = 302$) represented diverse demographic backgrounds. Of the total sample, 149 (49.3%) were males, and 153 (50.7%) were females. The majority of respondents were white ($n = 243, 80.5%$), followed by black/African-American ($n = 23, 7.6%$), Asian ($n = 18, 6.0%$), Hispanic ($n = 9, 3.0%$), multi-racial ($n = 8, 2.6%$), and other ($n = 1, 0.3%$). Regarding the ages of participants, the oldest participant was 68 years old while the youngest participant was 19 years old. The average age of participants was 35.25 ($SD = 11.27$). Concerning the level of education, college degree 41.1% ($n = 124$) was most frequent, followed by some college ($n = 98, 32.5%$), high school diploma ($n = 47, 15.6%$), graduate degree ($n = 31, 10.3%$), and some high school ($n = 2, 0.7%$). In terms of marital status, 47.4% ($n = 143$) of respondents were single, 38.4% ($n = 116$) reported that they were married, 9.65% ($n = 29$) were divorced, and 3.6% ($n = 14$) of participants were widowed, separated, or other. Last, the most frequent household income range was \$30,000 to \$50,000 ($n = 76, 25.2%$), followed by \$15,000 to \$30,000 ($n = 68, 22.5%$), \$50,000 to \$75,000 ($n = 53, 17.5%$), \$75,000 to \$100,000 ($n = 42, 13.9%$), less than \$15,000 ($n = 33, 10.9%$), \$100,000 to \$150,000 ($n = 22, 7.3%$), and \$150,000 or more ($n = 8, 2.6%$). Table 6 summarizes the demographic information of participants, which was deemed to be representative of the general population (The U.S. Census Bureau, 2016). For example, the U.S. Census Bureau (2016) indicates that 50.8 % of the U.S. citizens are females while 77.4% of them are White, followed by Black (12.6%), and Asian (4.8%). For income, the median house hold income in 2014 was \$53,482.

Table 6. Demographic Information of Pilot Testing Sample (N = 302)

Demographics	<i>n</i>	<i>%</i>
Gender		
<i>Male</i>	149	49.3
<i>Female</i>	153	50.7
Age, years		
<25	39	12.9
25-34	136	45.0
35-44	75	24.8
45-54	22	7.3
55-64	25	8.3
65+	5	1.7
Race		
<i>White</i>	243	80.5
<i>Black</i>	23	7.6
<i>Asian</i>	18	6.0
<i>Hispanic</i>	9	3.0
<i>Multi-racial</i>	8	2.6
<i>Other</i>	1	0.3
Marital Status		
<i>Single</i>	143	47.4
<i>Married</i>	116	38.4
<i>Divorced</i>	29	9.6
<i>Widowed</i>	3	1.0
<i>Separated</i>	4	1.3
<i>Other</i>	7	2.3
Education		
<i>Some High School</i>	2	0.5
<i>High School Diploma</i>	47	15.6
<i>Some College</i>	98	32.5
<i>College Degree</i>	124	41.1
<i>Graduate Degree</i>	31	10.3
Household Income		
<i>Less than \$15,000</i>	33	10.9
<i>\$15,000 to \$30,000</i>	68	22.6
<i>\$30,000 to \$50,000</i>	76	25.2
<i>\$50,000 to \$75,000</i>	53	17.5
<i>\$75,000 to \$100,000</i>	42	13.9
<i>\$100,000 to \$150,000</i>	22	7.3
<i>\$150,000 or more</i>	8	2.6

Exploratory Factor Analysis (EFA). Using SPSS 23.0, an EFA was conducted with principal axis factoring using varimax rotation on the initial 41 items to identify the underlying structure of crisis self-efficacy. Results of analyses of the scree plot, eigenvalues, item factor loadings, and overall factor interpretability were used to determine the factor solution (Worthington & Whittaker, 2006). The Kaiser-Meyer-Olkin index was .98, which indicates that the sample was appropriate for factor analysis (Pett, Lackey, & Sullivan, 2003). Additionally, Bartlett's test of sphericity was significant [$\chi^2(741) = 13580.10, p < .001$], suggesting that an item correlation matrix is not an identity matrix, and factor analysis is therefore appropriate (Pett et al., 2003). Before determining the number of factors to retain, several steps were followed.

First, items were dropped if their factor loadings were $< .50$ (Raubenheimer, 2004), and the Kaiser-Guttman rule (i.e., retaining factors with an eigenvalue ≥ 1) was taken into account to determine the number of factors to be extracted. Also, a criterion was used to determine the number of items to retain; although it is ideal for items to load highly on only one factor, an item often cross-loads on two or more factors (Lent et al., 2003). Therefore, items that showed a difference of $< .10$ between the factors they loaded on were deleted (Sheu & Lent, 2007). As a result, 13 items were removed from the list (i.e., "During a crisis, I can rely on my coping abilities," "If I am in a crisis situation, I can usually think of a solution," "When facing difficult tasks during a crisis, I am certain that I can complete them," "In crisis situations, I can obtain outcomes that are important to me," "In crisis situations, I believe I can succeed at most any endeavor to which I set my mind," "I will be able to successfully overcome many challenges I face during a crisis," "During a crisis, I am confident that I can perform effectively on many different tasks," "During a crisis, compared to other people, I can do most tasks very well," "I am certain I can master the skills to protect myself during a crisis," "I feel prepared to meet most

of the demands for crisis situations in my job,” “In crisis situations I have the ability to solve most problems even though initially no solution is immediately apparent,” and “During a crisis, I try to make a plan of action”). Table 7 shows factor loadings of all 41 initial items.

After removing the 13 items, another EFA was conducted. The results yielded one dominant factor with an eigenvalue greater than 25, explaining 63.2% of the total variance, and two subsequent factors with eigenvalues slightly greater than 1 (1.40 and 1.17, respectively), which explain 5.00% and 4.19% of the total variance, respectively. However, the third factor included only two items (i.e., “In crisis situations, many problems I face are too complex for me to solve” and “When confronted with a problem during a crisis, I am unsure of whether I can handle the situation.”). Since a factor with less than three items decreases the fit (Osborne & Costello, 2009), the third factor (with two items) was dropped. The two factors that remained included 15 and 11 items, respectively (see bolded items in Table 7).

To find the best fit of factors, several steps were followed using a confirmatory factor analysis with a maximum likelihood estimation (MLE) method (CFA; using AMOS 22.0). First, considering that previous self-efficacy scales were mostly single-factor measurement scales (i.e., GSE and NGSE), two models (i.e., single factor and two factors) were compared. The fit of the single factor model (factor 1 with 15 items) did not meet the criteria, CMIN/DF = 5.38; CFI = .912; RMSEA = .121, while the fit of the two factors model (factors 1 and 2 with 26 total items; 15 for the first factor and 11 for the second factor) was acceptable, CMIN/DF = 3.80; CFI = .902; RMSEA = .096.

Table 7. Items and Factor Loadings of the Crisis Self-Efficacy Scale

Item No.	Item	Factor		
		1	2	3
1	During a crisis, I can solve difficult problems in crisis situations if I try hard enough.	.480	.615	.267
2	During a crisis, I can stick to my goals.	.299	.799	.175
3	During a crisis, I can accomplish my goals.	.316	.784	.183
4	I am confident that I can deal efficiently with unexpected crisis situations.	.381	.795	.144
5	Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis.	.454	.728	.151
6	I can solve most problems during a crisis if I invest the necessary effort.	.466	.662	.223
7	During a crisis, I can remain calm when facing difficulties.	.418	.681	.108
8	During a crisis, I can rely on my coping abilities.	.501	.584	.193
9	When I am confronted with a problem during a crisis, I can usually find several solutions.	.511	.650	.089
10	If I am in a crisis situation, I can usually think of a solution.	.618	.553	.246
11	During a crisis, I can usually handle whatever comes my way.	.468	.741	.088
12	During a crisis, I can achieve most of the goals that I have set for myself.	.423	.806	.065
13	When facing difficult tasks during a crisis, I am certain that I can complete them.	.597	.634	.153
14	In crisis situations, I can obtain outcomes that are important to me.	.589	.580	.183
15	In crisis situations, I believe I can succeed at most any endeavor to which I set my mind.	.554	.565	.100
16	I will be able to successfully overcome many challenges I face during a crisis.	.565	.662	.141
17	During a crisis, I am confident that I can perform effectively on many different tasks.	.617	.598	.140
18	During a crisis, compared to other people, I can do most tasks very well.	.598	.562	.182
19	Even when things are tough, I can perform quite well during a crisis.	.529	.689	.138
20	I am certain I can master the skills to protect myself during a crisis.	.614	.550	.120
21	I am certain I can figure out how to take action to prevent crisis.	.693	.228	.070

Table 7. Items and Factor Loadings of the Crisis Self-Efficacy Scale (continued)

Item No.	Item	Factor		
		1	2	3
22	I know I can take action to protect myself during a crisis.	.674	.458	.162
23	I am certain I have the ability to take necessary action to protect myself during a crisis.	.721	.444	.132
24	I know that I have the ability to do things to protect myself in case of a crisis.	.723	.448	.170
25	What I do with the knowledge I have about a crisis will keep me safe.	.711	.346	.085
26	I can help others decide what actions to take during a crisis.	.702	.338	.059
27	As far as crisis is concerned, I am a self-reliant person.	.602	.507	.146
28	If I am in a crisis, I can usually think of something to do.	.661	.514	.225
29	I feel prepared to meet most of the demands for crisis situations in my job.	.554	.516	.075
30	I can consider alternatives to solve a problem during a crisis.	.689	.431	.228
31	I can anticipate likely events during a crisis.	.732	.294	.135
32	I am able to use resources effectively during a crisis.	.703	.454	.222
33	In crisis situations I have the ability to solve most problems even though initially no solution is immediately apparent.	.550	.613	.082
34	In crisis situations, many problems I face are too complex for me to solve.	.079	.200	.859
35	When I make plans to solve a problem during a crisis, I am certain that I can make them work.	.678	.499	.106
36	Given enough time and effort, I believe I can solve most problems during a crisis.	.719	.447	.174
37	When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis.	.700	.473	.170
38	I trust my ability to solve new and difficult problems during a crisis.	.662	.514	.225
39	After making a decision during a crisis, the outcome I expected usually matches the actual outcome.	.682	.447	-.002
40	When confronted with a problem during a crisis, I am unsure of whether I can handle the situation.	.197	.105	.852
41	During a crisis, I try to make a plan of action.	.515	.435	.054

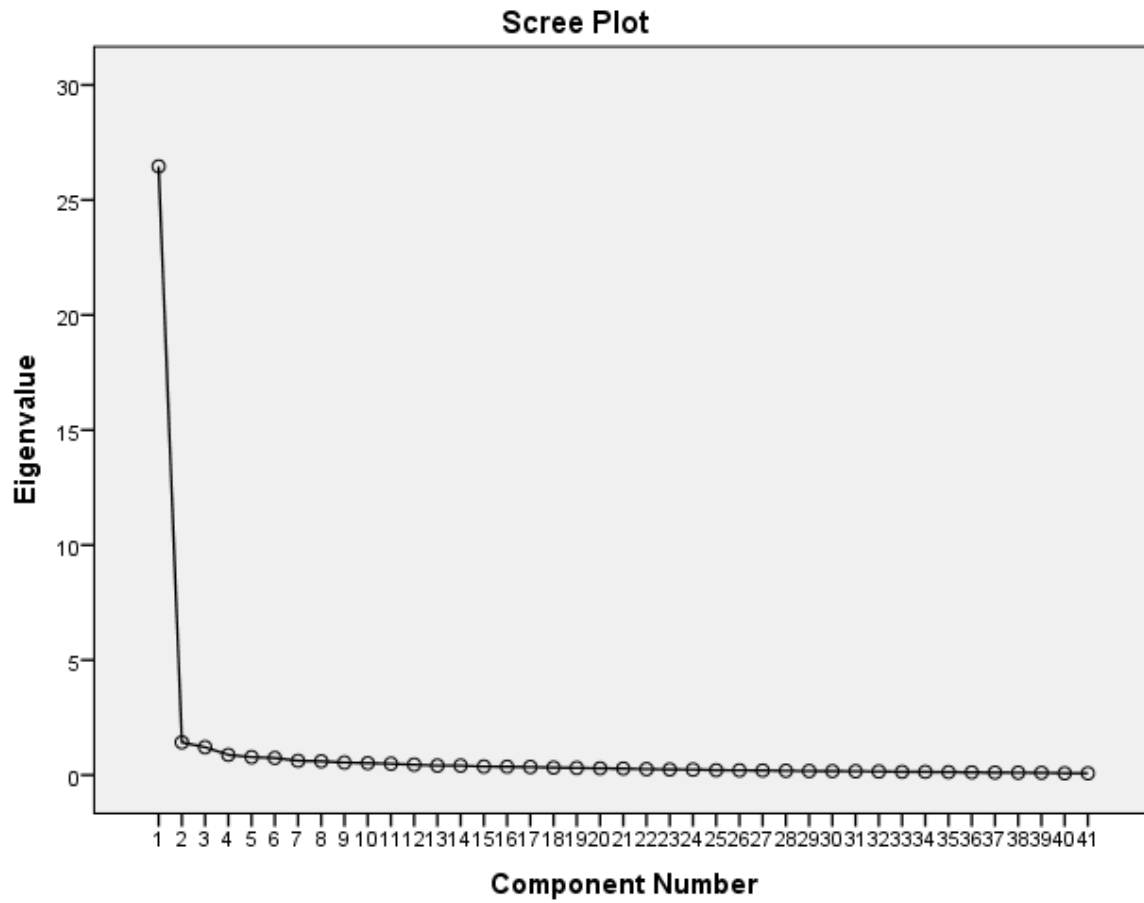


Figure 3. Scree plot with Pilot Testing items

Two other models were compared to make the scale reasonably brief and roughly comparable in length (Lent et al., 2003). The third model was a single factor of items with loadings greater than .70 and with a difference of $< .10$ between the factors (8 items), while the fourth model was a two factor model with loadings greater than .70 with a difference of $< .10$ between the factors (14 items; 8 for the first factor and 6 for the second factor). The fit of the third model did not meet the criteria, CMIN/DF = 5.34; CFI = .956; RMSEA = .120. However, the fourth model showed the best fit among four models, CMIN/DF = 3.76; CFI = .949; RMSEA = .096. Table 8 summarizes the model fit.

As a result, the fourth model that included two factors with 14 items was retained and used in the second data collection. In the first factor, three items modified from foodborne illness crisis efficacy (i.e., “I am certain I have the ability to take necessary action to protect myself during a crisis,” “I know that I have the ability to do things to protect myself in case of a crisis,” and “What I do with the knowledge I have about a crisis will keep me safe.”); one item from counselor activity self-efficacy (i.e. “I can help others decide what actions to take during a crisis”); two items from crisis resource management skill (i.e., “I can anticipate likely events during a crisis,” and “I am able to use resources effectively during a crisis.”); and two items from problem solving confidence (i.e., “Given enough time and effort, I believe I can solve most problems during a crisis,” and “When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis”) were included (Cronbach’s alpha = .942). In the second factor, five items from general self-efficacy (i.e., “During a crisis, I can stick to my goals,” “During a crisis, I can accomplish my goals,” “I am confident that I can deal efficiently with unexpected crisis situations,” “Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis,” and “During a crisis, I can usually handle whatever comes my way”)

Table 8. Model Comparison in Pilot Testing

Model	No. of Items (Factor 1 / Factor 2)	CMIN/DF	Model Fit	
			CFI	RMSEA
Single factor with >.5 loading and difference of < .10	15/0	5.38	.912	.121
Two factors with >.5 loading and difference of < .10	15/11	3.80	.902	.096
Single factor with >.7 loading and difference of < .10	8/0	5.34	.956	.120
Two factors with >.7 loading and difference of < .10	8/6	3.76	.949	.096

Table 9. Items Retained in Pilot Testing

Item No.	Factor No.	Origin	Crisis Self-Efficacy Item
1	1-1	Foodborne Illness Crisis Efficacy	I am certain I have the ability to take necessary action to protect myself during a crisis.
1	1-2	Foodborne Illness Crisis Efficacy	I know that I have the ability to do things to protect myself in case of a crisis.
1	1-3	Foodborne Illness Crisis Efficacy	What I do with the knowledge I have about crisis will keep me safe.
1	1-4	Counselor Activity Self-Efficacy	I can help others decide what actions to take during a crisis.
1	1-5	Crisis Resource Management Skill	I can anticipate likely events during a crisis.
1	1-6	Crisis Resource Management Skill	I am able to use resources effectively during a crisis.
1	1-7	Problem Solving Confidence	Given enough time and effort, I believe I can solve most problems during a crisis.
1	1-8	Problem Solving Confidence	When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis.
2	2-1	General Self-Efficacy	During a crisis, I can stick to my goals.
2	2-2	General Self-Efficacy	During a crisis, I can accomplish my goals.
2	2-3	General Self-Efficacy	I am confident that I can deal efficiently with unexpected crisis situations.
2	2-4	General Self-Efficacy	Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis.
2	2-5	General Self-Efficacy	During a crisis, I can usually handle whatever comes my way.
2	2-6	New General Self-Efficacy	During a crisis, I can achieve most of the goals that I have set for myself.

and one item from new general self-efficacy (i.e. “During a crisis, I can achieve most of the goals that I have set for myself”) were identified (Cronbach’s alpha = .949). Table 9 shows the items and their origins. The alpha of 14 items was .964.

Validation Testing

Sample Profile. Among 519 respondents, 286 (55.1%) were males, and 233 (44.9%) were females. For the ages of participants, the oldest participant was 74 years old while the youngest participant was 18 years old. The average age was 33.97 ($SD = 10.77$). The most prevalent ethnic group was white ($n = 413, 79.6%$), followed by black/African-American ($n = 40, 7.7%$), Asian ($n = 33, 6.4%$), Hispanic ($n = 21, 4.0%$), multi-racial ($n = 8, 1.5%$), and other ($n = 4, 0.8%$). For marital status, 52.6% ($n = 273$) of respondents were single, 35.8% ($n = 186$) indicated that they were married, 6.7% ($n = 35$) were divorced, and 4.9% ($n = 25$) of participants were widowed, separated, or other. Regarding the level of education, college degree 47.2% ($n = 245$) was most frequent, followed by some college ($n = 160, 30.8%$), high school diploma ($n = 64, 12.3%$), graduate degree ($n = 47, 9.1%$), and some high school ($n = 3, 0.6%$). Next, the most frequent household income range was \$30,000 to \$50,000 ($n = 127, 24.5%$), followed by \$15,000 to \$30,000 ($n = 108, 20.8%$), \$50,000 to \$75,000 ($n = 104, 20.0%$), \$75,000 to \$100,000 ($n = 69, 13.3%$), less than \$15,000 ($n = 61, 11.8%$), \$100,000 to \$150,000 ($n = 39, 6.9%$), and \$150,000 or more ($n = 14, 2.7%$). The majority of participants answered that they had no children ($n = 365, 68.4%$), while 17% ($n = 89$) had 1 child, 9.2% ($n = 48$) had 2 children, and 9.2% ($n = 27$) had 3 or more children living in their houses. Finally, respondents were from 45 U.S. states: California was the most frequent ($n = 56, 10.8%$), followed by Florida ($n = 46, 8.9%$), Texas ($n = 38, 7.3%$), New York ($n = 33, 6.4%$), Pennsylvania ($n = 26, 5.0%$), and Illinois and Ohio ($n = 24, 4.6%$ for both). Table 10 summarizes the demographic information of participants.

Table 10. Demographic Information of Validation Testing Sample (N = 519)

Demographics	<i>n</i>	<i>%</i>
Gender		
<i>Male</i>	286	55.1
<i>Female</i>	233	44.9
Age, years		
<25	77	14.9
25-34	250	48.3
35-44	109	21.0
45-54	51	9.8
55-64	25	4.8
65+	6	1.2
Race		
<i>White</i>	413	79.6
<i>Black</i>	40	7.7
<i>Asian</i>	33	6.4
<i>Hispanic</i>	21	4.0
<i>Multi-racial</i>	8	1.5
<i>Other</i>	4	0.8
Marital Status		
<i>Single</i>	273	52.6
<i>Married</i>	186	35.8
<i>Divorced</i>	35	6.7
<i>Widowed</i>	4	0.8
<i>Separated</i>	6	1.2
<i>Other</i>	15	2.9
Education		
<i>Some High School</i>	3	0.6
<i>High School Diploma</i>	64	12.3
<i>Some College</i>	160	30.8
<i>College Degree</i>	245	47.2
<i>Graduate Degree</i>	47	9.1
Household Income		
<i>Less than \$15,000</i>	61	11.8
<i>\$15,000 to \$30,000</i>	108	20.8
<i>\$30,000 to \$50,000</i>	127	24.5
<i>\$50,000 to \$75,000</i>	104	20.0
<i>\$75,000 to \$100,000</i>	69	13.3
<i>\$100,000 to \$150,000</i>	36	6.9
<i>\$150,000 or more</i>	14	2.7
Number of children		
0	365	68.4
1	89	17.1
2	48	9.2
3 or more	27	5.2

Confirmatory Factor Analysis (CFA). Using AMOS 22.0, a series of CFAs were conducted with the maximum likelihood estimation (MLE) method to confirm the underlying constructs of crisis self-efficacy. The first CFA was performed to assess the model fit of the two-factor model identified in the pilot testing. The initial CFA results did not meet the criteria for a good model fit (CMIN/DF = 5.23; CFI = .895; RMSEA: .106). To improve the model fit, regression weights, modification indices, normality, and correlations among items were examined. All regression weights were significant, and the skewness and kurtosis of the items were acceptable. Also, all of the modification indices of regression weights were lower than 10. However, correlations of some items were considerably low compared to other correlations. For example, for items 1-5, the fifth item in the first factor's correlations with other items in the same factor were relatively low ($r_s < .60$), while its correlations with the items in factor 2 were high ($r_s > .60$). Similarly, for items 1-8, the eighth item in the first factor's correlations with other factor 1 items were lower than its correlations with items in factor 2. As a result, items 1-5 ("I can anticipate likely events during a crisis") and 1-8 ("When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis") were deleted.

Next, correlations among items in the same factor were examined to identify possible factors within; high inter-item correlations are indicators of homogeneity, while items that have low correlations with items in the same factor should be removed (Bosscher & Smit, 1998). There were correlations that were notably higher than other correlations. For example, the correlations of item 2-1 ("During a crisis, I can stick to my goals") with item 2-2 ("During a crisis, I can accomplish my goals") and with item 2-6 (i.e., "During a crisis, I can achieve most of the goals that I have set for myself) were very high ($r_s = .896$ and $.882$, respectively). Also, the correlation between items 2-2 and 2-6 was notably high ($r = .917$). Likewise, the correlations

among three other items in the same factor (i.e., items 2-3, 2-4, and 2-5) were higher than their correlations with items 2-1, 2-2, and 2-6. The same patterns were found among the correlations of the items in the first factor (see bold and underlined correlations in Table 11). The patterns suggested the possibility of a four-factor model with three items in each factor; therefore, the goodness of the four-factor model fit was tested.

Another CFA was conducted after 2 items were removed (i.e., items 1-5 and 1-8), and two factors were added based on the correlations. As a result, in the first factor, items 1-1 (“I am certain I have the ability to take necessary action to protect myself during a crisis”), 1-2 (“I know that I have the ability to do things to protect myself in case of a crisis”), and 1-3 (“What I do with the knowledge I have about crisis will keep me safe”) were included, while the items in the second factor were items 1-4 (“I can help others decide what actions to take during a crisis”), 1-6 (“I am able to use resources effectively during a crisis”), and 1-7 (“Given enough time and effort, I believe I can solve most problems during a crisis”). The items in the third factor were items 2-1 (“During a crisis, I can stick to my goals”), 2-2 (“During a crisis, I can accomplish my goals”), and 2-6 (“During a crisis, I can achieve most of the goals that I have set for myself”), and the fourth factor included items 2-3 (“I am confident that I can deal efficiently with unexpected crisis situations”), 2-4 (“Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis”), and 2-5 (“During a crisis, I can usually handle whatever comes my way”). The model fit of this four-factor model was significantly improved compared to the two-factor model (with 14 items) identified in the pilot testing, $CMIN/DF = 3.19$; $CFI = .977$; $RMSEA: .057$.

Table 11. Correlation Matrix for the Crisis Self-Efficacy Items

Items	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	2-1	2-2	2-3	2-4	2-5	2-6
CSE1-1	-													
CSE1-2	<u>.837</u>	-												
CSE1-3	.636	.617	-											
CSE1-4	.618	.653	.638	-										
CSE1-5	.565	.553	.523	.586	-									
CSE1-6	.678	.662	.642	.641	.575	-								
CSE1-7	<u>.746</u>	<u>.716</u>	.618	.648	.573	.659	-							
CSE1-8	.573	.562	.586	.568	.588	.538	.571	-						
CSE2-1	.615	.587	.566	.566	.558	.649	.587	.640	-					
CSE2-2	.582	.561	.529	.553	.546	.614	.585	.637	<u>.896</u>	-				
CSE2-3	.705	.648	.577	.621	.556	.660	.690	.776	.708	.684	-			
CSE2-4	.693	.674	.547	.621	.638	.667	.713	.753	.629	.623	<u>.798</u>	-		
CSE2-5	.740	.740	.597	.651	.597	.722	.755	.778	.694	.718	<u>.838</u>	<u>.825</u>	-	
CSE2-6	.613	.560	.519	.567	.562	.614	.600	.644	<u>.882</u>	<u>.917</u>	.705	.645	.717	-

To assure that the four-factor model also yields a better model fit with the pilot testing data, the final CFA was conducted. The suggested four-factor model with the pilot testing data showed higher model fit indices than the original two-factor model, CMIN/DF = 3.10; CFI = .969; RMSEA: .083. Table 12 shows a comparison of the summary of model fit indices for CFA models, and Figure 4 indicates the CFA model for the four factors of crisis self-efficacy.

Reliability of the Scale and Scale Intercorrelations

The internal reliability of the scale was tested using Cronbach's alpha. First, the alpha of 12 items was calculated, which was .96. Second, the alphas of each factor were .91 for factor 1, .83 for factor 2, .96 for factor 3, and .93 for factor 4, suggesting their internal consistency.

To insure each factor measures different concepts, discriminant validity tests among factors were performed. The results indicated that factor 1 had high correlations with factors 2 and 4 ($r = .798$ and $.816$, respectively), while factor 2 was highly correlated with factor 4 ($r = .778$). The correlation between factor 3 and 4 ($r = .754$) was considered high compared to the rest of the correlations (e.g., the correlation between factors 3 and 1 which was $r = .664$).

Scholars argue that factors with correlations of $< .80$ should be further examined (Rentz, Shepherd, Tashchian, Dabholkar, & Ladd, 2002). First, the correlations between factors were calculated (see Table 13 for correlations). As shown in Table 13, the correlation between factors 1 and 4 was higher than $.80$; therefore, the discriminant validity was tested using model comparison in AMOS 22.0. The first model was the saturated model that allows for all possible relationships among variables, while the second model indicated that the two factors (i.e., factors 1 and 4) were the same. In other words, the correlations between the factors were set to 1 in the second model. The comparison of the models indicated that the models were significantly different, $\chi^2(1) = 14.37, p < .001$.

Table 12. Model Comparison in Pilot and Validation Testing

Model	No. of Items (Factor 1 / 2 / 3 / 4)	Pilot Testing			Validation Testing		
		CMIN/DF	CFI	RMSEA	CMIN/DF	CFI	RMSEA
Two factors model with items 5 and 8	8 / 6	3.76	.949	.096	5.23	.895	.106
Four factors model without items 5 and 8	3 / 3 / 3 / 3	3.10	.969	.083	3.19	.977	.057

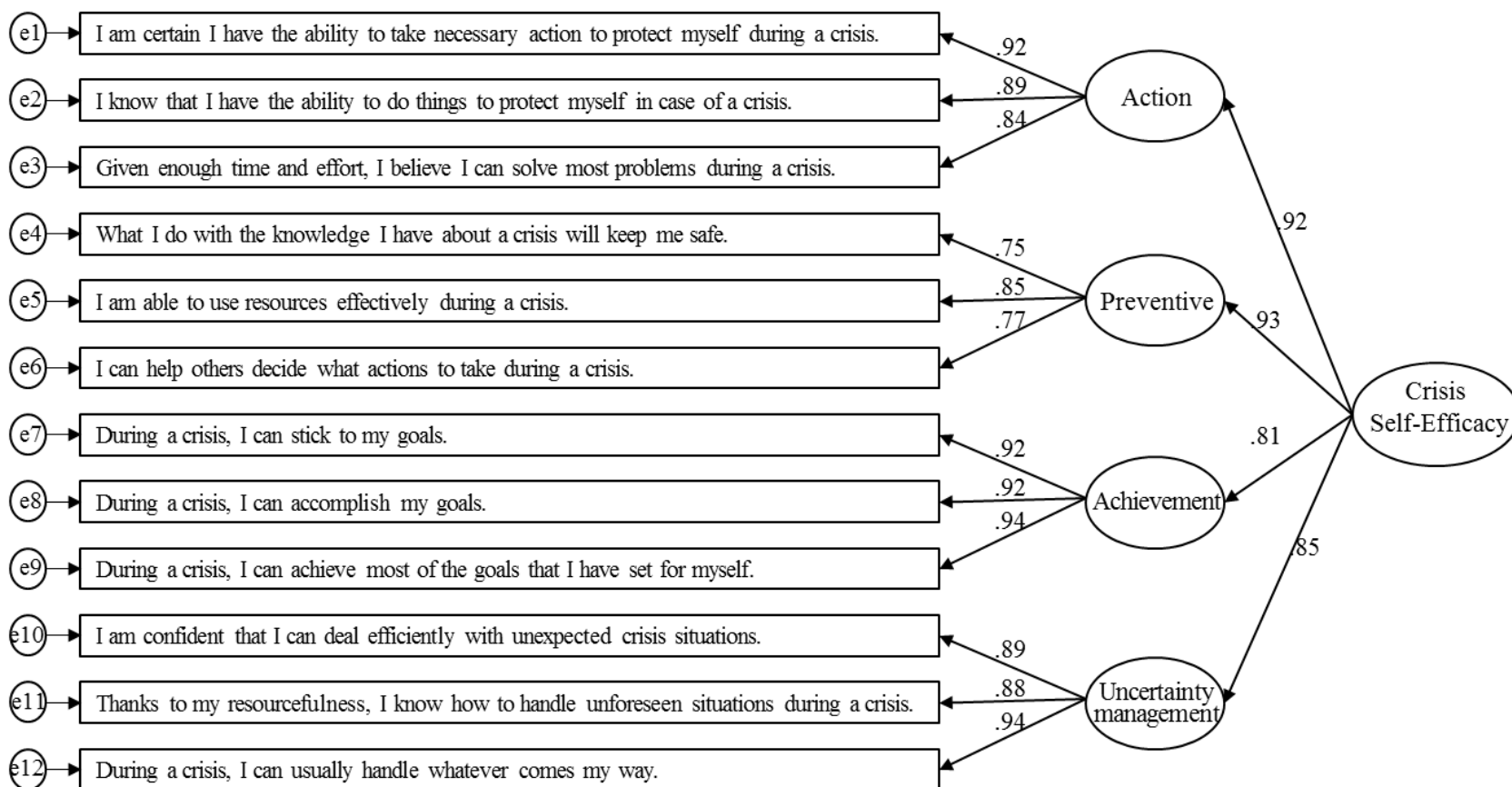


Figure 4. Confirmatory Factor Analysis (CFA) Model for the Four Dimensions of Crisis Self-Efficacy

Table 13. Correlation Matrix for the Crisis Self-Efficacy Dimensions

Items	Factor1	Factor2	Factor3	Factor4
Factor1	-			
Factor2	.798	-		
Factor3	.664	.691	-	
Factor4	.816	.778	.754	-

The model fit of the second model was significantly lower (CMIN/DF = 3.70; CFI = .980; RMSEA: .072) than that of the first model. Therefore, it was concluded that the two factors had sufficient discriminant validity.

Convergent and Discriminant Validity of the Scale

As discussed, to assess construct validity (i.e., convergent and discriminant validities) of the crisis self-efficacy scale, participants' general self-efficacy and social desirability were measured. Prior to exploring correlations among the scale and criterion variables, the mean, standard deviation, kurtosis, and skewedness of each variable were reviewed. Table 14 summarizes the descriptive statistics.

Table 14. Descriptive Statistics for Crisis Self-Efficacy and the Criterion Variables

Variable	M	SD	Min.	Max.	Kurtosis	Skewness
Factor 1	5.28	1.21	1	7	1.58	-1.20
Factor 2	5.24	1.07	1	7	.91	-.88
Factor 3	4.87	1.37	1	7	-.17	-.72
Factor 4	5.06	1.31	1	7	.50	-.96
Crisis Self-Efficacy	5.11	1.12	1	7	.77	-.92
General Self-Efficacy	3.81	.64	1	5	2.23	-1.04
Social desirability	3.16	.67	1	5	-.01	.22

Note: Factors 1-4 and crisis self-efficacy were measured on a 7-point scale; general self-efficacy and social desirability were measure on a 5-point scale.

Next, the correlations among crisis self-efficacy, general self-efficacy, and social desirability were calculated. Overall, the factors comprising crisis self-efficacy and the overall scale showed low correlations with participants' social desirability scores, while their correlations with general self-efficacy were high. For instance, the correlations between crisis self-efficacy factors with social desirability were .16, .13, .13, and .16 (factors 1, 2, 3, and 4, respectively). Also, although it was significant, the correlation between the crisis self-efficacy scale and social desirability was small, $r = .16$, $p < .01$. On the other hand, the correlations of factors with general self-efficacy were .69, .68, .62, and .67 (factors 1, 2, 3, and 4, respectively), and the correlation between crisis self-efficacy and general self-efficacy was $r = .74$, $p < .01$. Collectively, that the crisis self-efficacy scale and its factors had high correlations with general self-efficacy and low correlations with social desirability provides strong evidence to support the convergent and discriminant validity of the crisis self-efficacy scale.

Table 15. Correlations of the Crisis Self-Efficacy Scale to the Criterion Variables

	Social Desirability	General Self-Efficacy
Factor1	.16**	.69**
Factor2	.13**	.68**
Factor3	.13**	.62**
Factor4	.16**	.67**
CSE total	.16**	.74**

** $p < .01$.

Indicators of Crisis Self-Efficacy

Gender. RQ 3(a) explored the difference in crisis self-efficacy by gender. An ANOVA was conducted to examine the difference. The results yielded a significant difference in crisis self-efficacy by gender. Male participants' average score was 5.22, and the mean score of

females was 4.98. This difference between genders was statistically significant, $F(1,517) = 5.61$, $p < .05$. Specifically, the difference between genders in crisis self-efficacy was from the differences in factors 2 and 3; however, the differences between genders in factors 1 and 4 were not significant. Table 16 shows means for genders and ANOVA results.

Table 16. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Gender

	Male ($n = 286$)	Female ($n = 233$)	df	F
Factor1	5.37(1.20)	5.17(1.20)		3.34
Factor2	5.32(1.04)	5.14(1.09)		3.86*
Factor3	5.02(1.37)	4.68(1.35)	1, 517	7.82**
Factor4	5.16(1.29)	4.94(1.33)		3.33
CSE total	5.22(1.12)	4.98(1.10)		5.61*

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

Age. The difference in crisis self-efficacy among age groups was tested using ANOVA. Prior to the analysis, the open-ended measure of age was recoded into 6 categories: 18-24, 25-34, 35-44, 45-54, 55-64, and 65+. Age groups were assigned a value of 1-6 in chronological order by group. There were slight deviations across age groups; however, ANOVA results indicated that age was not a predictor of crisis self-efficacy and its factors, $F(5, 513) = 1.19$, $p = .32$. Overall, people whose age was between 45 and 54 had the highest crisis self-efficacy scores ($M = 5.39$), while participants ages 25 to 34 had the lowest crisis self-efficacy scores ($M = 5.01$). Table 17 summarizes the results.

Table 17. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Age Group

	18-24 (<i>n</i> = 77)	25-34 (<i>n</i> = 250)	35-44 (<i>n</i> = 109)	45-54 (<i>n</i> = 51)	55-64 (<i>n</i> = 25)	65+ (<i>n</i> = 6)	<i>df</i>	<i>F</i>
Factor1	5.36(1.23)	5.18(1.27)	5.38(1.10)	5.48(.94)	5.12(1.40)	5.39(1.21)	5,513	.92
Factor2	5.22(1.03)	5.17(1.12)	5.25(1.10)	5.58(.71)	5.28(1.07)	5.27(1.07)		1.33
Factor3	5.02(1.41)	4.77(1.38)	4.83(1.39)	5.18(1.04)	4.92(1.46)	4.56(2.01)		1.11
Factor4	5.06(1.20)	4.92(1.41)	5.20(1.20)	5.31(1.10)	5.07(1.49)	6.00(.63)		1.78
CSE total	5.16(1.09)	5.01(1.19)	5.17(1.05)	5.39(.82)	5.09(1.27)	5.31(1.04)		1.19

Ethnicity. For RQ3(c), an ANOVA was conducted to explore if crisis self-efficacy levels differed significantly by participants' ethnicities. The results indicated that differences in crisis self-efficacy and its factors by ethnic group were not significant for crisis self-efficacy and its factors. As shown in Table 18, means for each ethnic group were around 5.00.

Table 18. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Ethnicity

	Black (<i>n</i> = 40)	White (<i>n</i> = 413)	Asian (<i>n</i> = 33)	Hispanic (<i>n</i> = 21)	Multi-racial (<i>n</i> = 8)	Other (<i>n</i> = 4)	<i>df</i>	<i>F</i>
Factor1	5.25(1.27)	5.29(1.20)	5.52(.91)	5.02(1.60)	4.63(1.40)	5.83(.33)	5,513	1.10
Factor2	5.33(.98)	5.24(1.06)	5.43(.87)	5.00(1.44)	4.71(1.43)	5.33(.82)		.89
Factor3	4.94(1.38)	4.84(1.37)	5.11(1.32)	5.03(1.40)	4.25(1.47)	5.25(.96)		.71
Factor4	4.99(1.32)	5.07(1.31)	5.30(1.06)	4.94(1.63)	4.16(1.60)	5.50(.64)		.112
CSE total	5.13(1.04)	5.11(1.12)	5.34(.89)	5.00(1.43)	4.44(1.25)	5.47(.63)		1.00

Marital Status. RQ3(d) examined differences in crisis self-efficacy by marital status. Although people with “widowed” status had the highest overall scores ($M = 5.85$) and with “separated” had the lowest overall scores ($M = 4.86$) for crisis self-efficacy, the overall difference was not significant $F(5, 513) = .64, p = .67$. Table 19 presents mean, standard deviation, and ANOVA results for crisis self-efficacy by marital status.

Table 19. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Marital Status

	Single (<i>n</i> = 273)	Married (<i>n</i> = 186)	Divorced (<i>n</i> = 35)	Widowed (<i>n</i> = 4)	Separated (<i>n</i> = 6)	Other (<i>n</i> = 15)	<i>df</i>	<i>F</i>
Factor1	5.21(1.28)	5.35(1.10)	5.30(1.20)	6.08(.92)	5.17(.81)	5.58(1.20)		.89
Factor2	5.19(1.11)	5.28(1.03)	5.36(.93)	5.58(1.45)	5.22(.81)	5.53(1.13)	5,513	.58
Factor3	4.89(1.35)	4.84(1.36)	4.91(1.50)	5.50(1.91)	3.89(1.62)	5.11(1.46)		.91
Factor4	5.00(1.32)	5.10(1.30)	5.18(1.28)	6.25(.96)	5.17(1.07)	4.98(1.31)		.89
CSE total	5.07(1.15)	5.14(1.07)	5.19(1.08)	5.85(1.30)	4.86(.77)	5.30(1.26)		.64

Household income. Participants whose household income was between \$100,000 and \$150,000 had the highest crisis-self-efficacy scores ($M = 5.46$), followed by \$50,000 to \$75,000 ($M = 5.39$), \$75,000 to \$100,000 ($M = 5.12$), \$150,000 or more ($M = 5.10$), \$15,000 to \$30,000 ($M = 5.09$), \$30,000 to \$50,000 ($M = 4.96$), and less than \$15,000 ($M = 4.80$). There was a significant relationship between household income and crisis self-efficacy, $F(6,512) = 2.96$, $p < .001$. Post hoc comparison using the LSD test indicated that crisis self-efficacy levels of the participants whose income was less than \$15,000 was significantly lower than those of participants whose income was \$50,000 to \$70,000 and \$100,000 to \$150,000. Also, the income group of \$15,000 to \$30,000 had a lower crisis self-efficacy score than the \$50,000 to \$75,000 group did. Finally, the income group of \$30,000 to \$50,000's score was lower than the scores of the \$50,000 to \$75,000 group and of the \$100,000 to \$150,000 group. All other comparisons were not significant. Refer to Table 20 for the details of the analysis.

Table 20. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Household Income

	< \$15K (<i>n</i> = 61)	\$15K-\$30K (<i>n</i> = 108)	\$30K-\$50K (<i>n</i> = 127)	\$50K-\$75K (<i>n</i> = 104)	\$75K-\$100K (<i>n</i> = 69)	\$100K-\$150K (<i>n</i> = 36)	> \$150K (<i>n</i> = 14)	<i>df</i>	<i>F</i>
Factor1	4.97(1.40)	5.28(1.24)	5.07(1.29)	5.52(.98)	5.36(1.13)	5.68(.96)	5.40(1.13)	6, 512	2.78*
Factor2	5.09(1.10)	5.19(1.11)	5.13(1.14)	5.45(.89)	5.22(1.10)	5.54(.93)	5.21(1.08)		1.62
Factor3	4.50(1.54)	4.84(1.45)	4.76(1.31)	5.19(1.16)	4.78(1.35)	5.28(1.32)	4.62(1.70)		2.57*
Factor4	4.63(1.38)	5.04(1.42)	4.88(1.35)	5.41(1.08)	5.13(1.21)	5.34(1.22)	5.14(1.41)		3.15**
CSE total	4.80(1.19)	5.09(1.20)	4.96(1.15)	5.39(.91)	5.12(1.09)	5.46(.97)	5.10(1.20)		2.96**

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

Education level. For RQ3(f), an ANOVA was conducted to test whether participants' levels of education indicated their crisis self-efficacy scores. The results reveal that people's crisis self-efficacy did not differ significantly based on their education levels, $F(4, 514) = .65, p = .62$. Similarly, there was no difference in the 4 factors by participants' education levels. See Table 21 for results.

Table 21. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Education

	Some high school ($n = 3$)	High school diploma ($n = 64$)	Some college ($n = 160$)	College degree ($n = 245$)	Graduate degree ($n = 47$)	df	F
Factor1	5.67(.58)	5.33(1.31)	5.20(1.30)	5.34(1.15)	5.16(1.00)	4,514	.58
Factor2	6.33(.33)	5.35(1.17)	5.16(1.12)	5.26(1.04)	5.22(.88)		1.23
Factor3	4.78(2.12)	5.04(1.33)	4.89(1.46)	4.86(1.33)	4.62(1.28)		.65
Factor4	5.56(.51)	5.10(1.41)	4.91(1.44)	5.16(1.23)	4.95(1.16)		1.13
CSE total	5.58(.65)	5.21(1.22)	5.04(1.21)	5.16(1.07)	4.99(.92)		.65

Number of children. RQ3(g) explored whether the number of participants' children living in their homes predicts their crisis self-efficacy. A linear regression analysis was performed assigning the number of children as the independent variable and crisis self-efficacy scores as the dependent variable. The results showed that the number of children in the house was not a significant indicator of people's crisis self-efficacy, $\beta = .02, p = .67$. Another analysis using ANOVA was conducted to see whether the presence of children made a difference in scores. Before the analysis, a binary variable that indicated whether or not participants have children living in their homes was created. If a participant had no child at home, his/her response was coded as 1, and if a participant had 1 or more children at home, his/her response was coded as 2. The ANOVA results confirmed that the presence of children in the house was not a

predictor of crisis self-efficacy, $F(1, 517) = .30, p = .59$. Table 22 summarizes the ANOVA results.

Table 22. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by Children in House

	No child ($n = 355$)	1 or more children ($n = 164$)	<i>df</i>	<i>F</i>
Factor1	5.25(1.25)	5.35(1.09)		.67
Factor2	5.24(1.07)	5.25(1.07)		.02
Factor3	4.85(1.37)	4.92(1.37)	1, 517	.34
Factor4	5.05(1.29)	5.09(1.36)		.13
CSE total	5.10(1.12)	5.15(1.11)		.30

State residency. RQ3(h) examined whether participants' crisis self-efficacy differed depending on the state in which they reside. Overall, state residency did not predict people's crisis self-efficacy, $F(44, 474) = 1.05, p = .38$. However, according to the federal emergency management agency (FEMA) (2016), people face different numbers of disasters in their lives depending on the state in which they live. For example, between 1953 and 2012, Texas had 86 disasters that included severe storms, tornadoes, and hurricanes, while Wyoming only had 9 disasters for the same period of time (FEMA, 2016). Considering this, it was expected that people's experience of disasters would be different according to their state residency.

Scholars argue that disaster per square mile is one of the most important factors to consider in disaster studies (e.g., Cutter, Boruff, & Shirley, 2003; Sims & Baumann, 1972). First, the current study ranked the 50 U.S. states based on disasters per square mile; each state had between 1953 and 2012. The results showed that California (11.0 disasters per square mile), Texas (7.5 disasters per square mile), and Kansas (5.0 disasters per square mile) were the top three states affected by disaster, and Indiana, Rhode Island, Vermont, and Kentucky (0.1 disasters per square mile each) were the states that had the lowest number of disasters per square

Table 23. State Rankings by Disaster per Square Mile

Ranking	State	Disaster per miles	Ranking	State	Disaster per miles
1	California	11.04	26	Missouri	0.92
2	Texas	7.53	27	Virginia	0.84
3	Kansas	5.04	28	Wisconsin	0.83
4	New Mexico	4.29	29	Mississippi	0.77
5	Idaho	3.85	30	New York	0.75
6	Alaska	3.84	31	Arkansas	0.69
7	North Dakota	3.63	32	South Carolina	0.67
8	Montana	3.47	33	Oklahoma	0.66
9	Iowa	2.42	34	Colorado	0.64
10	Arizona	2.18	35	Georgia	0.63
11	Alabama	1.47	36	Wyoming	0.57
12	Nebraska	1.44	37	Maryland	0.55
13	South Dakota	1.40	38	New Jersey	0.54
14	Nevada	1.35	39	Massachusetts	0.43
15	Michigan	1.24	40	New Hampshire	0.39
16	Pennsylvania	1.22	41	West Virginia	0.34
17	Florida	1.21	42	Tennessee	0.30
18	North Carolina	1.18	43	Maine	0.28
19	Washington	1.17	44	Connecticut	0.27
20	Illinois	1.15	45	Delaware	0.24
21	Minnesota	1.13	46	Hawaii	0.21
22	Oregon	1.12	47	Indiana	0.16
23	Louisiana	1.10	48	Rhode Island	0.15
24	Utah	1.06	49	Vermont	0.13
25	Ohio	0.96	50	Kentucky	0.12

Note: Data from FEMA (2016).

mile. Then, the states were divided evenly into five categories based on the disasters per square mile they had. The top 10 states were group 1, the 11th to 20th states were group 2, the 21th to 30th states were group 3, the 31th to 40th states were group 4, and the 41th to 50th states were group 5 (see Table 23 for the rankings).

Next, an ANOVA was conducted with group as the independent variable and crisis self-efficacy as the dependent variable. The results indicated that the average number of disasters per square mile of the participants' state of residency was an indicator of people's crisis self-efficacy, $F(4, 514) = 2.71, p < .05$. Interestingly, participants' crisis self-efficacy scores increased as their states had less disaster per square mile. For example, group 1's crisis self-efficacy was 4.95, group 2's score was 5.11, group 3's score was 5.17, and group 4's score was the highest at 5.41. However, for participants who had the least disasters per square mile (i.e., group 5), crisis self-efficacy scores dropped ($M = 4.96$), and for that group the score was close to the score of group 1. Post hoc comparison using the LSD test indicated that group 4's (i.e., the 31th to 40th states on the list; 0.39 to 0.69 disasters per square mile) crisis self-efficacy was significantly higher than group 1 and group 5's crisis self-efficacy scores. All other comparisons were not significant.

Table 24. Mean, Standard Deviation, ANOVA Results for Crisis Self-Efficacy by State Residency

	Group 1 (<i>n</i> = 125)	Group 2 (<i>n</i> = 162)	Group 3 (<i>n</i> = 122)	Group 4 (<i>n</i> = 68)	Group 5 (<i>n</i> = 42)	<i>df</i>	<i>F</i>
Factor1	5.67(.58)	5.33(1.31)	5.20(1.30)	5.34(1.15)	5.16(1.00)	4,514	3.31*
Factor2	5.10(1.15)	5.31(1.09)	5.25(.98)	5.46(.90)	5.03(1.15)		1.91
Factor3	4.75(1.33)	4.86(1.49)	4.92(1.29)	5.06(1.27)	4.75(1.41)		1.17
Factor4	4.89(1.44)	5.00(1.33)	5.15(1.16)	5.44(1.16)	4.94(1.42)		2.39*
CSE total	4.95(1.19)	5.11(1.17)	5.17(1.01)	5.41(.94)	4.96(1.18)		2.71*

* $p < .05$

Table 25. Summary of Research Findings

Research Question	Findings
RQ1: What are the underlying constructs of crisis self-efficacy?	Four constructs of crisis self-efficacy: action efficacy, preventive efficacy, achievement efficacy, and uncertainty management efficacy
RQ2(a): What is the reliability of the scale?	Cronbach's α (the scale) = .96
RQ2(b): What is the convergent validity of the scale?	High correlations with general self-efficacy (γ s = .62 - .74)
RQ2(c): What is the discriminant validity of the scale?	Low correlations with general self-efficacy (γ s = .13 - .16)
RQ3(a): Is there a gender difference in crisis self-efficacy?	Yes. Males ($M = 5.22$) showed higher crisis self-efficacy than female ($M = 4.98$), $F(1,517) = 5.61, p < .05$.
RQ3(b): Is there a difference in crisis self-efficacy among age groups?	No, $F(5,513) = .32, p = ns$.
RQ3(c): Is there a difference in crisis self-efficacy among ethnic groups?	No, $F(5,513) = 1.00, p = ns$.
RQ3(d): Is there a difference in crisis self-efficacy based on marital status?	No, $F(5,513) = .64, p = ns$.
RQ3(e): Is there a difference in crisis self-efficacy based on household income?	Yes, $F(5,513) = 2.96, p < .01$. Mid to high incomes (> \$50,000) had higher crisis self-efficacy than low incomes (< \$50,000).
RQ3(f): Is there a difference in crisis self-efficacy based on participants' education levels?	No, $F(4,514) = .65, p = ns$.
RQ3(g): Is there a difference in crisis self-efficacy based on the number of children in house?	No, $\beta = .02, p = .67$
RQ3(h): Is there a difference in crisis self-efficacy based on the states participants live in?	Yes, $F(4, 514) = 2.71$. Participants' scores on crisis self-efficacy was increased as their state had more disaster per square mile

CHAPTER 5

DISCUSSION

Scholars have argued that crisis preparedness is a critical aspect of crisis management that is somewhat overlooked in scholarly research (e.g., Avery et al., 2010; Janoske et al., 2012). McEntire and Myers (2004) propose that increasing people's crisis preparedness via public education is key to minimizing possible damages of a crisis; yet, not much is known about crisis preparedness, particularly at the individual level. As discussed previously, most of the literature in the crisis communication field highlights the importance of responses from organizations in crisis (McEntire & Myers, 2004). Mileti (1991) notes that "effective preparedness and response activities help save lives, reduce injuries, limit property damage, and minimize all sorts of disruptions that disasters cause" (p. 239). Similarly, Kreps (1984) suggests that people's ability to cope with crisis situations can be enhanced dramatically with even just a minimal amount of preparedness. Despite its clear importance, research on crisis preparedness is lacking (Avery et al., 2010), and this study sought to address this deficit.

An operational definition of a concept provides details about how research will empirically measure the concept (Wimmer & Dominick, 2013). An operational definition assigns meaning to a variable for better understanding of the concept, and having a sound operational definition to insure researchers are measuring what they intend to measure is critical. Measurement is an indicator of how well a concept is operationalized (Wimmer & Dominick, 2013); therefore, measurements should be selected with careful consideration and should be tailored to the research context. In the extant body of crisis communication literature, most of the measurements employed are adopted from previous studies and/or other fields (e.g., psychology and sociology), and scholars have expressed concern about the lack of scales specifically

developed for measuring crisis communication concepts (Cloudman & Hallahan, 2006). Due to the limited reliability, validity, and applicability of borrowed/adapted scales, developing measurements that are specific to the crisis communication context is important.

The current study develops and validates a scale that measures people's crisis preparedness. Specifically, to predict people's behaviors and crisis preparedness levels in the pre-crisis phase as well as understand how they will respond to directives in the crisis situation, a context-specific crisis self-efficacy scale is developed. Previous research demonstrates that self-efficacy is a strong predictor of crisis preparedness (Hoy & Spero, 2005; Paton, 2003; Uhernik, 2008). For a more comprehensive understanding of crisis self-efficacy, the underlying constructs and predictors of the concept are examined, and the results of data analyses are discussed in this section.

Constructs of Crisis Self-Efficacy

To identify underlying constructs of crisis self-efficacy, first, items from previous research on self-efficacy were reviewed. Among them, only statements relevant to the crisis context were modified and/or adopted for the creation of the initial crisis self-efficacy items list. Then, the items on the list went through two screening processes. The first screening process was completed by seven experts who published research that used measures of self-efficacy in a crisis context. The focus of the process was the face and content validity of items in the list. Based on the experts' comments, items were removed, added, modified, or revised. The second screening process was conducted by 50 members of the general public to test the comprehension and readability of the items. The items were revised again based on the comments from the general public. Next, an EFA was performed with 302 participants to identify underlying factors of the crisis self-efficacy scale. The results identified two factors with 14 items of crisis self-efficacy;

however, the two-factor model did not have strong model fit in a confirmatory factors analysis conducted in the validation testing of the scale. Correlations among items were reviewed to increase the model fit. As a result, two items were dropped, and two more factors were identified, resulting in a four factor crisis self-efficacy scale with 12 total items.

The first construct of crisis self-efficacy includes three items: (a) “I am certain I have the ability to take necessary action to protect myself during a crisis,” (b) “I know that I have the ability to do things to protect myself in case of a crisis,” and (c) “Given enough time and effort, I believe I can solve most problems during a crisis.” The construct is entitled ‘action efficacy’ since the items in the construct reflect one’s beliefs about his or her ability to perform protective actions in crisis. In crisis situations, people often behave irrationally if they panic. Such irrational behavior can exacerbate damage; therefore, having a high level of action efficacy could help prevent people from additional or unnecessary harm. Also, even if a person is confident in his or her ability to cope with crisis, it may not be possible for the person to act on something because ‘thinking’ and ‘doing’ are different, especially during crisis situations (Frisby et al., 2014). Therefore, a construct that measures whether one can believe he or she can take protective behaviors is a critical facet of measuring one’s crisis self-efficacy.

Considering that action efficacy concerns whether individuals can act to protect themselves in crisis situations, this construct is especially valuable to crisis officials. For example, in crises such as natural disasters, protective behaviors are extremely important in minimizing the damage of crisis. That is, if a person takes appropriate protective actions if a tornado hits, s/he will increase the chance of survival. However, if the person fails to take protective measures, his/her life could be threatened. Therefore, crisis officials should gauge

people's levels of action efficacy regularly using the action efficacy items and educate publics to bolster their action efficacy so that the damage of a crisis can be minimized in the future.

Compared to the scores on the other constructs of the crisis self-efficacy scale, the participants in this study had the highest scores on action efficacy ($M = 5.28$). In other words, overall, people believed that they had the ability to protect themselves in crisis. This result is not surprising, as previous research suggests that people tend to be optimistic about their abilities to deal with crisis situations (e.g., Sattler, Kaiser, & Hittner, 2000). At the same time, scholars argue that an optimistic bias about people's crisis management skills could result in disaster. For example, Lindell and Ferry (1992) found that individuals with optimistic bias in a flood case (i.e., people who believed that they could effectively handle a flood situation) suffered more serious damages than people without optimistic bias. Therefore, it is critical that crisis officials and managers make efforts to warn people not to be overly optimistic about their abilities to handle crisis situations and to be realistic in their assessments. For instance, officials and managers may measure the levels of individuals' action efficacy, identify people with a high score, and assess whether high scores reflect an optimistic bias or not. Also, the action efficacy items can be used to identify people who are not confident about taking protective actions during crisis (i.e., low scores on action efficacy). For those individuals, officials may consider developing a program that is designed to increase their action efficacy levels and encourage them to participate in the program.

The items in the second construct are (a) "What I do with the knowledge I have about a crisis will keep me safe," (b) "I am able to use resources effectively during a crisis," and (c) "I can help others decide what actions to take during a crisis." The construct is named 'preventive efficacy' and defined as one's beliefs about his or her level of crisis preparedness. In other words,

it is a self-assessment of one's crisis preparedness. If a person believes that s/he is well-prepared for crisis situations, s/he will show a high score on preventive efficacy and vice versa. As the items imply, a higher score on preventive efficacy reflects that the person is confident about his or her crisis knowledge, having plenty of resources to use, and helping others cope with crisis situations with that knowledge.

This construct is closely related to the activities performed before a crisis occurs. That is, whether people have knowledge about crisis and/or resources to use is typically determined before a crisis occurs. The construct allows researchers and officials to learn about how much people are prepared for crisis. Theoretically, the construct helps scholars to better understand people's actual crisis preparedness. By doing so, the construct enables researchers to argue that paying attention to people (not the organization in crisis) is critical in crisis management. Practically, if crisis officials provide enough information and resources prior to crisis so that people have more knowledge about the crisis in advance, people's level of preventive efficacy can be increased.

Researchers have argued that lack of information and resources leads to uncertainty in crisis, and people with higher levels of uncertainty are likely to be placed in more dangerous situations during crisis (Moynihan, 2008). Therefore, officials should note that reducing uncertainty surrounding a crisis by offering extensive resources and information to the public before the crisis occurs is a critical step in minimizing potential damage of a crisis. In that case, the items in this construct could be helpful for officials to measure the effectiveness of the distribution of information and resources through how well informed publics are. For example, community officials could gauge the effectiveness of a disaster safety campaign (i.e., whether people in the community received the information provided by the community officials and

whether that information actually bolstered people's efficacy) using the preventive efficacy items identified in the current research. Also, crisis researchers may utilize these preventive efficacy items. For instance, there have been limited efforts to develop measurements that gauge the level of preparedness among people (Cloudman & Hallahan, 2006). Using the items in the preventive efficacy construct, researchers will be able to test the effectiveness of messages and whether they actually increased individuals' preparedness (i.e., knowledge levels and/or confidence in crisis management).

The third construct is entitled 'achievement efficacy.' It is comprised of three items as well: (a) "During a crisis, I can stick to my goals," (b) "During a crisis, I can accomplish my goals," and (c) "During a crisis, I can achieve most of the goals that I have set for myself." The construct is defined as one's beliefs about his or her ability to accomplish goals during crisis. That is, if an individual is high in achievement efficacy, the individual strongly believes that s/he can accomplish goals that s/he set during crisis despite the uncertainties and difficulties crisis situations impose.

The participants in this study had the lowest scores on achievement efficacy among the four constructs of crisis self-efficacy ($M = 4.87$). A possible reason for this low score would be that people do not know what would constitute desirable goals during crisis or have not set goals for crisis response; thus, they believed that they could not stick to and achieve goals during crisis. Considering this, to increase individual's achievement efficacy, officials may consider providing very specific, detailed directions to follow when a crisis occurs. For example, if a tornado strikes, official announcements should include response directives such as taking cover and moving to the lowest floor of the house or building. These directions are critical for people in crisis because taking such actions reduces their risks of damages. In a similar vein, officials should carefully

consider channels for delivering directions during crisis. For instance, often, radio is the only available channel during natural disasters (Birowo, 2010; Spence, McIntyre, Lachlan, Savage, & Seeger, 2011). If directives are issued through a channel that was not available during a certain crisis (e.g., TV and/or websites), people may not receive the directions, and, are thus unable to achieve response goals. All in all, officials should note that people's sense of achievement efficacy is relatively low and that delivering directions to follow through the proper channel could be a solution in boosting achievement efficacy.

The last construct includes the following three items: (a) "I am confident that I can deal efficiently with unexpected crisis situations," (b) "Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis," and (c) "During a crisis, I can usually handle whatever comes my way." As these items pertain to one's confidence in handling unexpected or unforeseen crisis situations, the construct is named 'uncertainty management efficacy.' Uncertainty management efficacy is defined as one's beliefs about his/her ability to deal with uncertainties in crisis. A crisis event imposes many uncertainties. If an individual can effectively manage uncertainties during crisis, chances are increased that s/he would be able to successfully take appropriate precautions in crisis situations.

Managing uncertainty has been an important topic in crisis management. Crisis is always fraught with uncertainties. It is critical for crisis management to minimize uncertainty before a crisis occurs as well as manage uncertainties that emerge during a crisis (Murphy, 1996; Reynolds, & Seeger, 2005; Ulmer, Seeger, & Sellnow, 2007). Considering that uncertainty management efficacy in this research reflects one's beliefs about the ability to deal with uncertainty in crisis situations, reducing the amount of uncertainty before crisis occurs would result in a higher level of uncertainty management efficacy. That is, if a person has less

uncertainty about crisis before it occurs, that person is likely to show high uncertainty management efficacy as there's less uncertainty that s/he needs to handle. Therefore, it is critical for crisis officials to take actions to minimize uncertainties before crisis.

Researchers have suggested several solutions for reducing uncertainties. First, scholars such as Dawes, Cresswell, and Cahan (2004) argue that an existing network of personal relationships could minimize uncertainties experienced by people in crisis. The authors found that a strong interpersonal network among individuals enabled the flow of information about the attack on the world trade center (WTC) on September 1, 2001 (e.g., texting and calling friends/family members about the attack) and as a result of the information flow, people's uncertainties were decreased during the crisis (i.e., people around the WTC received information about the attack via their personal networks so they knew what happened to them and how to behave in the situation). Given this finding, officials should encourage people to develop a strong network so that uncertainties they may face in crisis are minimized by their communication within their networks, and, as a result, they may develop a high level of uncertainty management efficacy before and during crisis.

Second, previous research on uncertainty reduction contends that simulation and training reduce uncertainties in crisis. For instance, Ulmer, Sellnow, and Seeger (2013) argue that indirect experiences with crisis situations via simulation and training processes significantly decrease uncertainty in crisis. Based on this argument, the authors suggest that having simulation and training processes should be an important criterion in evaluating crisis preparedness (Ulmer et al., 2013). Similarly, Sniezek, Wilkins, Wadlington, and Baumann. (2002) propose that "multiple novel scenarios increase breadth of knowledge, aid in the reduction of uncertainty" (p.153). In other words, if people experience crisis situations through reading or experiencing

possible scenarios in crisis, their levels of uncertainty may decrease. However, there is little empirical evidence that supports those arguments (i.e., simulations, trainings, and/or scenarios reduce uncertainty) in the literature. In this application, the uncertainty management items in this study can be a useful tool for scholars to test the effects of simulations, trainings, and/or scenarios in uncertainty reduction in crisis. If the effects are identified through research, officials should develop such simulations, trainings, and scenarios for publics to experience crisis in advance and thus minimize uncertainty prior to crisis. In that case, the uncertainty management items identified in this research can be an important measure that gauges the difference in uncertainty levels before and after the simulations, trainings, and/or scenarios.

All in all, the four constructs identified in this research are action efficacy, preventive efficacy, achievement efficacy, and uncertainty management efficacy. As discussed, each construct measures a unique aspect of one's crisis self-efficacy, and the composite score of these components reflects a strong, valid measure of an individual's overall crisis self-efficacy. Scholars and officials realize great theoretical and applied value in the overall measurement of crisis self-efficacy and items in each construct in the various cases that are discussed above. Table 26 indicates each construct and corresponding definitions and items.

Reliability and Validity of Crisis Self-Efficacy Scale

For the reliability test of the crisis self-efficacy scale, the internal consistency among items was computed using Cronbach's alpha. Reliability is defined as "the degree to which measures are free from error and therefore yield consistent results" (Peter, 1979, p.6), and Cronbach's alpha has been the most widely used measurement for reliability (Peterson, 1994). A meta-analysis of previous studies in applied research found that $\alpha = .75$ is the criterion for the acceptable reliability of a measurement (Peterson, 1994). For studies developing self-efficacy

Table 26. Constructs of Crisis-Self Efficacy

Construct	Definition	Items
Action Efficacy	One's beliefs about his/her ability to take protective actions in crisis	(a) I am certain I have the ability to take necessary action to protect myself during a crisis. (b) I know that I have the ability to do things to protect myself in case of a crisis. (c) Given enough time and effort, I believe I can solve most problems during a crisis.
Preventive Efficacy	One's beliefs about his/her level of preparedness in crisis	(a) What I do with the knowledge I have about a crisis will keep me safe. (b) I am able to use resources effectively during a crisis. (c) I can help others decide what actions to take during a crisis.
Achievement Efficacy	One's beliefs about his/her goal accomplishment in crisis	(a) During a crisis, I can stick to my goals. (b) During a crisis, I can accomplish my goals. (c) During a crisis, I can achieve most of the goals that I have set for myself.
Uncertainty Management Efficacy	One's beliefs about his/her ability to deal with uncertainties in crisis	(a) I am confident that I can deal efficiently with unexpected crisis situations. (b) Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis. (c) During a crisis, I can usually handle whatever comes my way.

scales, the alphas of overall measurements and the constructs of the measurements ranged from .71 (Sheer et al., 1982) to .99 (DiClemente et al., 1994). The alpha in this study indicated a high level of internal consistency for the total crisis self-efficacy score with 12 items, $\alpha = .96$. In addition, the alphas of the four constructs (i.e., action efficacy, preventive efficacy, achievement efficacy, and uncertainty management efficacy) ranged from .83 to .96; therefore, the scale is considered reliable.

The face and content validities of the crisis self-efficacy scale were obtained via the experts and non-experts review processes. Although validity of the overall scale was strong, the correlations between the constructs needed examination to confirm the heterogeneity among constructs (Clark & Watson, 1995); thus, the discriminant validity among constructs was tested. Research suggests that correlations between constructs that are higher than .80 should be tested for discriminant validity (Clark & Watson, 1995). In this study, there was a correlation that was higher than .80 (i.e., the correlation between action efficacy and uncertainty management efficacy, which was .816). The results showed that all the constructs uniquely measured the aspects of people's crisis self-efficacy. That is, testing of the discriminant validity among the constructs confirmed that there are four underlying efficacies in the overall measure of crisis self-efficacy (i.e., action, preventive, achievement, and uncertainty management efficacy), and each efficacy is significantly different from the other efficacies in the crisis self-efficacy scale.

Next, to test the convergent validity of the crisis self-efficacy scale, the relationship between it and the general self-efficacy scale was examined. The overall crisis self-efficacy scale and its constructs demonstrated strong correlations with general self-efficacy. The correlations were ranged from .62 to .74, and all correlations were statistically significant. These strong correlations indicate that like general self-efficacy, crisis self-efficacy is a strong measure of

efficacy levels in people as the two are closely related concepts, but the crisis self-efficacy scale captures unique dimensions of self-efficacy specific to crisis situations such as taking protective actions in crisis (action efficacy), level of preparedness in crisis (preventive efficacy), goal accomplishment in crisis (achievement efficacy), and dealing with uncertainties in crisis (uncertainty management efficacy). On the other hand, the correlations of the scale and its constructs with social desirability were between .13 and .16. These weak correlations confirmed the discriminant validity of the crisis self-efficacy scale. In other words, although both crisis self-efficacy and social desirability are self-assessment measurements, the two are not closely related concepts. Previous research suggests that social desirability is a widely used construct in estimating discriminant validity of a new self-efficacy scale (Lent et al., 2003; Sheu & Lent, 2007; Tsai et al., 2014).

Indicators of Crisis Self-Efficacy

The relationships between crisis self-efficacy and demographics were tested to identify any possible indicators of crisis self-efficacy. As a result, three predictors of crisis self-efficacy were identified in the current study: gender, income, and state residency, or, more specifically, how affected the state of residency is by disasters. First of all, male participants had significantly higher levels of crisis self-efficacy than female participants. Specifically, for all four constructs (i.e., action, preventive, achievement, and uncertainty management efficacy), males' scores were higher than females' scores.

Scholars have argued that gender differences in managing crisis situations could exist due to the basis of biological (Wilson, 1993) and socialization (Xie & Whyte, 1997) processes. That is, females' levels of situation management could be lower than that of males' because they are less physical (in general) than males (Wilson, 1993) or are less trained to deal with such

situations because of the gender roles in their society (Xie & Whyte, 1997). According to Birzer and Craig (1996), the pass/failure rates of male and female police officers in physical ability tests were quite different: 93% of male officers passed the test while only 28% of female officers passed the same test. Based on this result, the authors argue that the difference in physical test pass rates could result in difference between genders in managing criminal situations.

Like the difference in managing criminal situations, the results of this study reveal a gender difference in crisis self-efficacy that may reflect a disparity in managing crisis situations. The results indicated that, compared to women, men have stronger confidence that they can complete a given task in crisis situations. The gap between genders was the biggest for achievement efficacy ($M = 5.02$ for males and $M = 4.68$ for females), while the difference was the smallest for preventive efficacy ($M = 5.32$ for males and $M = 5.14$ for females). Therefore, more effort needs be made to boost females' level of confidence in goal accomplishment in crisis. As discussed previously, delivering directions in crisis through the proper channels could be an effective tool for increasing achievement efficacy; thus, crisis officials should develop plans for effectively disseminating directions to follow that are sensitive to a possible gender difference when a crisis occurs. Prior to that, researchers may need to explore what message channels are preferred for delivering instructing information to women as well as ways to empower them with message strategy. Lastly, since this is exploratory research, the nature of the gender difference in crisis self-efficacy is unknown (i.e., it is not confirmed whether the difference is because of physical difference among genders or due to the difference in socialization); therefore, scholars also need to parcel out the reasons for this difference among genders in future research.

The second indicator of crisis self-efficacy identified in this study is household income. The data analysis indicated that the lowest income group (i.e., people whose annual income is

less than \$15,000) had the lowest crisis self-efficacy scores ($M = 4.80$) while the high-mid income group (i.e., individuals whose income is between \$100,000 and \$150,000) had the highest crisis self-efficacy scores ($M = 5.46$). There was a trend in the relationship between household income and crisis self-efficacy; as income goes up, the level of crisis self-efficacy also rises.

This might be because those participants with high-incomes were able to afford the costs associated with crisis preparedness that require financial or time resources. For example, an individual with high-income living in a tornado alley is able to afford a more substantial, durable house perhaps with a basement to protect his/her family. People with higher incomes also have access to resources to protect themselves during a crisis; good health insurance coverage may yield more immediate or better quality preventative healthcare during a disease outbreak. Further, it costs money to prepare disaster preparedness kits or equip one's home with warning systems. Certainly, the ability to take these and similar measures would enhance one's sense of crisis efficacy. Thus, those with higher incomes may feel better equipped to manage crisis while a low-income person may be less confident about his/her crisis preparedness and ability to deal with crisis.

These results are consistent with previous research; for example, Murray-Johnson and Witte (2003) argue that financial status is a critical consideration in crisis communication. More specifically, Avery and Park (forthcoming) found that high-income groups are better prepared for crisis than low-income groups. Considering these results and the results of this study, crisis managers should pay close attention to people and/or communities/cities with low-income. Income level data for publics can be easily obtained on the Internet by crisis managers. For example, the U.S. Census Bureau annually publishes reports on income by geographical regions.

Based on those reports, crisis managers could identify geographical regions where people who need more information about and education on crisis situations (i.e., low-income groups) are living and launch campaigns to boost the crisis self-efficacy of people living in those areas. Message strategy and response protocol issued in low-income areas should take limited resources to prepare for and respond to crisis into account. Meanwhile, researchers need to investigate the cause and nature of the differences between income groups in crisis self-efficacy and suggest strategies for minimizing the gap between the groups.

The last predictor of crisis self-efficacy identified in this research is state residency (i.e., in which U.S. state individuals currently reside). If a participant lives in a state where natural disasters occur frequently, s/he could feel better prepared for crisis due to increased personal experience with managing natural disasters. In other words, with experience comes efficacy. If an individual has frequent experience with acts of terrorism, s/he may use that knowledge of responding to terrorist acts to inform and improve future crisis management. Therefore, state residency was considered as an indicator of participants' crisis experience in this study. The results indicated that state residence alone is not a predictor of people's crisis self-efficacy; that is, ANOVA results (i.e., state as the independent variable and crisis self-efficacy as the dependent variable) showed that there is no direct relationship between state residency and crisis self-efficacy. However, when the number of disasters in their states of residency was considered, state residency predicted participants' crisis self-efficacy. For example, people in group 4 (i.e., people who live in the 31th to 40th states on the list of states with disasters per square mile, where the rates are between 0.39 to 0.69 disasters per square mile) had the highest crisis self-efficacy scores ($M = 5.41$) while individuals in group 1 (i.e., individuals who reside in the 1th to 10th states

on the list where there have been 2.18 to 11.04 disasters per square mile, the highest disaster frequency group) had the lowest crisis self-efficacy scores ($M = 4.95$).

This result is interesting as it contradicts arguments in previous research and the above rationale that led to its investigation; with experience does not come efficacy. According to Witte's (1992) extended parallel process model (EPPM), prior history with a crisis (e.g., experience with public health crisis) decreases one's fear or anxiety about that crisis, thus increasing the individual's sense of self-efficacy for managing it. Similarly, Schaefer and Moos (1998) found that prior experience with crisis could enhance people's ability to cope with crisis as well as their sense of self-efficacy. They also note that "individuals who triumph over small stressors in day-to-day life may acquire resilience that serves to protect them when future crises arise" (p. 114).

Again, since this is an exploratory study, the cause of the difference in self-efficacy among people with more and less crisis experience (i.e., people from high frequency states vs. individuals from low frequency states) is beyond the scope of the current research. However, a possible explanation for the result (i.e., people with more crisis experience had significantly lower crisis self-efficacy scores than people with less experience) would be that people who frequently experience natural disasters might have witnessed the inevitability of natural disasters and the devastation they cause; therefore, their confidence in dealing with natural disasters is diminished. Or, they might have failed to effectively respond to natural disasters in the past; therefore, their sense of crisis self-efficacy is compromised.

Considering these results, more efforts should be made for boosting the crisis self-efficacy of people who live in states with frequent natural disasters. However, the budgets for disaster management and prevention are not being spent that way. According to a report of

Government Accountability Office (GAO, 2015), the FEMA did not consider disaster frequency for its budget allocations in 2015. For example, North Dakota is one of the states that frequently experiences natural disasters (i.e., 3.63 disaster per square mile; it ranks 7th on the list); however, the money spent on the state (i.e., average budget per disaster; \$1.0 billion for North Dakota) was low compared to other state's budgets considering the frequency. On the other hand, the report found that Indiana had low disaster frequency compared to its relatively high budget (\$9.1 billion per disaster). As discussed, there is a negative relationship between crisis experience and crisis self-efficacy (i.e., as people have more experience, their crisis self-efficacy decreases).

Considering that, crisis officials should invest more money for increasing the crisis self-efficacy of people who live in states with high disaster frequency rather than allocate the budgets based on other factors (e.g., political and/or economic factors), as the budget could significantly affect damages incurred. Also, it is possible that people who live in the states with low disaster frequency have a high level of crisis self-efficacy because they don't know better due to lack of experience. Therefore, using simulations and training, officials and crisis managers need to prevent those publics from developing a false sense of confidence and insure they are prepared for what may not be frequent but is possible.

Theoretical Implications

This study addresses shortcomings of the crisis communication literature. First, research on crisis communication has primarily focused on the post-crisis phase. Considering that the pre-crisis phase is critical in crisis management (Mileti, 1991), researchers should pay closer attention to factors that affect crisis communication, especially related to directives issued to audiences to safeguard them, before a crisis occurs. Among components of the pre-crisis phase, the current research highlights individual's crisis preparedness. The crisis self-efficacy scale

developed in this study is a strong indicator of peoples' overall levels of crisis preparedness. For example, if a person strongly believes that s/he can complete a given task in crisis situations (i.e., high in crisis self-efficacy), it is expected that the person will take action in those situations to protect himself/herself as well as to help others cope with the situation. Also, if an individual is confident about how to respond during crisis and/or the ability to follow important directives, the individual is likely better prepared to mitigate harm imposed by that crisis. In sum, the crisis self-efficacy scale developed in this study is strong research on the pre-crisis phase and yields a useful tool in future crisis research to measure people's crisis preparedness.

Second, this study focuses on the audience side of crisis communication. As discussed previously, the majority of crisis communication research collects data from the organization or message sender's perspective (Choi & Lin, 2009; Lee, 2004). Similarly, theories on crisis communication (e.g., SCCT and image restoration theory) discuss the best strategies to minimize reputational damage to organizations in crisis, and the broad body of work they have generated share that primary focus (Avery et al., 2010). Scholars have argued that research from the audience perspective is essential to understanding crisis response, how well audiences are prepared for crisis situations, and how audiences feel about crisis (Jin et al., 2014; Lee, 2005; McDonald et al., 2010). As the items in this scale indicate, people's levels of crisis self-efficacy are a good indicator of how knowledgeable and well-prepared they are for crisis. Previous research suggests that an individual's knowledge of crisis (which is an indicator of his/her crisis preparedness) could in turn affect how they feel about the crisis situation itself (Arpan & Roskos-Ewoldsen, 2005). Taking these considerations into account, a scale that gauges people's knowledge about and preparedness in crisis (i.e., the crisis self-efficacy scale) is a very useful tool for understanding the audience's perspective in crisis. Finally, the crisis self-efficacy scale

enables crisis researchers and managers to better understand their publics by better understanding people's behaviors during crisis (action efficacy), gauging individuals' crisis preparedness and level of goal achievement (preventive and achievement efficacy, respectively), and measuring their level of uncertainty management (uncertainty management efficacy).

Lastly, this research adds knowledge to the crisis communication literature by developing a scale that is specifically designed to measure self-efficacy during crisis. Scholars have suggested that most measurements in crisis communication are adopted from other fields, and limited endeavors have been made for developing new crisis measurements and constructs (e.g., Cloudman & Hallahan, 2006). Although adopted measurements have shown acceptable reliability and validity in previous studies (e.g., Hong, 2011; Maloney et al., 2011; McMahan, et al., 1998), efforts to develop the most optimal scale tailored to this domain are essential. By developing a self-efficacy scale unique to the crisis context, the current study contributes to the minimization of measurement errors; therefore, it allows researchers to measure what they intended to measure.

This study is that it extends the application of the self-efficacy concept, which has seen limited use in the crisis context. As mentioned, self-efficacy is a strong predictor of behavior in various contexts/ situations (Bandura, 1977a; 2006).. Studies such as Barnett et al. (2014a), Frisby et al. (2014), and Veil et al. (2011) measured individuals' self-efficacy during crisis; however, those studies merely borrowed measurements that were developed in other contexts rather than explored the applicability of self-efficacy in the crisis context. Recalling that self-efficacy measurement is ideally context-specific (Bandura, 1977a), measurements that were borrowed from other contexts might be limited in predicting behaviors during crisis. To address this problem, this study developed and validated a crisis-optimized self-efficacy scale. By

reflecting the unique nature of crisis situations given their great complexities and inherent uncertainties, the crisis self-efficacy scale supports the argument that self-efficacy should be context-specific (Bandura, 1977a).

Finally, this study identified constructs and indicators of crisis self-efficacy. The four constructs of crisis self-efficacy are action, preventive, achievement, and uncertainty management efficacies. Unlike other self-efficacy scales with a single dimension (e.g., GSE and NGSE), the crisis self-efficacy scale is comprised of the unique underlying constructs of people's self-efficacy in crisis. By doing so, the scale enables researchers to gauge individual strengths and/or weaknesses in crisis preparedness. Also, considering the uniqueness of each construct, the constructs can also be utilized as individual measurements of different domains of crisis self-efficacy. For example, if a researcher is specifically interested in people's ability to take protective actions in crisis, the action efficacy component of the crisis self-efficacy scale can be used. Similarly, when a scholar wants to examine whether a person has the ability to deal with unexpected/unforeseen crisis situations, s/he can use the items capturing uncertainty management efficacy.

The current study identifies several predictors of crisis self-efficacy and initiates exploration into why those predictors are relevant to one's sense of crisis self-efficacy. First, it identifies that males are higher in crisis self-efficacy than females, and it argues that the disparity could be accounted for by biological difference (e.g., difference in physical strength) or a socialization process (e.g., men believe they are responsible for protecting their family members while such pressure may fall less on females). Next, the study found that household income predicts crisis self-efficacy. This could be attributable to protective measures income enables a person to take to prepare for crisis. Lastly, it identifies that state residency predicts crisis self-

efficacy. Overall, the more crisis experience people have, the more their levels of crisis self-efficacy decreased. This trend might be because the more crises people experience, the more fear of the inevitability and damages of crisis they have. In sum, this research argues that one's crisis self-efficacy should be better parceled out and understood with relation to demographic factors.

Practical Implications

Scholars have argued that, with regard to the audience, apathy is the most serious obstacle in crisis planning and crisis preparedness (Auf der Heide, 1989; McEntire & Myers, 2004). When people approach crisis with indifference, the crisis could be harmful to those individuals as they may be less inclined to prepare for crisis and less motivated to take protective response actions. This research indicates that the crisis self-efficacy scale can be an effective tool for solving this problem. For instance, if people who are indifferent about crisis realize their levels of crisis preparedness are low, they may experience anxiety and want to improve their level of preparedness. Considering that the crisis self-efficacy scale is an indicator of one's level of crisis preparedness, crisis managers could use the scale to create awareness among individuals so that the individuals pay more attention to their crisis preparedness levels and recognize the possibility of crisis occurrence around them. Thus, as a result, they may be less indifferent and/or apathetic about crisis anymore.

Also, the crisis self-efficacy scale can be utilized to gauge the effectiveness of a crisis preparedness education program. By comparing participants' scores before and after an intervention, the scale, administered longitudinally, could be a useful indicator of campaign success. If publics' crisis self-efficacy scores increase after an intervention, crisis managers have tangible evidence of success in safeguarding publics. On the other hand, programs failing to boost people's crisis self-efficacy should be modified.

McConnell and Drennan (2006) categorized organizations into three types depending on their level of crisis preparedness: high preparedness, medium/mixed preparedness, and low preparedness. According to the authors, low preparedness organizations pay little to no attention to potential threats and do not have plans for crisis, while mid-range organizations tend to consider threats seriously but do not prioritize planning (McConnell & Drennan, 2006). On the other hand, highly prepared organizations take threats seriously and have detailed crisis plans. The authors propose that, with effort, an organization with low preparedness can be a moderately or highly prepared organization, while a highly prepared organization could be lowly prepared if people in the organization "bury their heads in the sand" (McConnell & Drennan, 2006, p.68) Table 27 indicates each type of organization and corresponding characteristics.

Similar to organizations, people have different levels of crisis preparedness. Rimal (2001) suggests that there are four groups of people in terms of perceived risk and self-efficacy. The first group includes people who believe that they are at risk (i.e., they could possibly be affected by risks around them) and that they can deal with the risk (high risk, high efficacy; the author calls it the 'responsive group'), while individuals in the 'proactive group' have low perceived risk but high efficacy. The third group is comprised of people who think that they are at risk but do not think that they can effectively handle the situation (i.e., high perceived risk, low efficacy). This group is called the 'avoidance group.' The fourth group is the 'indifference group,' and people in this group are not at risk and do not think that they can handle the situation well (i.e., low risk, low efficacy) (Rimal, 2001).

Table 27. A Typology of Organizational Preparedness for Crisis

	Low Preparedness	Medium/Mixed Preparedness	High Preparedness
Importance of Contingency Planning on the Organizational Agenda	Little or no importance. Not an item for serious consideration. Main focus is 'routine' survival and growth.	Fairly important on occasion, but normally of much less priority than 'routine' organization goals.	Very high. Crisis preparedness becomes part of the core goals of the organization.
Attitude to Threats	Dismissive. 'It couldn't happen here' mentality.	Fairly serious consideration. A range of threats should be recognized and planned for.	Very serious consideration. Organization must give high priority to planning for a range of threats.
Extent of Contingency Plans	None at all. Or at best a plan tucked away with little or no awareness by staff or stakeholders.	Fairly detailed and extensive contingency plans as an 'add on' to existing organizational structure and practice.	Very detailed and extensive contingency plans, permeating the structures, practices and culture of the organization and its interactions with stakeholders.
Extent of Active Readiness through Trials and Simulation	Non-existent.	None or patchy. Plans on paper are considered adequate.	Highly active readiness through regular crisis training and exercises.
Organizational Psyche	Major limits on emotional and cognitive capacities. Constant quest for existence/ego satisfaction. Unable to cope with anxiety. Self-inflated or self-defeatist outlook	Reasonably open (within limits) to emotional and cognitive change. Some ability to balance core drivers with the need to address problems. Some but limited toleration and capacity to cope with anxiety. Reasonably strong self-image, although prone to over-regarding or under-regarding itself.	Openness to emotional and cognitive change. Major concern with addressing problems. Is able to tolerate and cope with anxiety. Positive self-image.

Source: McConnell and Drennan (2006, p.61)

The response group is similar to highly prepared organizations. That is, people in this group are well-prepared, having their own crisis plans and abilities to deal with crisis situations. The proactive and avoidance groups are similar to medium preparedness organizations. Individuals in those groups may have fairly detailed plans (such as people in avoidance group; high perceived risk, low efficacy) or have confidence in their ability to handle crisis situations (such as people in the proactive group; low perceived risk, high efficacy). Finally, people in the indifference group can be compared to organizations with low preparedness. They could be in danger if they do not acknowledge that there are risks around them and thus do not plan for crisis.

Similar to McConnell and Drennan's (2006) arguments about changes in organizations' preparedness, Rimal (2001) suggests that the level of individual crisis preparedness can be altered with effort. Taking these arguments into account, crisis officials can identify people with low crisis self-efficacy using the scale developed in this study and focus on educating them to move them to a more prepared group. As Janoske et al. (2012) and Averbek, Jones, and Robertson (2011) contend, lack of knowledge on risk and crisis can lead to both fear and to weak perceptions of the individual's ability to handle crisis situations. Therefore, to mitigate damage inflicted on publics by crisis, crisis managers may want to periodically evaluate people's levels of crisis self-efficacy and develop ideas to maintain (for people with high efficacy) or increase (for people with low efficacy) it.

The measures of crisis self-efficacy established in this study might be useful in identifying populations in need of interventions to enhance efficacy. First, federal officials should evaluate the geographical regions (e.g., states) where crisis self-efficacy scores were lower. For example, the results showed that people who are living in states with high frequency of natural disasters had the lowest levels crisis self-efficacy. Therefore, people in those states

should be prioritized in crisis preparedness education campaigns. Also, people's gender and household income could be considered in these efforts. As the results of this study indicate, more attention should be paid to females and people with low-income. Campaigns should suggest ways to prepare for crisis mindful of the economic gap in efficacy. For example, in tornado planning, the safest options in all different types of housing should be presented.

Even more important than a good crisis plan is preparing publics (McEntire, & Myers, 2004). Crisis officials should keep this in mind and educate people to bolster their levels of crisis self-efficacy to minimize damages from a crisis.

Limitations and Future Research

Like most academic studies, the present study is not without limitations. However, these limitations also present areas for future research. First, the ideal scenario in scale development is to have the same model used in different data analyses. However, the model in pilot testing was not exactly the same as the model employed in validation testing. To maximize the reliability of the scale, however, extra analyses were performed, and, as a result, the final model had the best model fit. In future research, the reliability of the scale may need to be retested by exploring the fit of the current four-construct model in different waves of analysis.

Second, this scale assesses people's crisis preparedness in general. That is, it is a measurement that designed uniquely for use in the crisis context; therefore, it may not be appropriate to use the scale in other contexts. Also, the scale does not consider a certain crisis type; thus, it could be used regardless of crisis type. However, it is possible that one person may have different levels of crisis self-efficacy for different crisis types such as natural disaster, public health, political crisis, and terrorism. Therefore, future research should explore the

applicability of the crisis self-efficacy scale across crisis types and develop measurements tailored to fit to each crisis type, if needed.

Next, in this exploratory research, only demographic variables were tested as predictors of crisis self-efficacy. There could be other indicators such as direct/indirect crisis experience, involvement, and the nature of crisis. Further, social factors were not considered in this study, as they were beyond the scope of this study. Future studies may explore the relationships between crisis self-efficacy and variables other than demographics and examine the influence of social factors such as expectations of others and social pressure.

Finally, this study does not answer questions of *why*. For example, relationships between crisis self-efficacy and demographic factors (i.e., gender, household income and state residency) were identified; however, the cause of such differences is not revealed. Especially research on gender differences propose that men and women have areas that each gender is stronger in over the other gender (e.g., Copeland & Hess, 1995; Eschenbeck, Kohlmann, & Lohaus, 2007; Piko, 2001); therefore, the cause of differences in crisis self-efficacy should be scrutinized. Other limitations, as detailed in the methods section, include those not unique to this study but inherent in any study using online surveys and paid survey panels.

Despite these limitations, this research is critical as it fills gaps in the crisis communication literature by studying the relatively unexplored area of the pre-crisis phase, scrutinizing the audience perspective, and developing a measurement that is tailored to the crisis context. More specifically, the current study establishes a framework from which to measure crisis preparedness, to predict individuals' behaviors in crisis using unique constructs, and to guide more audience-focused research in the future. From a practical standpoint, the crisis self-efficacy scale is valuable in creating crisis preparedness programs and gauging their

effectiveness as well as in developing communication strategies tailored to audiences' needs and levels of crisis preparedness. This research is just the beginning of a promising stream of research on crisis self-efficacy that has great heuristic value and rich, even critical, applied implications.

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Appendices

Appendix A

Recruiting Email

Dear Dr. XXX,

My name is Sejin Park, and I am a doctoral student in Public Relations at the University of Tennessee writing my dissertation under the direction of Dr. Elizabeth Avery Foster.

I am developing a crisis self-efficacy scale through my dissertation research and would greatly appreciate your help.

As you know, a self-efficacy scale is preferable when it is context specific, and reliable and valid measurements minimize error in research. Therefore, I believe developing a crisis self-efficacy scale is a worthy pursuit.

While searching articles in the crisis literature using self-efficacy scales, I read your article “XXXXXX” and thought that you would be a strong expert source to review the initial items for ensuring the face and content validity of the scale items.

I've attached the list of items if you would like to review them prior to deciding whether or not to help, or if you would like to go ahead and review them to offer feedback.

The items were adopted from previous studies. The majority of existing self-efficacy scales were reviewed, and only crisis relevant items were adopted with modification. In addition to self-efficacy scales, measurements that are related to self-efficacy (e.g., coping strategy, crisis resources management, problem solving confidence) were also reviewed and adopted.

If you are willing to help, will you please review the items I generated and add or delete items as you see fit. I'd also appreciate any comments you could provide.

Please reply to this email if you can help.

As a token of my gratitude, I will give you a small gift (a \$25 Amazon gift card) for your service.

Thank you so much in advance for your help.

Best Regards,

Sejin Park

Appendix B

Pilot Test Survey

SECTION 1: Informed Consent

Project Title:

Crisis Self-Efficacy Study

Please read this consent document carefully before you decide to participate in this study

Purpose of the research study:

This study is designed to identify the underlying constructs of crisis self-efficacy.

What you will be asked to do in the study:

You will be asked to answer survey questions about your beliefs about whether you can successfully complete a given task in crisis situations.

Time required:

15~20 minutes

Risks and Benefits:

There are no greater anticipated risks for study participants than those encountered in everyday life. There is a minimal risk that security of any online data may be breached, but our survey host (QUALTRICS) uses strong encryption and other data security methods to protect your information. Only the researchers will have access to your information on the Qualtrics server. Your identity will be unknown to the researchers. Your MTurk Worker ID will be used only for the purpose awarding compensation, and will not be share with anyone outside the research team. It will not be linked with your survey responses, so they will be anonymous, and it will be removed from the data set once compensation has been made.

This study is designed to identify underlying constructs of crisis self-efficacy. By doing so, it will help crisis communication researchers to better understand the pre-crisis stage, to build receiver-based research, and to develop measures specific to the crisis context.

Compensation:

If you complete the survey, you will receive \$1 via Amazon MTurk. In other words, if you click a “complete” button on the last webpage of survey questionnaire, we will consider that you have completed the survey. However, if you discontinue the survey, refuse to participate or do not click the “complete” button, your survey will be considered as an incomplete one. In this case, the \$1 compensation will not be given to you. Also, your responses will be reviewed by researchers. If your responses were completed in less than 10 minutes, your survey will be considered as an incomplete one; therefore, the \$1 compensation will not be given to you.

Confidentiality:

The information you provide will be confidential. You will not be identified individually at any stage of the study. The data obtained by survey will only be analyzed to address the research questions.

Voluntary participation:

The participation is voluntary. If you do not wish to answer a question, you may skip the question without penalty. Also, if you wish to quit the survey, you can simply discontinue or refuse to take part at any time and have no penalty or without loss of benefits to which you are otherwise entitled. In this case, your responses will be returned to you or destroyed.

Whom to contact if you have questions about the study:

Sejin Park, Doctoral Candidate, School of Advertising and Public Relations, College of Communication and Information, University of Tennessee, Knoxville.

Tel: (865) 201-9301, E-mail: spark37@utk.edu

Supervisor:

Dr. Elizabeth Avery Foster, Associate professor, School of Advertising and Public Relations,
College of Communication and Information, University of Tennessee, Knoxville.

Tel: (865) 974-8157, E-mail: ejavery@utk.edu

Whom to contact about your right as a research participant in the study:

Office of Research Compliance Officer, University of Tennessee, Tel: (865) 974-7697.

Agreement:

I have read the procedure described above. I acknowledge that clicking the button “proceed” means giving my consent to participate in this study.

Thank you.

SECTION 2: Crisis Self-Efficacy Items**Please indicate your level of agreement with the following questions.**

1. During a crisis, I can solve difficult problems in crisis situations if I try hard enough.

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

2. During a crisis, I can stick to my goals.

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

3. During a crisis, I can accomplish my goals.

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

4. I am confident that I can deal efficiently with unexpected crisis situations.

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

5. Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis.

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

6. I can solve most problems during a crisis if I invest the necessary effort.

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

7. During a crisis, I can remain calm when facing difficulties.

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

8. During a crisis, I can rely on my coping abilities.

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

9. When I am confronted with a problem during a crisis, I can usually find several solutions.

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

10. If I am in a crisis situation, I can usually think of a solution.

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

11. During a crisis, I can usually handle whatever comes my way.

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

12. During a crisis, I can achieve most of the goals that I have set for myself.

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

13. When facing difficult tasks during a crisis, I am certain that I can complete them.

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

14. In crisis situations, I can obtain outcomes that are important to me.

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

15. In crisis situations, I believe I can succeed at most any endeavor to which I set my mind.

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

16. I will be able to successfully overcome many challenges I face during a crisis.

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

17. During a crisis, I am confident that I can perform effectively on many different tasks.

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

18. During a crisis, compared to other people, I can do most tasks very well.

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

19. Even when things are tough, I can perform quite well during a crisis.

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

20. I am certain I can master the skills to protect myself during a crisis.

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

21. I am certain I can figure out how to take action to prevent crisis.

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

22. I know I can take action to protect myself during a crisis.

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

23. I am certain I have the ability to take necessary action to protect myself during a crisis.

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

24. I know that I have the ability to do things to protect myself in case of a crisis.

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

25. What I do with the knowledge I have about a crisis will keep me safe.

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

26. I can help others decide what actions to take during a crisis.

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

27. As far as crisis is concerned, I am a self-reliant person.

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

28. If I am in a crisis, I can usually think of something to do.

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

29. I feel prepared to meet most of the demands for crisis situations in my job.

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

30. I can consider alternatives to solve a problem during a crisis.

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

31. I can anticipate likely events during a crisis.

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

32. I am able to use resources effectively during a crisis.

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

33. In crisis situations I have the ability to solve most problems even though initially no solution is immediately apparent.

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

34. In crisis situations, many problems I face are too complex for me to solve.

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

35. When I make plans to solve a problem during a crisis, I am certain that I can make them work.

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

36. Given enough time and effort, I believe I can solve most problems during a crisis.

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

37. When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis.

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

38. I trust my ability to solve new and difficult problems during a crisis.

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

39. After making a decision during a crisis, the outcome I expected usually matches the actual outcome.

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

40. When confronted with a problem during a crisis, I am unsure of whether I can handle the situation.

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

41. During a crisis, I try to make a plan of action.

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

SECTION 3: Demographic Information

Please complete the following information. Your answers are for statistical purposes only.
All answers will remain confidential, and your anonymity will be maintained.

1. What is your gender?

- Male Female

2. What is your age? _____

3. What is your race?

- African American/Black Caucasian/White Hispanic/Latino
 Asian Native Hawaiian/Pacific Islander Multi-racial
 Other

4. What is your marital status?

- Single Married Divorces
 Widowed Separated Other

5. What is your highest level of education you have reached?

- Some high school High school diploma Some college
 College degree Graduate degree

6. What is your total household income?

- Less than \$15,000 \$15,000 to less than \$30,000
 \$30,000 to less than \$50,000 \$50,000 to less than \$75,000
 \$75,000 to less than \$100,000 \$100,000 to less than \$150,000
 \$150,000 or more

Appendix C

Validation Test Survey

SECTION 1: Informed Consent

Project Title:

Crisis Self-Efficacy Study

Please read this consent document carefully before you decide to participate in this study

Purpose of the research study:

This study is designed to identify the underlying constructs of crisis self-efficacy.

What your will be asked to do in the study:

You will be asked to answer survey questions about your beliefs about whether you can successfully complete a given task in crisis situations. The survey questionnaire is consisted of four parts: a) crisis self-efficacy, b) self-efficacy, c) social desirability, and e) demographic information.

Time required:

15~20 minutes

Risks and Benefits:

There are no greater anticipated risks for study participants than those encountered in everyday life. There is a minimal risk that security of any online data may be breached, but our survey host (QUALTRICS) uses strong encryption and other data security methods to protect your information. Only the researchers will have access to your information on the Qualtrics server. Your identity will be unknown to the researchers. Your MTurk Worker ID will be used only for the purpose awarding compensation, and will not be share with anyone outside the research team. It will not be linked with your survey responses, so they will be anonymous, and it will be removed from the data set once compensation has been made.

This study is designed to identify underlying constructs of crisis self-efficacy. By doing so, it will help crisis communication researchers to better understand the pre-crisis stage, to build receiver-based research, and to develop measures specific to the crisis context.

Compensation:

If you complete the survey, you will receive \$1 via Amazon MTurk. In other words, if you click a “complete” button on the last webpage of survey questionnaire, we will consider that you have completed the survey. However, if you discontinue the survey, refuse to participate or do not click the “complete” button, your survey will be considered as an incomplete one. In this case, the \$1 compensation will not be given to you. Also, your responses will be reviewed by researchers. If your responses were completed in less than 10 minutes, your survey will be considered as an incomplete one; therefore, the \$1 compensation will not be given to you.

Confidentiality:

The information you provide will be confidential. You will not be identified individually at any stage of the study. The data obtained by survey will only be analyzed to address the research questions.

Voluntary participation:

The participation is voluntary. If you do not wish to answer a question, you may skip the question without penalty. Also, if you wish to quit the survey, you can simply discontinue or refuse to take part at any time and have no penalty or without loss of benefits to which you are otherwise entitled. In this case, your responses will be returned to you or destroyed.

Whom to contact if you have questions about the study:

Sejin Park, Doctoral Candidate, School of Advertising and Public Relations, College of Communication and Information, University of Tennessee, Knoxville.

Tel: (865) 201-9301, E-mail: spark37@utk.edu

Supervisor:

Dr. Elizabeth Avery Foster, Associate professor, School of Advertising and Public Relations,
College of Communication and Information, University of Tennessee, Knoxville.

Tel: (865) 974-8157, E-mail: ejavery@utk.edu

Whom to contact about your right as a research participant in the study:

Office of Research Compliance Officer, University of Tennessee, Tel: (865) 974-7697.

Agreement:

I have read the procedure described above. I acknowledge that clicking the button “proceed” means giving my consent to participate in this study.

Thank you.

SECTION 2(a): Crisis Self-Efficacy Items**Please indicate your level of agreement with the following questions.**

1. I am certain I have the ability to take necessary action to protect myself during a crisis.

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

2. I know that I have the ability to do things in the case of a crisis.

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

3. What I do with the knowledge I have about crisis will keep me safe.

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

4. I can help others decide what actions to take during a crisis.

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

5. I can anticipate likely events during a crisis.

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

6. I am able to use resources with effectiveness during a crisis.

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

7. Given enough time and effort, I believe I can solve most problems during a crisis.

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

8. When faced with a novel situation, I have confidence that I can handle problems that may arise during a crisis.

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

9. During a crisis, I can stick to my goals.

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

10. During a crisis, I can accomplish my goals.

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

11. I am confident that I can deal efficiently with unexpected crisis situations.

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

12. Thanks to my resourcefulness, I know how to handle unforeseen situations during a crisis.

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

13. During a crisis, I can usually handle whatever comes my way.

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

14. During a crisis, I can achieve most of the goals that I have set for myself.

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

SECTION 2(b): Social desirability

Please indicate your level of agreement with the following questions.

1. I'm always willing to admit it when I make a mistake.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

2. I always try to practice what I preach.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

3. I never resent being asked to return a favor.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

4. I am never irked when people expressed ideas very different from my own.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

5. I have never deliberately said something that hurt someone's feelings.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

6. I like to gossip at times.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

7. There have been occasions when I took advantage of someone.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

8. I sometimes try to get even rather than forgive and forget.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

9. I am certain I have the ability to take necessary action to protect myself during a crisis.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

10. There have been occasions when I felt like smashing things.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

SECTION 2(c): Self-efficacy

Please indicate your level of agreement with the following questions.

1. I am able to achieve most of the goals that I have set for myself.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

2. When facing difficult tasks, I am certain that I will accomplish them.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

3. During a crisis, I can accomplish my goals.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

4. I believe I can succeed at most any endeavor to which I set my mind.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

5. I will be able to successfully overcome many challenges.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

6. I am confident that I can perform effectively on many different tasks.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

7. Compared to other people, I can do most tasks very well.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

8. Even when things are tough, I can perform quite well.

Strongly Disagree		Neutral		Strongly Agree
1	2	3	4	5

SECTION 3: Demographic Information

Please complete the following information. Your answers are for statistical purposes only.
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1. What is your gender?

- Male Female

2. What is your age? _____

3. What is your race?

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 \$30,000 to less than \$50,000 \$50,000 to less than \$75,000
 \$75,000 to less than \$100,000 \$100,000 to less than \$150,000
 \$150,000 or more

7. What U.S. state do you live in? (e.g., TN or Tennessee) _____

8. How many children under the age of 18 reside in your home? _____

Vita

Sejin Park earned his bachelor's degree in Management from the Korea Military Academy in 2004 and his master's degree in Communication and Information from the University of Tennessee in 2011. His research interests include crisis communication, military-public relationship, and military recruitment advertising. He published research articles in peer-reviewed journals such as *Public Relations Review*, *Journal of Public Relations Research*, *Journal of Contingencies and Crisis Management*, *Armed Forces & Society*, and *Journal of Promotion Management*.