# DISASTER EXPERIENCE AND SELF-EFFICACY AS FACTORS INFLUENCING EMERGENCY PLANNING IN COMMUNITY-DWELLING OLDER ADULTS

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This study design was to identify and examine how disaster experience, self-efficacy, and demographic factors influence disaster preparedness in community-dwelling older adults. Current data indicates the United States is rapidly aging. Parallel to this significant increase among the elderly population, natural disasters are more prevalent. Consequently, older adults are affected adversely by these disasters and exposure to social vulnerabilities during the disaster cycle.

For the purpose of this study, non-identifiable secondary data were analyzed. Sources of the data were the 2007 and 2008 National Center for Disaster Preparedness surveys. The sample focus of this study was adults 50 and older. Regression analyses identified important predictors of disaster preparedness in the survey respondents. Sample adults with previous disaster experience are two times more likely to be in a higher category for having an emergency plan than those respondents with no observable effects of self-efficacy and no previous disaster experience. The frequency of natural disasters in the United States has generated a renewed interest in disaster management, in particular, disaster preparedness. Nevertheless, the focal point of disaster preparedness is no longer the rudimentary stockpile of water, a first aid kit, and a battery operated radio. To advance the field of disaster management it is vital for gerontologist to approach disaster preparedness by differentiating between stockpiling supplies and social cognitive interventions that fundamentally alters preparedness behavior.

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# CHAPTER 1

# INTRODUCTION

## Background

This study is designed to identify and examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. This chapter explores background information on the significant increase of natural disasters in the United States, the rapid population growth among older adults, and the impact of social barriers and ethnicity on emergency planning among older adults and vulnerable populations. It also explains the problem and research statements, and the theoretical framework that defines the social cognitive phases of disaster preparedness.

A meteorological study conducted by Munich Reinsurance of America confirms natural disasters in the United States are more prevalent. Since 1980, the average annual number of natural disasters has more than tripled (National Oceanic and Atmospheric Administration [NOAA], 2011). In 2011, an estimated 650 people were killed by devastating hurricanes, floods, tornadoes, wildfires, and winter storms. Wildfires, drought, and extreme heat destroyed livestock, crops, and structures across the southern plains and southwest regions of the United States. In addition, an estimated $50 billion in property was destroyed by these natural disasters (NOAA, 2011). Yet, hydrological hazards in the United States continue to have an astounding impact on communities. In 2011, Hurricane Irene battered the northeastern seaboard. A reported 55 people died, 9 million people were without electricity, and mandatory evacuation orders were issued to 2.3 million residents (NOAA, 2011).

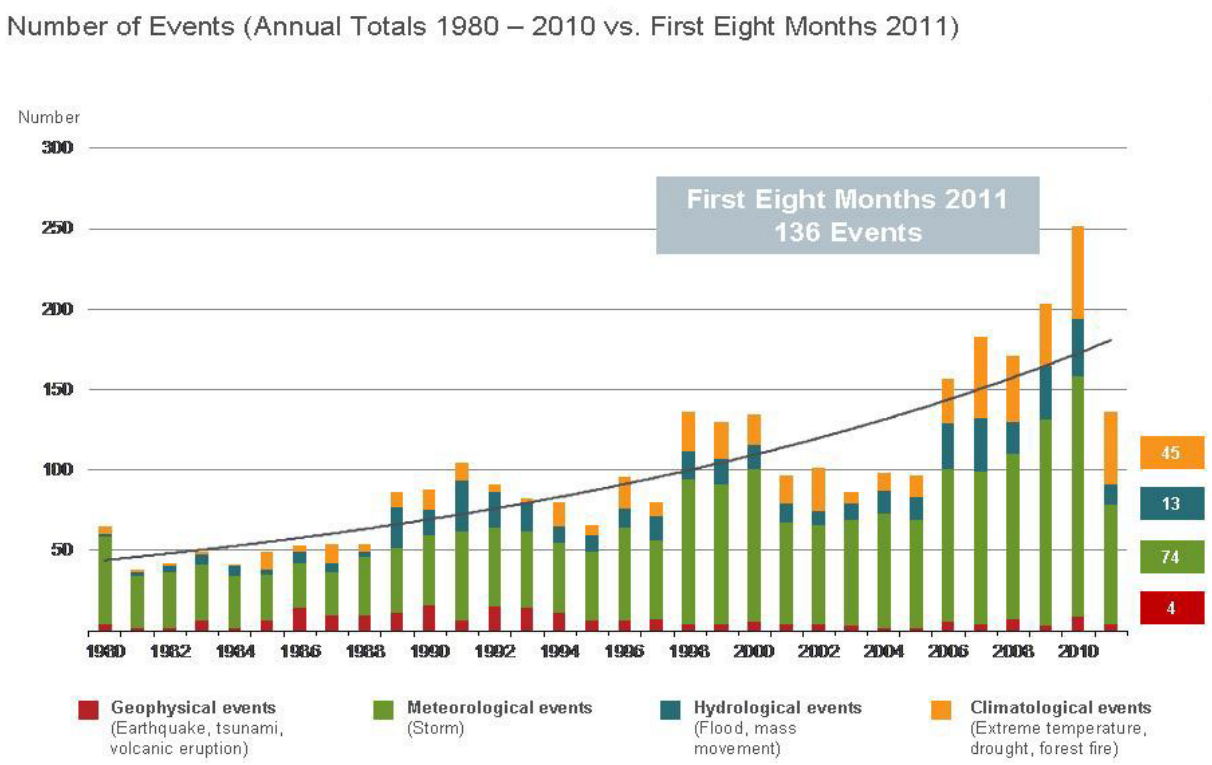


*Figure 1.* Natural disasters in the United States, 1980-2011. 2011 Munchener Ruckversicherungs-Gesellchatt, Geo Risk Research, NatCatSERVICE – as of September 2011.

Even more, in 2012, Hurricane Sandy pummeled the mid-Atlantic and northeastern United States. In particular, New York City and the surrounding boroughs were inundated with storm surge several feet high, massive flooding, and destructive waves (Blake, Kimberlain, Berg, Cangialosi, & Beven, 2012). In addition, Hurricane Sandy significantly impacted several Caribbean countries, located in the Atlantic basin. In total, across the Atlantic basin, Hurricane Sandy directly related to approximately 147 deaths, with 72 of the casualties occurring in the United States (Blake et al., 2012). Indirectly Hurricane Sandy contributed to 87 fatalities in the United States. On account of power outages and winter weather, the cause of 50 of these fatalities were hypothermia, elderly residents falling in the dark, and carbon monoxide poisoning from hazardous cooking equipment and generators. Attributed to removing

uprooted trees during the cleanup effort and motor vehicle accidents were the remaining fatalities. Further, in New York the storm surge destroyed approximately 305,000 homes. Damaged by extensive flooding were hospitals, schools, the subway system, and commercial buildings. Public and private industries suffered substantial economic ruin resulting in $19 billion of loss property (Blake et al., 2012).

### *Population Growth Among Older Americans*

Current data indicates the United States is rapidly aging. Elderly Americans are living longer due to advancements in medical technology, preventive health care, and a growing emphasis on gerontological health. The Administration on Aging estimates by the year 2020, 55 million people living in the United States will be 65 years of age or older. Likewise, aggregated aging data indicates significant growth among minority elders from 5.7 million in 2000 (16.3% of the elderly population) to 8.1 million in 2010 (20% of the elderly population); by 2020, an estimated 13.1 million minority elders (24% of the elderly population) will be living in the United States (Fowles & Greenberg, 2010).

Aging statistics among minority groups suggest parallel growth. In 2008, the African American older adult population was 3.2 million; by 2050, African American elders are estimated to increase to over 9.9 million (11% of the elderly population). In 2007, the American Indian and Native Alaskan older adult population was 212,605; by 2050, American Indian and Native Alaskan elders are projected to grow to almost 918,000 (1.0% of the elderly population). Furthermore, in 2008, the Asian, Hawaiian, and Pacific Island older adult population was slightly over 1.3 million; by 2050, the estimate is over 7.6 million (8.6% of the elderly population) Asian, Hawaiian, and Pacific Island elderly will live in the United States (Fowles & Greenberg, 2010).

Lastly, the most significant population growth expected is among Hispanic elders. In 2008, the Hispanic older adult population was 2.7 million; by 2050, the Hispanic older adult population estimate is beyond 17 million. However, current data from the Administration on Aging suggest by 2019, Hispanic elders will be the largest ethnic minority group among the minority aging populations. In comparison, between 2010 and 2030, the expectation is White older adults will increase only by 59%, while the total population of minority elders is projected to grow by 160%, respectively (Fowles & Greenberg, 2010).

Parallel to this significant increase among the older adult population, natural disasters are more prevalent. Consequently, adversely affected by these disasters and exposure to social vulnerabilities during the disaster cycle are the elderly. Even more so, minority older adults are significantly impacted by natural disasters and often experience disproportionate deaths and property destruction (Bourque, Siegel, Kano, & Wood, 2006; NOAA, 2005).

*Impact of Natural Disasters on Minority Older Adults*

Undoubtedly, Hurricane Katrina generated astounding attention to natural disasters in the United States. Researchers not only examined the cataclysmic atmospheric conditions that occurred during Hurricane Katrina, but also how people were drastically affected by the powerful hurricane (Leong, Airriess, Wei, Chia-Chen, & Keith, 2007; Messias & Lacy, 2007; NOAA, 2005; Zoraster, 2010). An estimated 1,330 people killed were by the brutal weather conditions spawned by Hurricane Katrina (Burton, 2010; Wilson, 2006). Failed levees in New Orleans and record storm surge in the coastal communities of Pass Christian and Biloxi, Mississippi, caused an accumulative $80 billion in destroyed property across the Gulf Coast displacing over a million residents (Burton, 2010). Consequently, disproportionately affected by

the devastation associated with Hurricane Katrina were older adults. Before Hurricane Katrina, elders 60 and older comprised 15% of the population in New Orleans; however, 74% of the dead were 60 years old or older. Nearly, half were older than 75 years of age (Glass, 2006).

Yet, minority older adults were at an increased disadvantage. Messias and Lacy's (2007) qualitative research on Latino residents in New Orleans and other Gulf Coast communities, chronicled the devastating impact of Hurricane Katrina on socially vulnerable Latino elders. Analysis of in-depth interviews emphasized specific themes exposing poverty, limited transportation, inadequate Spanish language weather reports, and insensitivity to the Latino culture and social networks. These social barriers impeded appropriate disaster preparation for the impending, Category 3 hurricane (Messias & Lacy, 2007).

New Orleans' Saint Gabriel Morgue medical examiner mortality statistics indicated poor African American elders were most at risk for death during and after Hurricane Katrina (Bourque et al., 2006). Reported on 705 bodies examined and identified by the Saint Gabriel Morgue medical examiner were statistics on gender, race, and age. Disproportionately represented among the victims were males – 51% (359/705), females – 48% (339/705), and gender undetermined – 1% (7/705) (Bourque et al., 2006). Prior to Hurricane Katrina, these statistics were comparable to state population figures where 51.6% of the residents were female. African American victims comprised 48% of the dead (339/705), which compares with the number of African Americans residing within Louisiana at 32.5% and the number of African American residents living in New Orleans at 67.9% (Bourque et al., 2006). When examining the age of victims, the significant number of older adults killed by the hurricane perplexed

researchers. Sixty-seven percent (475/705) of the dead were older than 60, and 44% (309/705) were older than 75 years of age (Bourque et al., 2006).

Zoraster (2010) further examined the racial composition of elderly Whites and African Americans living in New Orleans before Hurricane Katrina. It appears a 44% mortality rate occurred during Hurricane Katrina among White older adults. This was especially alarming when White elders comprised 36% of New Orleans population. State population data indicated a disproportionate number of White elders lived in New Orleans before Hurricane Katrina. However, after adjusting population data for age and race, elderly African American mortality rates found were disproportionately high due to Hurricane Katrina (Zoraster, 2010).

Indeed, this was not the first time New Orleans endured a deadly hurricane. Friedsam's (1960) publication in the *Journal of Health and Human Behavior* described in great detail the disaster and mortality associated with Hurricane Audrey, a Category 4 hurricane that overwhelmed Louisiana in 1957. Fothergill, Maestas, and Darlington (1999) reported findings for African Americans killed in Hurricane Audrey. The death rate was 322 per thousand for African Americans compared to 38 per thousand for whites. Likewise, this article clearly addresses the suffering and neglect of elderly residents post Hurricane Audrey and the lack of appropriate health care services, transportation, and evacuation shelters (Fothergill et al., 1999; Friedsam, 1960).

Further, Bolin and Klenow (1988) identified and compared the social vulnerabilities of Black and White older adults who were victims of a destructive tornado that struck the city of Paris, Texas, in 1982. The results of Bolin and Klenow suggested Black elders were significantly impacted by the tornado damage compared to White elders. In the city of Paris, Texas, Black

older adults already experienced significant poverty, subsidized housing arrangements, limited spousal support, and inadequate property insurance thus decreasing the ability to recover fully from the tornado damage (Bolin & Klenow, 1988).

## Problem Statement

Before citizens of the Gulf Coast experienced the devastation of Hurricane Katrina, an expanding body of disaster literature addressed preparedness from an organizational viewpoint. The concept of disaster preparedness generally applied to government entities on the federal, state, and local level (Gillespie & Streeter, 1987; McEntire & Myers, 2004). From an organizational context, disaster preparedness with an emphasis on government readiness encompasses a broad scope and includes several components. McEntire and Myers (2004) systematically reviewed disaster preparedness and government readiness by analyzing the importance of

- Implementing municipal ordinances
- Local hazard and infrastructure assessments
- Emergency operation plans and warning systems
- Viable community resources
- Engaged civic partners
- Training for emergency personnel
- Advanced technology
- Public education (McEntire & Myers, 2004)

However, limited studies focus on disaster preparedness from a social cognitive framework within the individual or family unit. Disaster preparedness at the household level

concentrates on maintaining a three-day supply of non-perishable food, water, first aid supplies, prescription medications, and batteries for each individual in the household; securing heavy appliances and furniture; protecting important papers; and implementing a family emergency plan. This micro level approach to disaster preparedness minimizes injury and property damage, but a sustained cognitive approach to disaster preparedness is often temporary (Baker, 2010; Paton, 2003). Yet, disaster preparedness activities on the micro level are likely left to the individual or head of household. Needless to say, disproportionately impacted by disasters are older adults due to the lack of preparedness activities, often constricted by financial resources, frail health, limited disaster preparedness education, and fragmented social networks (Cutter, 1996).

Contemporary literature continues to investigate the disaster preparedness levels of older adults residing in the United States. Al-rousan, Rubenstein, and Wallace (2014) examined secondary data provided by the Health and Retirement Study (HRS), a biennial survey designed to track developing trends among adults 50 and older. Primarily, the survey items focus on work force participation, retirement, health behaviors, social attitudes, and socioeconomic status. Updated with targeted modules randomly administered to a subgroup within the sample population, in order to capture current perceptions of adults 50 and older, is the biennial survey. In 2010, disaster preparedness items were included in the HRS survey. In the HRS Disaster Preparation Module, a total of 1,304 older adults participated in the survey. Researchers collected demographic data on ethnicity, gender, age, education level, household income, living arrangements, marital status, self-reported health status, and level of physical impairment (Al-rousan et al., 2014).

Disaster preparedness questions focused on survey respondents' having household emergency plans, access to a battery-operated radio, and a three-day supply of water, food, and medication. Respondents answered questions about their awareness of community programs that offered disaster readiness assistance, evacuation plans, knowledge of emergency shelters, and physical impairments that might impede disaster preparedness activities. Demographic characteristics revealed the average age of the respondents to be 70.2 years. The majority (81.5%) reported white; while 14.8% of the sample population reported African American, and 3.7% reported other for ethnicity. Seventy-nine percent pursued an education level beyond high school and 25.7% reported living alone. The yearly income for most respondents was $37,608; while 21.2% reported less than $17,600 a year. Indicated by most respondents was good or excellent health status. However, 28.5% reported fair to poor health. About 37.6% of older adults reported one or more physical limitation (Al-rousan et al., 2014).

Results from the disaster readiness survey items revealed low levels of disaster preparedness behavior in the sample population. Only 23.6% of older adults reported having an emergency plan; while 10.1% reported being in a disaster registry database should they need help, and 43.2% were aware of a local community shelter, in case of evacuation. Reported by 24.8% of the respondents was not having access to a car during an emergency. This finding is consistent with Wilson (2006) that an estimated 27% of all adults residing in the city of New Orleans and more than 50% of adults 65 years of age and older lacked an automobile, and the vast majority of older adults were dependent on public transportation (Wilson, 2006). The United States Government Accountability Office identifies elders without vehicles as transportation disadvantaged implying older adults, compared to the general public,

report more physical impairment, often live on a fixed income, or choose not to drive (Bascetta, 2006).

Regarding demographic variables, findings revealed increased age, low levels of education and income, and poor health were strong indicators for being less prepared for an emergency. Nearly two thirds of the sample population reported never attending any disaster readiness programs in their local community and over one third did not have basic disaster readiness supplies in case of an emergency (Al-rousan et al., 2014).

This contemporary literature supports the importance of effective emergency planning in older populations. This information is necessary to develop strategic, culturally appropriate, and sustainable community-based interventions that encourage local collaboration and inclusion of vulnerable populations.

## Research Statement

This study design was to identify and examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. Often, current research on natural disasters examines the aftermath of the storm and its impact on people. However, limited studies address the importance of adequately preparing for the unexpected natural disaster, especially among older adults and social cognitive mediating factors that influence behavior change – the ability to reduce threat and adopt proactive behaviors that initiate disaster preparedness activities. The following questions guided the inquiry:

Research Question 1: Does self-efficacy influence emergency planning in community-dwelling older adults?

Research Question 2: Does previous disaster experience influence emergency planning in community-dwelling older adults?

## Theoretical Framework

Astounding morbidity and mortality statistics reveal the urgent need to establish appropriate and relevant disaster preparedness interventions among older adults. Emergency planning encompasses adopting a social-cognitive comprehension of preparedness intervention strategies. The research was premised on Paton's (2003) social-cognitive disaster preparedness model. Paton critically evaluated levels of disaster preparedness by analyzing components of protective health behavior research and the preparedness phase of emergency planning in disaster management. By comparing these two disciplines the following similarities emerge: critical awareness, outcome expectancy in self-efficacy, and preparation (Paton, 2003). The organizing framework designed was to identify and examine three specified phases of disaster preparedness. The first phase, critical awareness is to understand and acknowledge disasters pose a threat to personal safety and property. The second phase, outcome expectancy measures perceptions of self-efficacy. Self-efficacy is the capacity to secure appropriate disaster preparedness resources by assessing individual skill, knowledge, physical ability, and finances. The third phase, existing preparedness examines a person's actual readiness for a natural disaster.

Prochaska and DiClemente's (1983) stages of change framework is a health behavior model utilized in disaster research to determine where an individual lies on the continuum of behavior change, ranging from pre-contemplation, contemplation, preparation, action, and finally to maintenance (Prochaska & DiClemente, 1983). However, Prochaska and Di

Clemente's (1983) stages of change framework focuses on behavior modification and less on social-cognitive mediating factors that influence behavior change. Paton's (2003) social-cognitive disaster preparedness model directly links cognitive motivators to social influenced intentions – the ability to reduce threat and adopt proactive behaviors that initiate disaster preparedness activities (Paton, 2003; Prochaska & Di Clemente, 1983).

Within the past decade, there has been a significant increase in catastrophic hurricanes, tornadoes, wildfires, and floods (NOAA, 2011). The frequency of natural disasters in the United States has generated a renewed interest in disaster management, in particular, emergency planning. Nevertheless, the focal point of disaster preparedness is no longer on the rudimentary stockpile of water, a first aid kit, and a battery operated radio. Understand, these items are necessary, however, to advance the field of disaster management it is vital for social scientist to approach disaster preparedness by differentiating between stockpiling supplies and social cognitive processes that fundamentally alter preparedness behavior; perhaps expending disaster preparedness from an individual approach to a community effort thereby increasing resiliency (Paton, 2003; Paton & Johnston, 2001).

A social cognitive approach to disaster preparedness requires a dutiful examination of important variables. Paton (2003) interprets the function of critical awareness as a necessary construct to disaster preparedness and the implementation of protective behaviors. However, it is important to emphasize critical awareness is determined by the frequency in which people acknowledge and discuss the imminent danger of a natural disaster (Johnston et al., 2005; Paton, 2003). Now with recurrent natural disasters, constructive discussion, proactive decision making, and adoption of protective behaviors is imperative, even more so, within the context of

social networks and community resiliency (Paton, 2003; Paton & Johnston, 2001). Paton (2003) delineates between disaster preparedness intentions and actively adopting protective behaviors. As illustrated by the social-cognitive preparation model (see Figure 2), the cohesion between intention and preparation are easily interrupted by social barriers that restrict self-efficacy impeding the capacity to secure appropriate disaster preparedness resources by assessing individual skill, knowledge, physical ability, and finances (Paton, 2003). Marginalized individuals may feel detached from their communities, receive formal sources of information with suspicion, and likely disenfranchised from political participation and empowerment. These compounding factors hinder the intention-preparation connectivity among individuals and communities (Paton, 2003; Paton et al., 2005).

### *An Ecological Perspective to Disaster Preparedness*

#### Social Barriers and Ethnicity

Paton's (2003) utilization of health behavior research is a relevant and functional approach to understanding the social cognitive perspective of disaster preparedness. Similarly, Waites (2013) intrinsically aligns the ecological perspective with a study on African American older adults' perceptions and practices of healthy aging in an urban community. Initially, the three tier approach in the ecological framework observes the organic connection of the individual and the ability to access health information and services. Second, the interpersonal tier examines the role of social networks and the prominence of culture and traditions in health behavior.

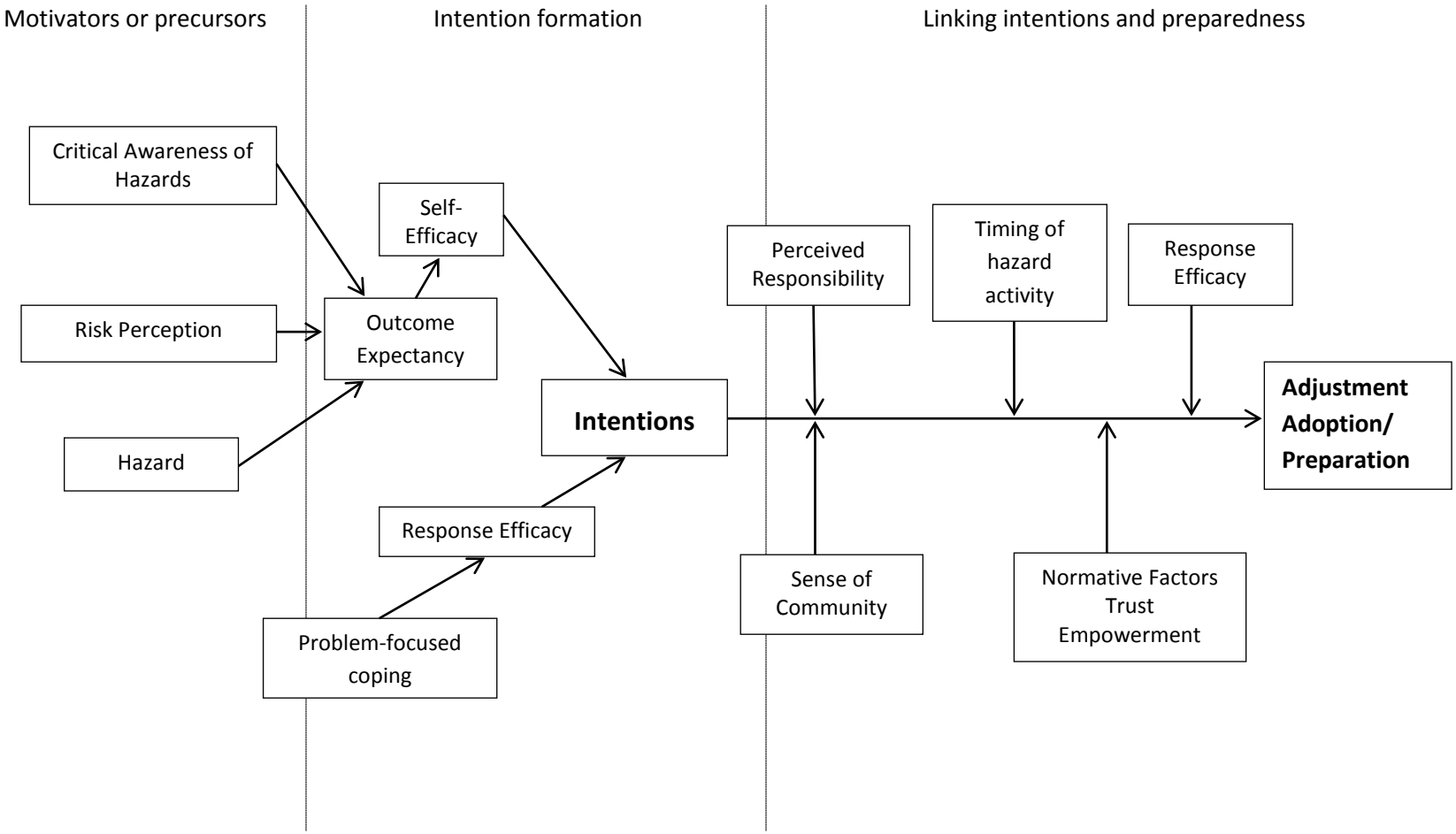


*Figure 2.* Social-cognitive preparation model (Paton, 2003).

Lastly, the third tier explores the availability of healthy aging resources and the impact of the physical environment on health promotion and practices among African American elders (Waites, 2013). In addition, ecological research conducted by Dancy and Ralston (2002) profiled three groups of African American elders to further cross examine the economic and social barriers experienced by African American older adults when accessing health care. Study results determined barriers to optimum health care include geographic isolation, limited community networks, and social support (Dancy & Ralston, 2002).

Zastrow and Kirst-Ashman's (1997) ecological framework defined in the meso-theories conceptualizes individual, group, and organizational behavior. Micro theory interprets the complexities of the biological, psychological, and social dimensions of an individual, thereby creating synchronized systems. The micro theory examines the individual human strength, weakness, coping strategy, and resilience. Meso theory explores the small group dynamic and the ability to function effectively. Small groups defined as family, work groups, and social groups. Often, it is difficult to assess if an identifiable problem's cause is the micro system (individual) or meso system (small group) with which the person may be involved. This is due to the fact human relationships are complex and overlap (Zastrow & Kirst-Ashman, 1997). Macro theory focuses on societal foundations and system functions to include: social policy, government, and the economy. Macro theory critically analyzes the effect of these broad societal systems on the human condition and perceived quality of life (Zastrow & Kirst-Ashman, 1997). Macro systems and the broader social environment steadily influence individual micro systems. Communities and organizations are two recognized macro systems that impact individuals. These two units are often tightly meshed; an individual may be identified by their

geographical location, ethnicity, or employment, whereas, organizations are formal structures of people working toward a shared goal or activity, within established rules and guidelines (Zastrow & Kirst-Ashman, 1997).

In understanding the broad reaching influence of the ecological system, further analysis validates the significant impact of income, education, employment, race and ethnicity, health status, age, and gender on disaster preparedness and adopting protective behaviors in disenfranchised individuals (micro system) and communities (meso system). Social barriers in poor neighborhoods hinder economic development and commerce, perpetuate crime, produce inferior school districts, and limit access to optimal health care and affordable housing (macro system). These social vulnerabilities nearly eliminate critical awareness, self-efficacy, and the capacity to prepare adequately for a disaster (Phillips, Thomas, Fothergill, & Blinn-Pike, 2010).

Responding proactively to disaster warnings intensify when race and ethnicity, income, education, and employment dictate the response. Also, the ability to assess the complexities of the disaster warning may be obstructed by how individuals receive, interpret, and act on the warning message. Specifically, minority communities tend to rely on family members and reliable social networks for important information. It is not uncommon for official sources of disaster information or authority figures delivering disaster information to be discarded with suspicion. Taken together, this response is legitimate based on previous experiences of discrimination and racism in minority communities (Phillips et al., 2010).

## Definition of Terms

Community-dwelling older adults: Individuals 50 years of age or older; also called older population, or elderly population within this research.

Emergency plan: Dependent measure used to define disaster readiness in community-dwelling adult respondents. According to the survey question, a well implemented emergency plan consist of a minimum two-day supply of water and food, a small battery operated radio, extra batteries, a flashlight, and emergency contact information for family and friends. Also, if evacuation is necessary, a safe designated meeting location for family members is essential.

Preparation-with-warning: Dependent measure used to examine respondents' personal preparedness level when a specified pending disaster poses a threat to personal safety and property.

Preparation-with-time: Dependent measure used to examine respondents' level of preparedness when a natural disaster will occur in a few days.

# CHAPTER 2

# REVIEW OF LITERATURE

Given the purpose of this study, a literature review was conducted to determine the scope of social cognitive disaster preparedness research and the impact on older adults, minorities, and marginalized communities. Contemporary research supports the shifting paradigm in disaster preparedness. A social cognitive approach requires an appropriate and practical theoretical framework that addresses the disaster readiness needs of vulnerable populations. This chapter reviews contextual literature on critical awareness, self-efficacy, previous disaster experience, and socio-demographics effect on emergency planning.

## Critical Awareness: Understanding Disaster Threat

In various disciplines critical awareness is recognized by three prevailing themes: (a) defining life experiences, (b) contemplation of those defining experiences and motivation to learn from the experience, and (c) constructive interaction with others (Dalton, Elias, & Wandersman, 2007). Likewise, in disaster preparedness literature critical awareness is recognized by similar themes. It requires an individual understand and acknowledge a specified disaster poses a threat to personal safety and property. Further, a conscious decision determines a course of action to prevent physical harm and destruction of property (Perry & Lindell, 1990; Perry, Lindell, & Green, 1981).

Perry and Lindell (1990) methodically studied two Washington communities directly impacted by the May 18, 1980, volcanic eruption of Mount Saint Helen. This historical research examined the construct of hazard awareness, often compared to critical awareness, and how the residents of Toutle and Lexington, Washington, responded to the looming threat of a

volcanic eruption from Mount Saint Helen. The devastating blast killed 68 people, annihilated 150 square miles of woodlands and wildlife; spoiled 169 fresh water lakes, and over 3,000 streams were marred by the eruption. Government officials estimated $1.8 billion in lost property and farmland (Perry & Lindell, 1990).

Perry and Lindell (1990) determined that Toutle and Lexington residents' experience of living in the vicinity of an active volcano and incorporating that knowledge into the routine of daily activities produced a heighten awareness of the potential danger. Data results indicated that 72.2% of Toutle residents and 61.5% of Lexington residents believed the foreseeable danger of the active volcano to be important. This intense awareness of the volcano revealed a significant level of threat knowledge among the residents (Perry & Lindell, 1990). Further investigation determined that individual planning behavior, now known as disaster preparedness, increased significantly among Toutle and Lexington residents with high treat knowledge (Perry & Lindell, 1990). Perry and Lindell define individual planning behavior as the amount of energy expended on gathering information about the specified danger (Perry & Lindell, 1990). Study findings showed people who initiated contact with information sources were more likely to acquire comprehensive threat knowledge (Perry & Lindell, 1990).

## Critical Awareness and Pre-Warning Disaster Messages

Scientists in disaster research differentiate between the constructs of warnings during disasters, as demonstrated in earthquake aftershock warnings, and warnings concerning impending disasters, for example, hurricanes, floods, and wildfires (Mileti & O'Brien, 1992). Although the definitions are distinctly different in disaster literature, pre-warning and post-warning messages have similar characteristics and intended goals. Critical awareness or pre-

warning messages require an individual understand and acknowledge a specified disaster poses a threat to personal safety and property. Further, a conscious decision determines a course of action to prevent physical harm and destruction of property (Perry & Lindell, 1990; Perry, Lindell, & Green, 1981).

Likewise, risk communication during disasters or post-warnings requires an individual actively participate in a sequence of cognitive stages. First, received by the individual or community is the risk communication. Second, validated usually by checking a credible source is the warning. Third, an individualized understanding of the risk and its potential impact is developed. Fourth, determine the warning is correct and relevant to individual circumstances or the community environment. Fifth, a conscious decision determines a course of action and protective behaviors are initiated (Mileti & O'Brien, 1992). With each new warning received, these five cognitive stages are processed.

Individuals receiving risk information tend to prioritize the warnings into three attributes: (a) environment, (b) social, and (c) psychological. Often influenced by physical and social prompts are weather or environment related warnings. To illustrate, residents of the community evacuate as wind and rain intensify and the media broadcast hurricane evacuation messages (Mileti & O'Brien, 1992). Social attributes examine the following characteristics: (1) dynamics of social networks, social support, and cohesive family units (Messias, Barrington, & Lacy, 2012; Mileti & O'Brien, 1992; Sanders, Bowie, & Bowie, 2003); (2) ability to secure appropriate financial resources, transportation, housing, and food (Baylor College of Medicine and the American Medical Association, 2006; Donald, Bodor, Rice, Swalm, Hutchinson, 2011; Fernandez, Byard, Lin, Benson, & Barbera, 2002; Mileti & O'Brien, 1992; Sanders, Bowie, &

Bowie, 2003; United States Government Accountability Office, 2006; Wilson, 2006); and (3) socioeconomic status, race, ethnicity, age, and gender (Brodie, Weltzien, Altman, Blendon, & Benson, 2006; Cutter, 1996; Cutter, Boruff, & Shirley, 2003; Eisenman, Cordasco, Asch, Golden, & Gilk, 2007; Elder et al., 2007; Fothergill, Maestas, & Darlington, 1999; Mileti & O'Brien, 1992). Salient psychological attributes of the individual receiving disaster messages are critical awareness and a conscious course of action to prevent physical harm and destruction of property (Dalton, 2007; Paton, 2003; Perry et al., 1981); and previous disaster experience that may be heighten by the type of disaster and the recency of the disaster experience (Mileti & O'Brien, 1992; Perry & Lindell, 1990).

Mileti and O'Brien (1992) further analyzed individual response to pre-warning and post-warning disaster messages by comparing two California counties – San Francisco and Santa Cruz. Both counties were significantly impacted by the October 17, 1989, Loma Prieta earthquake. The main shock registered 7.1 on the Richter scale. The massive earthquake and subsequent destruction killed 62 people while 3,757 people were injured. Over 12,000 people left homeless and property damage reported on 2,575 businesses and 18,306 homes. Interruptions to power grids, communications, mass transit, highway systems, and commerce exceeded $6 billion in lost revenue (Mileti & O'Brien, 1992). Study respondents living in Santa Cruz experienced physical injuries and greater structural damage in the initial earthquake. As a result, warnings of pending aftershocks and additional injuries induced feelings of greater risk in 55.2% of the Santa Cruz residents. In comparison, study respondents living in San Francisco reported fewer physical injuries and proportionately less property damage from the initial

earthquake. Consequently, 39.9% of San Francisco residents responded to earthquake aftershock warnings with feelings of greater risk (Mileti & O'Brien, 1992).

Study respondents in both counties adopted protective behaviors and initiated mitigation activities to prevent further property damage (Mileti & O'Brien, 1992). Yet, study findings indicate respondents who experienced more initial earthquake damage in their neighborhoods readily prepared for earthquake aftershocks. Residents chose simple task such as securing household items (70.3% of Santa Cruz respondents and 45.2% of San Francisco respondents, respectively). In Santa Cruz, 43.8% of residents implemented a household emergency plan, while 31.5% of San Francisco residents adopted a household emergency plan. A few residents considered making protective structural adjustments to their homes (17.6% of Santa Cruz respondents and 7.4% of San Francisco respondents, respectively). Moreover, to prepare for anticipated earthquake aftershocks a greater proportion of respondents living in Santa Cruz initiated a conscious course of action to prevent physical harm and further property damage, compared to respondents living in San Francisco (Mileti & O'Brien, 1992). Study results determined the following about pre-warning and post-warning disaster messages:

1. Feelings of risk have an immediate impact and positively influence individual response to disaster warnings with protective actions
2. Precise and complete warning messages or reinforcement have an immediate positive influence on individual response, even more, an unintended positive influence on individual response through feelings of risk
3. Critical awareness and hazard knowledge in anticipated disasters improve individual warning response with assumed and unintended protective behaviors

4. Socio-demographics may significantly impede feelings of risk and appropriate response to warning messages (Mileti & O'Brien, 1992)

Showalter's (1993) exploratory study measured the effect of a quasi-earthquake prediction on four small communities in Arkansas and Missouri. The four communities selected were based on the following criteria: (a) between 1974 and 1989 these communities recorded a substantial number of earthquakes measuring 3.0 or greater on the Richter scale, (b) the towns are located near a large active earthquake zone, and (c) the residents were likely to have experienced a prior earthquake. Among the four communities two had already experienced earthquakes 3.0 or greater on the Richter scale between 1974 and 1989. The two remaining communities had not experienced measurable tremors (Showalter, 1993).

Survey questions measured participants' attitudes toward the quasi earthquake prediction, earthquake fatalities, personal injuries, destruction of property, lost revenue, interruption of public utilities, and earthquake preparedness activity. Although Showalter (1993) interpreted findings from quasi-scientific research, the results are similar to previous work conducted in disaster preparedness. Data revealed an apparent positive relationship between concern over earthquake fatalities and preparedness activity among study participants. Further results demonstrate a positive relationship between personal injury and earthquake preparedness activity such as mitigate structural household hazards to minimize damage, maintain emergency supply kit, attend information sessions on the potential earthquake threat, and implementation of household mitigation plans. In summary, Showalter's (1993) exploratory study emphasized the saliency of individual critical awareness to

mitigate household hazards and initiate appropriate disaster preparedness activities to prevent physical harm and destruction of property.

## Self-Efficacy Initiates Protective Behaviors

Generally, self-efficacy is associated with protective health behaviors such as exercise, cardiac rehabilitation, smoking cessation, and weight loss programs (Sniehotta, Scholz, & Schwarzer, 2005). Likewise, social scientists in disaster management have adopted the significance of self-efficacy in preparedness research (Paton, 2003). These two disciplines provide parallel definitions for self-efficacy. In health behavior literature self-efficacy demonstrates individual aptitude to achieve a particular task by individual motivation, knowledge, and resources although hindered by familiar and social barriers (Sniehotta et al., 2005). In disaster preparedness research, self-efficacy is the capacity to calculate individual ability to secure appropriate resources by assessing individual skill, knowledge, health, and finances (Lindell & Whitney, 2000). Self-efficacy significantly influences individual intentions to prepare for a disaster (Paton, Smith, & Johnston, 2005).

Johnston et al.'s (2005) study on tsunami preparedness in costal Washington measured levels of outcome expectancy and self-efficacy in respondents. Outcome expectancy is the attitude or belief; potential danger can be alleviated by individual effort. Results indicated respondents with moderate levels of outcome expectancy reported decreased preparedness action. Respondents with low to moderate levels of self-efficacy were more likely to show impeded preparedness behavior. Further examination of the respondents' data revealed low to moderate levels of preparedness intentions. Consequently, only 13% of the study respondents reported a definite intention to prepare for a disaster (Johnston et al., 2005).

Examined thoroughly in earthquake hazard adjustment studies is self-efficacy. Participants in Lindell and Whitney's (2000) earthquake preparedness study revealed individuals' perceived efficacy in responding to a specified threat involving personal safety and property did not always translate to actual adoption of earthquake preparedness behavior. Lee and Lemyne's (2009) study on terrorism revealed perceived coping efficacy related to individual preparedness behavior and pursuit of relative disaster information. Also, results indicate individuals are less likely to be anxious about terrorist attacks and demonstrate avoidance behavior when considering the possibility of a terrorist attack (Lee & Lemyne, 2009).

Research on general self-efficacy and social cognitive theory intently examine the relationship of psychological constructs. Luszczynska, Scholz, and Schwarzer (2005) described self-efficacy as prospective and functional in design. The National Center for Disaster Preparedness' (2008) study survey provides the following example: "I am confident that I could deal efficiently with unexpected events" (p. 24). This statement demonstrates knowledge, prospective, and action. Bandura's (1997) social cognitive theory explores self-motivated traits: organization, reflection, and regulation; these unique human characteristics allow individuals to critique personal achievement (Luszczynska, Scholz, & Schwarzer, 2005).

General self-efficacy, identified as a universal and intrinsic human characteristic, extends across culture and populations. Luszczynska et al. (2005) distinguish self-efficacy as either task specific or domain specific. Yet, other social scientists define general self-efficacy as unwavering competence and ability to engage realistically stressful circumstances. Social cognitive theory suggests general self-efficacy is an important primary predictor of human behavior. However, the effect may be secondary. Results from previous research studies show

individuals with high self-efficacy tend to develop assertive goal setting strategies and as a result are more likely to realize the goal (Luszczynska et al., 2005). In addition, a propensity to plan for future events is apparent in individuals with high self-efficacy, referred to as action plans. Further, Bandura (1997) through his social cognitive theory interprets outcome expectancies as positive or negative results of definite behaviors. Consequently, individuals with high self-efficacy assumingly experience more affirming outcomes of future behaviors and less adverse outcomes (Bandura, 1997).

Luszczynska et al. (2005) in their particular study consider the relationship between general self-efficacy and three social cognitive theories constructs: (a) well-being, (b) health behaviors, and (c) coping. In addition to the social cognitive constructs, self-regulation implies an individual may consciously adjust a counterproductive response determined to restrain compulsions by substituting constructive decisions that support an identified goal. A review of health-promoting behaviors revealed the willingness to embrace a particular behavior may be determined by the individual's ability to perform successfully the behavior. Similarly, persons with high self-efficacy tend to participate in healthy behaviors, continue a healthy life, and often rebound after an obstacle or relapse. Moreover, persons with low levels of negative affect will likely overcome challenging circumstances and demonstrate self-efficacious behavior. Self-efficacy is the underlining factor that increases individual confidence providing the necessary skills and strategies to cope with anxiety and secure necessary resources that will help mitigate a crisis situation (Luszczynska et al., 2005).

Once individuals with high self-efficacy initiate proactive behavior, they are more likely to exert additional time and effort than individuals with low self-efficacy. Bandura (1997)

stated people with robust self-efficacy successfully negotiate obstacles and emphasis opportunities. Further, self-efficacy encourages practical problem solving skills. The hypotheses for Luszczynska et al.'s study were:

(1) General self-efficacy relates to targeted positive individual attitudes on exercise, healthy eating, and tobacco use

(2) Study respondents with elevated general self-efficacy should have lower pessimism and optimistic outlook on life, seemingly decreased pain levels, and an increase of healthy activities

(3) General self-efficacy will increase proactive coping techniques and decrease defeatism behaviors (Bandura, 1997; Luszczynska et al., 2005)

A sample of 1,933 study participants completed the general self-efficacy survey (Luszczynska et al., 2005). Sample adults were from three culturally diverse countries: Germany, Poland, and South Korea. Participants from Germany were from two distinct groups. The first group was 395 patients recovering from heart disease. The second group was 238 patients being treated for cancer in the digestive system. Participants from Poland formed three groups. The first group comprised 225 university students. Fifty-four professional swimmers formed the second group and 80 patients with digestive diseases comprised the third group. Participants from South Korea totaled 941 individuals who completed the general self-efficacy survey (Luszczynska et al., 2005).

Ten items are on the General Self-Efficacy Scale. A standard survey questions is, "I can usually handle whatever comes my way." The typical response format includes: (1) *not at all true*, (2) *hardly true*, (3) *moderately true*, and (4) *exactly true*. Several correlation studies across

28 countries established stringent validity and reliability for this scale. Luszczynska et al. reported Cronbach alphas on the study sample. Coefficient internal consistency ranged from .94 for the patients recovering from heart disease in Germany, .89 for the patients being treated for digestive cancer in Germany, .90 for the university students in Poland, .87 for the patients with digestive diseases and professional swimmers in Poland, and .86 for the respondents in South Korea (Luszczynska et al., 2005).

First, for well-being and health behavior, the results revealed robust general self-efficacy attitudes related to reduced levels of depression and increased exercise in patients with heart disease. Also, strong self-efficacy characteristics reduced levels of anxiety and pain in patients with digestive diseases. Cancer patients showed improved psychological, physical, cognitive, and social well-being. They reported less depressive symptoms and fatigue. Study respondents from South Korea with high levels of general self-efficacy participated in regular exercise and ate more nutritious foods compared to counterparts with low measurements of self-efficacy. Second, findings for general self-efficacy and coping revealed patients with digestive diseases and strong self-efficacy displayed regular use of proactive pain management. Cancer patients with robust self-efficacy often utilized proactive coping, planning, optimism, laughter, determination, and routinely researched health related information. On the contrary, cancer patients with low general self-efficacy often used adverse coping techniques such as guilt and isolation (Luszczynska et al., 2005).

Overall, study participants from Germany, Poland, and South Korea with robust general self-efficacy demonstrated proactive coping, regular planning, and determination. According to Luszczynska et al. (2005), these characteristics are indicators of the potential ability to adjust

effectively to stressful circumstances. More importantly, despite the culturally diverse sample population and significant variation in socioeconomic status, age, education, and physical health, the respondents reported more similarities than differences. However, the study limitations were: (a) percentage of participants varied by age and gender; and (b) not measured across the entire sample, in all three countries were well-being, health behaviors, and coping. Further, the effect of moderating variables such as race and ethnicity, income, and education may influence self-efficacy and related constructs (Luszczynska et al., 2005).

Certainly recognized in health behavior and disaster management academic literature is the significance of self-efficacy. Recently a current trend in health behavior research identified self-efficacy as a moderating variable. Studies predicting physical activity in culturally diverse adolescents explored how self-efficacy operates as a moderating variable to mediate the influence of planning an exercise program on the desired objective of participating in routine physical activity (Lippke, Wiedemann, Ziegelmann, Reuter, & Schwarzer, 2009).

Continuing research in self-efficacy, Luszczynska et al. (2010) conducted two longitudinal studies on Chinese youth ranging from 12 to 18 years old and Polish youth ranging from 15 to 19 years old. At the start of Week 1, in both studies, adolescent respondents completed a series of questionnaires measuring intention, planning, perceived self-efficacy, and physical activity. Administered at Week 4 to the Chinese youth were the second series of identical questionnaires. The Polish youth completed the second identical series of questionnaires at Week 10. Study results determined Chinese youth and Polish youth with robust self-efficacy were confident in their capability to plan, initiate, and maintain a routine exercise program. Whereas, adolescents with low self-efficacy were doubtful in their capability

to plan, initiate, and maintain a routine exercise program. Findings indicated planning is a dynamic tool to cultivate action, but only if individuals are convinced in their ability to succeed (Luszczynska et al., 2010).

Further, Bandura (1997) emphasized the necessity to develop robust self-efficacy in individuals. It is futile to focus on planning and intentions if people lack the confidence to initiate and maintain constructive behavior change even when personal and societal obstacles exist. It is necessary to understand the dynamics of self-efficacy in developing effective disaster preparedness strategies and interventions within a targeted population (Bandura, 1997; Luszczynska et al., 2010).

## Effects of Previous Disaster Experience

Sattler, Kaiser, and Hittner (2000) keenly explored two theoretical models that assess human reaction to natural disasters by examining the psychological and behavioral stressors that occur during the disaster cycle. By merging the models, Sattler et al. further examined a comprehensive approach to understanding human response to natural disasters. First, Hobfoll's (1989) resources stress model emphasizes four categories of resources: personal assets (e.g., vehicle, home, household items), societal position (e.g., spouse, parent, employee), individual traits (e.g., education, age, confidence, intellect), and efficacy (e.g., money, savings, insurance). Hobfoll's model infers psychological anxiety is inevitable when there is a risk of resource loss, disrupted investment of resource growth, or depleted resources. This specific model also calculates the positive impact of resource gain on human response. For instance, someone who survives a natural hazard may learn invaluable skills about disaster mitigation, preparedness, response, and recovery. In addition, developed by disaster survivors are self-

efficacy, increased social networks, strengthened family relationships, community resiliency, and positive coping strategies. More importantly, individuals who have experienced a previous disaster may gain skills and knowledge that bolster protective behaviors and reduce property loss in future disasters (Hobfoll, 1989; Sattler et al., 2000).

Second, the warning and response model developed by Lindell and Perry (1992); Perry and Mushkatel (1984) identified that situational elements (e.g., environmental warnings, social conduct, risk messages), individual traits (e.g., age, income, education, previous disaster experience), and societal factors (e.g., family relationships, social networks, civic engagement) influence critical awareness and protective behaviors. In summary, this model suggests people will initiate protective actions if (a) they understand the potential of physical harm and destruction of property; (b) initiating protective behaviors is achievable; and (c) they exhibit self-efficacy, knowledge, skills, and the ability to access protective resources. Also, imperative to the warning and response model is the idea previous disaster experience may help individuals and communities recognize and prepare for a future disaster (Lindell & Perry, 1992; Perry & Mushkatel, 1984; Sattler et al., 2000).

Sattler et al. (2000) suggested the resources stress model and the warning and response model share similar themes. When people encounter a new disaster threat, individuals with previous disaster experience – specifically those who have endured physical harm, property destruction, and psychological trauma would (a) be more likely to recognize a disaster threat, (b) be prone to psychological trauma, and (c) initiate appropriate protective behaviors than individuals who have experienced minimal property loss, no disaster related trauma, or individuals with no previous disaster experience. As previously discussed, Paton's (2003) social-

cognitive disaster preparedness model also acknowledged similar themes found in the resources stress model and the warning and response model. Paton targeted three specified phases of disaster preparedness. The first phase, critical awareness is to understand and acknowledge disasters pose a threat to personal safety and property. The second phase outcome expectancy measures perceptions of self-efficacy, such as the capacity to secure appropriate disaster preparedness resources by assessing individual skill, knowledge, physical ability, and finances. The third phase existing preparedness examines a person's actual readiness for a natural disaster (Paton, 2003; Sattler et al., 2000).

Geographic location is a prevalent factor when considering survivors of previous disasters. People who live in regions of the U.S. regularly threatened by major natural disasters are more likely to be critically aware of the potential for physical harm and property destruction. Sattler et al. (2000) suggest people who have experienced extreme property loss and psychological trauma are more responsive to warning messages and environmental cues than individuals who have not experienced a severe weather hazard. However, on the contrary, some disaster survivors may develop an unrealistic optimistic bias to having survived a major natural disaster. This faulty belief may hinder appropriate and timely disaster preparation or evacuation (Sattler et al., 2000).

Sattler et al. (2000) conducted a study to examine the association among previous disaster experience, hazard perception, psychological distress, socio-demographics, and preparation for an approaching major storm. The location of this study was Charleston, South Carolina, a city that has experienced major hurricanes in the past two decades. However, for this study, the historical reference frame was Hurricane Hugo. September 21, 1989, Hurricane

Hugo battered the south eastern coast of the U.S. with sustained winds of 135 miles per hour. Many of South Carolina's counties were severely damaged. At that time, Hurricane Hugo was the costliest disaster on record in the U.S. with an estimated $7 billion in property damage. Researchers were able to utilize the significant hurricane history of South Carolina, with a present approaching storm, Hurricane Emily. September 1993, Hurricane Emily threatened Charleston, South Carolina.

In addition, three years later, Sattler et al. (2000) expanded the research by replicating the initial study with analysis from Hurricane Fran. September 1996, Hurricane Fran's strong winds and storm surge impacted South Carolina. The intended purpose was to analyze and compare past human responses to Hurricane Hugo and present human responses to Hurricane Emily. Sattler et al.'s hypothesis was based on the shared themes of the resources loss model and the warning and response model. Study respondents who had endured previous disaster experience, disaster related psychological trauma, and property loss results would be positively associated with hazard perception, current psychological distress, and initiating preparedness behaviors. Socio-demographic variables were also measured (Sattler et al., 2000).

In the Hurricane Emily study, 257 participants completed the surveys (Sattler et al., 2000). A majority of respondents (79%) were students, faculty, and employees at a local college, while 21% lived in two beach communities. Study participants were predominately White (*n* = 89). Only 10 minority respondents participated in the study. The surveys had four components. The first section captured demographics, amount of property damage, and psychological trauma attributed to Hurricane Hugo and level of preparedness for Hurricane Emily. The second section focused on critical awareness and the immediate threat of Hurricane

Emily. The third and fourth sections each listed 20 psychological and psychophysiological distress symptoms. The surveys administered were while Charleston's weather forecast issued hurricane warnings. The overall response rate for the surveys was 80% (Sattler et al., 2000).

Study results indicated Hurricane Hugo was experienced by 67% of the sample population, 40% of the survey respondents reported moderate to severe psychological trauma linked to Hurricane Hugo, while 38% of the participants had experienced more than one hurricane. Overall results for Hurricane Emily determined that perceived threat, distress, and preparation were significant predictors for securing an emergency kit. Approximately one half of the respondents reported having access to the following disaster supplies: fuel for vehicle, flashlights, batteries, bottled water, non-perishable food, candles, and matches. Overall, results determined respondents disaster preparation for Hurricane Emily were positively associated with age, income, male, psychological trauma, and destruction of property as a result of Hurricane Hugo, knowing evacuation routes, following weather reports, past experience with Hurricane Hugo, and perceived threat (Sattler et al., 2000).

In the Hurricane Fran study, 180 participants completed the surveys (Sattler et al., 2000). A majority of respondents (88%) were students, and 12% faculty and staff at a local college. Again, study participants were predominately White ($n$ = 89). Only 10 minority respondents participated in the study. The surveys were similar to the first study on Hurricane Emily. However, researchers added questions on threat perception from Hurricane Fran. Study findings indicate respondents' disaster preparedness for Hurricane Fran were positively associated with age, perceived threat, following weather reports, and experiencing Hurricane Hugo. However, further analyses suggest the demographic variable age accounted for a

significant portion of preparation variance in the model. In total, results from both studies support the premise of resources stress model and the warning and response model within the framework of disaster preparedness and critical awareness (Hobfoll, 1989; Lindell & Perry, 1992; Perry & Mushkatel, 1984; Sattler et al., 2000).

Researchers Mishra and Suar (2007) continue to explore the impact of previous disaster experience and disaster education on individuals and the direct influence on initiating protective behaviors. However, for the purpose of the current study the primary focus was on previous disaster experience. Like Sattler et al. (2000), Mishra and Suar (2007) examined Hobfoll's (1989) resources stress model and the implications on a sample population residing in Orissa, India, located in the northeastern region of the country. In Orissa, residents encounter annual floods and dangerous heat wave conditions. According to Mishra and Suar (2007), hundreds of people die each year in deadly floods or from heat stroke. Researchers distributed 600 surveys to people residing in heat wave and flood prone communities. Fifty percent of respondents completed and returned surveys from both designated natural disaster areas. Survey questions measured hazard perception, individual safety, household safety, property destruction, and witnessing injury or death caused by disaster related circumstances. Additional survey questions measured flood and heat wave preparedness among the sample population. Flood preparedness questions measured the following behaviors: having a working radio in the home, available candles, and knowledge of close shelters in case of flood evacuation. Heat wave questions rated preparedness behaviors such as storage of cold water, using a protective curtain to block the summer heat from penetrating the rooms of the home, and awareness of government reported heat advisories. Risk perception served as the

mediating variable for previous disaster experience, disaster education, and preparedness behavior (Hobfoll, 1989; Mishra & Suar, 2007; Sattler et al., 2000).

Study results determined respondents with previous disaster experience and disaster education had higher levels of risk perception for both flood and heat wave. People with increased risk perception were motivated to engage in flood preparedness behavior. However, risk perception did not significantly influence heat wave preparedness behavior. Reflected in Mishra and Suar's (2007) research, vulnerable populations often respond to perceived threats with a sense of hopelessness. If a community does not have the ability to secure appropriate resources by assessing collective skills, knowledge, and government support, people are less likely to initiate protective behaviors (Mishra & Suar, 2007; Lindell & Whitney, 2000). Societal barriers such as poverty and illiteracy often prohibit preparedness action and foster a collective belief of despair. However, Mishra and Suar (2007) concluded previous disaster experience and disaster education are constructive tools in developing critical awareness and protective behaviors (Mishra & Suar, 2007).

## Socio-Demographics and Natural Disasters

### *Triple Jeopardy in Minority Communities*

Estes & Associates (2001) applies the term *triple jeopardy* when describing the negative effects of age, ethnicity, and low socioeconomic status on the health and psychological well-being of African American older adults. Dancy and Ralston (2002) acknowledge the significance of triple jeopardy when analyzing the cumulative risks of age, ethnicity, and socioeconomic status among African American older adults when accessing health care. An exploratory descriptive study by Sanders et al. (2003) emphasized the encompassing impact of Hurricane

Andrew on African American older adults. August 1992, Hurricane Andrew devastated Miami-Dade County; this natural disaster was one of the most devastating hurricanes to occur in modern history. As a result of Hurricane Andrew, a forced relocation effort was enacted in an attempt to safely evacuate older adults from structurally unstable public housing units. However, evacuation and relocation efforts poised a greater trauma for this vulnerable population by unintentionally disconnecting elders from established social support networks, community resources, and familiar health care providers (Estes & Associates, 2001; Dancy & Ralston 2002; Sanders et al., 2003).

This study critically examined the deteriorating health status of study participants, the fragmentation of social support networks, and inadequate relocation housing. After the severe property damage and disruption of social services following Hurricane Andrew, 58 older African American adults, relocated to high-rise apartments, agreed to an interview about their experiences. The participants ranged in age from 49 to 84 years old, 69% of the sample were female, while 31% were male. Forty-six participants reported having at least one debilitating chronic disease that required consistent medical supervision. Seventeen participants indicated they would remain in the high-rise apartments, however, 41 study participants wanted to return to their familiar community and homes (Sanders et al., 2003).

Study participants who received medical attention, several reported chronic health care problems as a primary concern (Sanders et al., 2003). Participants reported health conditions that required immediate medical intervention and regimented medication management such as: cardiovascular disease, hypertension, cognitive impairment, cancer, diabetes, and 40% of the African American elders in the study reported feeling sick by an undetermined illness or

unusual mental stress. Also, several older adults contracted the flu or cold symptoms placing additional burden on an already compromised health condition. Due to the relocation activity, established relationships with trusted health care providers were severed and participants had to secure new health care providers to monitor their chronic conditions. Study participants stated that finding a new physician created considerable stress and anxiety (Sanders et al., 2003).

Researchers have repeatedly identified family, friends, and the church as an invaluable social support network for older African Americans. This study sample reflected the same attitude, and beliefs toward social support networks in the African American community. Participants reported social support networks as the most crucial loss experienced after the relocation. Despite the structural damage and destruction of property caused by Hurricane Andrew, participants wanted to return to their familiar neighborhoods and friends. Seventy-one percent of the participants did not want to permanently transition into the apartments made available to the older adults during the relocation process (Sanders et al., 2003).

When asked, participants provided reasons why they wanted to return to their old neighborhood, three primary factors emerged from the data: (1) missed formal and informal support networks; (2) poor and inadequate living conditions in the new apartments, and (3) an inability to perform activities of daily living independently. Sanders et al. (2000) also documented the chain reaction that occurred when the elders' social support networks frayed; additional community resources, like public transportation; referral and information resources; and social service advocates were lost. Study participants expressed their frustration with the limited and unreliable public transportation systems in the new community. Older adults

stated they had difficultly or were unable to get to the doctor due to inadequate transportation. Grocery shopping, visiting family and friends, and attending church services were also impeded by lack of transportation in the new community. Elders indicated the inability to visit with old friends while living in the new location significantly increased feelings of isolation, loneliness, and depression (Sanders et al., 2003).

Relocated study participants reported numerous maintenance hazards and safety problems in the new apartment complex. Elders notified facility managers repeatedly with a list of concerns such as: cramped living areas; faulty air conditioning units; limited privacy; dilapidated beds and furniture; unsecured mail delivery; poor building security; broken pipes; and no accommodations for physical impairments. As a result of these substandard living conditions, study participants experienced additional psychological and physical stress. The inferior conditions of the apartment building impeded older adults' activities of daily living and restricted their ability to function independently. Study participants expressed frustration in their inability to access neighborhood grocery stores, laundry facilities, and community resources (Sanders et al., 2003). In disasters, older adults are affected disproportionately by poverty, limited education, ethnicity, and gender. Therefore, it is necessary to review socio-demographics in evacuation and relocation literature to gain a comprehensive understanding of preparedness research.

Kim and Kang's (2010) thorough review of disaster preparedness literature examined socio-demographic variables that explained an individual's decision to prepare for a natural disaster. However, contemporary preparedness research has evolved due to response and

recovery systematic failures in emergency management after a natural disaster (Kim & Kang, 2010; South Asian Disaster Knowledge Network, 2009).

Social scientists have determined Hurricane Katrina significantly impacted the frail elderly residents of New Orleans. However, beyond this unprecedented category three hurricane, several social barriers impeded the poor, elderly, and disabled from evacuating New Orleans before Hurricane Katrina made landfall (Elder et al., 2007). In a study conducted by Eisenman et al. (2007) approximately 100,000 residents of New Orleans and the surrounding parishes did not evacuate before Hurricane Katrina swept through the Gulf Coast. Research findings indicated many of the residents that did not evacuate were poor and African American. Similar studies on ethnicity and evacuation decisions are parallel with patterns witnessed during Hurricane Katrina: people of color are less likely to evacuate and affected more by natural disasters (Eisenman et al., 2007).

Elder et al.'s (2007) qualitative study investigated the impact of societal factors that influenced the delayed evacuation response of African Americans during Hurricane Katrina. Poor health and limited mobility among the elderly and disabled residents impeded evacuation. Family members stayed with older adults who were unable to walk to designated shelters or board buses due to frail health. The study design consisted of six focus groups of 53 African Americans recruited by convenience sampling. At the time of the study, the participants were residing in hotels in Columbia, South Carolina, provided by the Red Cross. Four focus groups were composed of eight participants each, while the remaining had 10 and 11, respectively (Elder et al., 2007).

Focus group findings indicated that limited or no financial resources was a barrier to evacuation (Elder et al., 2007). Participants explained Hurricane Katrina struck a few days before payday severely restricting the amount of available money needed for gas, food, and hotel accommodations. Focus group attendees stated why they did not evacuate: "The hurricane came at the wrong time. We were waiting for our payday," "No money for gas," and "Money was hard to come by at that time" (Elder et al., 2007). Further, focus group participants reported crime and perceived racism experienced during the government coordinated evacuation efforts hindered the evacuation response. Participants stated they did not "trust the police" to protect their personal property. Focus group members reported police officers were instructed to keep New Orleans' African American residents from walking through an affluent neighborhood to reach a designated shelter (Elder et al., 2007).

Perceived racism experienced during the government coordinated evacuation efforts prompted participants to discuss historical discrimination and racial inequalities in New Orleans. Focus group members explained New Orleans minority neighborhoods were built near Lake Pontchartrain and the levee system. However over the years, the levees were reported to be structural obsolete and incapable of retaining a deluge of water. Participants felt the local government intended to flood the minority neighborhoods.

> They have been trying to find a way to get rid of us. They had to do it in the way that wouldn't---wouldn't be known that they were trying to do it . . . That storm came through. Gave them the---that idea that [here] come you opportunity, "Oh, the storm coming in. The levees breaking." And whatever else . . . Give them $2,000 so they could forget we was trying to kill them. (Elder et al., 2007)

Brodie et al. (2006) surveyed 680 randomly selected respondents, 18 years or older, who were evacuated from the Gulf Coast states to temporary shelters in Houston, Texas. The

purpose and intent of the survey was to record the experiences of those who did not evacuate prior to Hurricane Katrina, were dependent on government support to evacuate, and did not have the resources to secure housing on their own. Survey demographics showed the vast majority of the respondents had never lived outside of New Orleans. Over 90% of the sample population was African American, and an estimated 6 in 10 families earned below $20,000 in 2004. Approximately 45% of the respondents had full-time employment before the hurricane (Brodie et al., 2006).

Evacuees temporarily relocated at the Houston shelters were 93% African American compared to 5% White (Brodie et al., 2006). Thirty percent of the evacuees were 50 years old or older. Only 18% of the sample population had private health insurance compared to 63% of the residents of Louisiana. The same report indicated 32% of the respondents earned less than $10,000 in 2004 as opposed to 10% of the general population of New Orleans and Louisiana. Barely 6% of the sample population had a bachelor's degree, compared with 26% of the residents of New Orleans and 19% of Louisiana residents in total.

In summary, in this chapter described the (a) significance of critical awareness and pre-warning messages, (b) influence of self-efficacy in initiating protective behaviors, (c) effects of previous disaster experience, and (d) impact of social barriers, ethnicity, economics, and perceived racism as antecedents that impede disaster preparedness in older adults, minorities, and other vulnerable communities.

# CHAPTER 3

# METHODOLOGY

## Study Design and Method

In response to the horrific terrorist attacks of September 11, 2001, the National Center for Disaster Preparedness at Columbia University, Mailman School of Public Health, and the Children's Health Fund began evaluating American citizens' beliefs, awareness, attitudes, and behaviors regarding terrorist attacks (NCDP, 2008). The survey developed was the National Center for Disaster Preparedness, American Preparedness Project (Marist). Commencing in 2002, the National Center for Disaster Preparedness (NCDP) and Children's Health Fund (CHF) partnered with the Marist College Institute for Public Opinion (MIPO) to conduct their first random-dial telephone survey (NCDP, 2008). Utilizing demographic data from the 2000 U.S. census, researchers interviewed a representative random sample of the population examining levels of preparedness among American communities. The MIPO administered the survey, coded the data, and generated the descriptive statistics.

A cross-sectional design was used to identify and examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. For the purpose of this study, non-identifiable secondary data were analyzed. Sources of the data are the 2007 and 2008 NCDP, American Preparedness Project (Marist) surveys. In 2007, between July 9, and July 20, a total of 1,320 respondents participated in the NCDP survey. In 2008, between July 25, and August 9, a total of 1,537 respondents participated in the NCDP survey (see appendix). If requested by the respondent, the interview conducted was in

Spanish. Respondents 18 years of age and older residing in the continental United States participated in the interview by telephone.

However, the sample focus for this study was adults 50 years of age and older. The total number of older adult respondents in the 2007 NCDP survey was 758. The total number of older adult respondents in the 2008 NCDP survey was 819. Random household telephone numbers were determined by utilizing nationwide telephone exchanges. In proportion to its population, telephone exchanges chosen were to confirm representation of each region of the country.

To track current trends in recent national disasters, each survey designed was to include a question to target a specific disaster relevant to that particular time period. The NCDP and CHF researchers designed a cross-sectional study to examine the levels of individual and family preparedness, perceived levels of community preparedness, reliability in government during a disaster, personal loss, inclusive hazard preparedness, and evacuation readiness. All survey questions were cross-tabulated with a range of demographic data to include: age, education, civic engagement, income, geographic location, ethnicity, gender, and previous disaster experience

## Variables

This study was designed to identify and examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. A multivariate regression analysis was used to examine the association between the dependent variable and the independent variables. Because there were many cases with unique weights, so clusters with only one case each, the "MISSUNIT" specification was employed. Under this

specification, where there is only one unit in a cluster, the variance of a value for that unit is estimated by its variation from the overall mean for that variable in the sample population as a whole. SUDAAN was used to adjust for weighting structure.

*Dependent Variable*

*Emergency plan*: Measured community-dwelling older adults' level of disaster preparedness and the quantity of appropriate emergency supplies. Respondents reported if the family emergency plan included all, some, or none, of the necessary supplies and if they had a plan (no emergency plan). According to the NCDP survey question, a well implemented emergency plan consist of a minimum two-day supply of water and food, a small battery operated radio, extra batteries, a flashlight, and emergency contact information for family and friends. Also, if evacuation is necessary, a safe designated meeting location for family members is essential.

*Preparation-with-warning*: Measured older adults' personal preparedness level when a specified pending disaster poses a threat to personal safety and property. Older adults responded to the following categories: (1) very prepared, (2) prepared, (3) not very prepared, and (4) not prepared at all.

*Preparation-with-time*: Measured older respondents' level of preparedness when a natural disaster is anticipated and will occur in a few days. Older adults responded to the following categories: (1) completely prepared, that is, you have everything you need for an emergency in your home and you are prepared and organized to evacuate; (2) mostly prepared, that is, you have most of what you need, but you still need to get or organize a few things before you could evacuate; (3) partly prepared, that is, you still have to get most items and you

are not organized to evacuate; and (4) not really prepared, that is, you are not sure what you would need and you have not organized things for a possible evacuation.

*Emergency plan index:* The index included all three measures: (1) emergency plan, (2) preparation-with-warning, and (3) preparation-with-time. This subscale demonstrated reliability among 2007 older adult respondents with internal consistencies when Cronbach's alpha was 0.72. In 2008 older adult respondent, this subscale demonstrated reliability with internal consistencies when Cronbach's alpha was 0.73.

*Mediating Variable*

*Self-efficacy*: These statements measure the capacity to secure appropriate resources by assessing individual skill, knowledge, health, and finances. The sample adults were asked to respond to the following statements: (1) I can usually handle whatever comes my way. Is this statement true, moderately true, hardly true, or not at all true? (2) I am confident that I could deal efficiently with unexpected events. Is this statement true, moderately true, hardly true, or not at all true? The General Self-Efficacy Scale is administered to adult participants, although it can be tested on children 12 and older. As in this study, general self-efficacy questions are usually part of a comprehensive survey, it is recommended that the General Self-Efficacy Scale questions be mixed at random throughout the larger survey. Normally, the General Self-Efficacy Scale is self-administered and takes approximately five minutes to complete. Responses are designed on a 4-point scale. The General Self-Efficacy Scale final composite score, a range from 10 to 40, is calculated by adding the response to each question. No recoding is necessary.

*Self-efficacy index:* The index included both measures: (1) I can usually handle whatever comes my way, (2) I am confident that I could deal efficiently with unexpected events. This subscale demonstrated reliability among 2007 older adult respondents with internal consistencies when Cronbach's alpha was 0.72. In 2008 older adult respondents, this subscale demonstrated reliability with internal consistencies when Cronbach's alpha was 0.77.

*Independent Variables*

Demographic independent variables included: age, education, registered to vote, income, gender, ethnicity, geographic location, and previous disaster experience.

*Age*: *In which year were you born?* For age, I subtracted the YRBORNC variable from 2007, repeating the same step for 2008. To provide better scaling for the odds ratios, divided age by 10s, an odds ratio represented effect of a decade of age.

*Education*: Refers to the last grade of school completed. For education, I created ordinal-form dummy variables, showing the contrast of each level to the one before. The variable was collapsed into less than high school, high school degree, some college, and college degree; missing value excluded.

*Registered to vote:* A direct yes or no question - Are you registered to vote at your current address? In this study, dummy variables were utilized. For registered to vote, those who responded yes were coded 1 and those who responded no were coded 0, missing value excluded.

*Income*: Asked to report combined family income before taxes. For income, I created ordinal-form dummy variables, showing the contrast of each level to the one before. I used the set of five ordinal dummy variables for income, missing value excluded. Response categories

included: $15,000 to just under $25,000 a year, $25,000 to just under $50,000 a year, $50,000 to just under $75,000 a year, $75,000 to just under $100,000, a year, and $100,000 or more a year.

*Gender*: Refers to the two genders, male and female. For gender, those who responded male were coded 1 and female were coded 0, missing value excluded.

*Ethnicity:* Refers to the different race/ethnicity of the sample population defined as White, Black, Latino, or Asian. For ethnicity, those who responded White were coded 1 and those who responded Black, Latino, or Asian were coded 0 for non-White, missing value excluded.

*Geographic location*: Refers to the region of the country the sample adults resided. Response categories included east, central, south, and west.

*Disaster experience*: This question refers to previous disaster experience. Have you ever been in a disaster situation where you or other people were in serious danger of being seriously hurt or killed? This question required a direct yes or no answer; those who responded yes were coded 1 and those who responded no were coded 0, missing value excluded.

In summary, outlined and discussed was the basic methodological approach. To examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. The National Center for Disaster Preparedness, American Preparedness Project (Marist) survey data (2007-2008) was used for the secondary data analysis for this study (NCDP, 2008). Descriptive statistics, crosstabs, and multivariate regression analysis employed were to analyze data from the National Center for Disaster Preparedness, American Preparedness Project (Marist) survey data (NCDP, 2008).

# CHAPTER 4

# ANALYSIS AND DISCUSSION OF THE RESULTS

## Interpretation of Findings and Discussion

The purpose of this study was to examine how disaster experience, self-efficacy, and demographic variables influence emergency planning in community-dwelling older adults by using the National Center for Disaster Preparedness survey data from 2007 and 2008 (NCDP, 2008). The statistical software program SAS version 9.2 was used to determine Cronbach's alpha, the descriptive statistics, cross tabs, and regression analysis.

Descriptive statistics present the frequency and percentage age distribution of the independent variables and dependent measures. Table 1 shows an overview of the 2007 older adult respondents' demographic characteristics by education levels, civic engagement, income levels, gender, ethnicity, geographic location, and previous disaster experience. A total of 758 community-dwelling older adults participated in the NCDP 2007 survey with an average age of 63.5 and a standard deviation of 9.9. The majority of the respondents reported earning a college degree (42.8%) while 8.2% (*n* = 61) of the population reported less than a high school education. About 91.7% of the respondents reported being registered to vote. Income levels seem evenly distributed between survey respondents. The majority of individuals, 23.5% reported their annual household income level at $25,000 to just under $50,000 before taxes. An estimated 13.1% of older adults reported their annual household income level at less than $15,000 before taxes. Survey respondents were 34.2% male and 65.8% female; 88.7% (*n* = 648) of respondents reported White for ethnicity; while 11.4% (*n* = 83) reported non-White.

This is consistent with earlier research that minority older adults are impacted significantly by natural disasters and often experience disproportionate deaths and property damage (Bourque et al., 2006; NOAA, 2005). Yet, representative samples of minority survey respondents are often absent from disaster preparedness research literature.

Table 1

*2007 Adults 50 and Older: Frequency and Percentage of Demographic Data*

| Independent Variables | 2007 Unweighted Adults 50 and Older (*N* = 758) | | 2007 Weighted Adults 50 and Older (*N* = 562.2) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Education | **(*n* = 746)** | | **(*n* = 552.3)** | |
| Less than High School | 61 | 8.2 | 44.8 | 8.1 |
| High School | 219 | 29.4 | 175.4 | 31.8 |
| Earned Some College Credits | 147 | 19.7 | 104.3 | 18.9 |
| College Degree | 319 | 42.8 | 227.8 | 41.2 |
| Registered to Vote | **(*n* = 758)** | | **(*n* = 562.2)** | |
| No | 63 | 8.3 | 49.7 | 8.9 |
| Yes | 695 | 91.2 | 512.4 | 91.2 |
| Income | **(*n* = 642)** | | **(*n* = 488.5)** | |
| Less than $15,000 a year | 84 | 13.1 | 67.6 | 13.8 |
| $15,000 to just under $25,000 | 77 | 12.0 | 59.0 | 12.1 |
| $25,000 to just under $50,000 | 151 | 23.5 | 142.7 | 29.2 |
| $50,000 to just under $75,000 | 133 | 20.7 | 88.9 | 18.2 |
| $75,000 to just under $100,000 | 77 | 12.0 | 51.6 | 10.6 |
| $100,000 or more | 120 | 18.7 | 78.7 | 16.1 |
| Gender | **(*n* = 758)** | | **(*n* = 562.2)** | |
| Female | 499 | 65.8 | 301.3 | 53.6 |
| Male | 259 | 34.2 | 260.9 | 46.4 |
| Ethnicity | **(*n* = 731)** | | **(*n* = 524.9)** | |
| White | 648 | 88.7 | 424.9 | 80.9 |
| Non-White | 83 | 11.4 | 100.0 | 19.1 |
| Geographic Location | **(*n* = 758)** | | **(*n* = 562.2)** | |
| East | 165 | 21.8 | 126.2 | 22.5 |
| Central | 193 | 25.5 | 143.0 | 25.4 |
| South | 238 | 31.4 | 173.7 | 30.9 |
| West | 162 | 21.4 | 119.2 | 21.2 |
| Disaster Experience | **(*n* = 756)** | | **(*n* = 561.1)** | |
| No | 486 | 64.3 | 349.5 | 62.3 |
| Yes | 270 | 35.7 | 211.5 | 37.7 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)

To reiterate further, Al-rousan et al. (2014) examined responses from 1,304 older adults participating in a nationwide disaster preparedness study. Researchers collected demographic data on ethnicity, gender, age, education level, household income, living arrangements, marital status, self-reported health status, and level of physical impairment. However, the majority (81.5%) of respondents reported White; while only 14.8% of the sample population reported African American, and 3.7% reported "other" for ethnicity. This exclusion from disaster preparedness research is observed also among social scientist in Latino communities.

Messias and Lacy's (2007) qualitative research on Latino residents in New Orleans and other Gulf Coast communities after Hurricane Katrina, examined the overwhelming economic and social barriers that prevented adequate emergency planning for the approaching hurricane. Because of this systematic failure in emergency management to include vulnerable populations in appropriate emergency planning, numerous studies on vulnerable minority populations are in disaster response and recovery literature.

Geographic location described the region of the country. Survey respondents seemed distributed evenly between east (21.8%), central (25.4%), south (31.4%), and western (21.4%) regions of the United States. Approximately 64.3% (*n* = 486) of older adults had no previous disaster experience; while 35.7% (*n* = 270) reported previous disaster experience.

Table 2 shows the 2007 frequency and percentage distribution of measures for outcome factors. Emergency plan, preparation-with-warning, and preparation-with-time are the dependent measures examined in this study. Each dependent measure has four corresponding categories. The majority of the sample population, 54.4% (*n* = 412) reported no emergency plan for their households; 36.7% reported having all of the recommended emergency supplies:

at least two-days of food and water, flashlight, battery operated radio, emergency telephone numbers, and a safe designated meeting location for family members. Nearly 9% of respondents reported having some of the recommended emergency supplies; and 0.89% of the adults reported having none of the listed emergency supplies. This result is consistent with previous research; Al-rousan et al. (2014) disaster readiness survey revealed low levels of disaster preparedness behavior in the survey respondent. Only 23.6% of older adults reported having an emergency plan; while 10.1% reported being in a disaster registry database should they need help, and 43.2% were aware of a local community shelter, in case of evacuation. Not having access to a car during an emergency was reported by 24.8% of respondents. Nearly two thirds of the sample population reported never attending any disaster readiness programs in their local community and over one third did not have basic disaster readiness supplies in case of an emergency (Al-rousan et al., 2014).

The preparation-with-warning measure was intended to examine older adults' personal preparedness level when a specified pending disaster poses a threat to personal safety and property. Fifty percent (*n* = 375) of survey respondents reported being prepared for a major natural disaster such as a hurricane, winter storm, wildfire, or flood in their community. An estimated 24% of survey respondents reported being not very prepared; while 13.3% reported being not prepared at all; and 12.7% of study participants reported being very prepared. The preparation-with-time variable calculated respondents' level of preparedness when a natural disaster is anticipated and will occur in a few days. About 35% (*n* = 261) of sample population reported being mostly prepared; 27.3% responded partly prepared; while 25.2% responded not really prepared; and 12.4% (*n* = 92) reported completely prepared.

Table 2

*2007 Adults 50 and Older: Frequency and Percentage Measures for Outcome Factors*

| Dependent Variable | 2007 Unweighted Adults 50 and Older (*N* = 758) | | 2007 Weighted Adults 50 and Older (*N* = 562.2) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Emergency Plan | **(*n* = 758)** | | **(*n* = 562.2)** | |
| All | 275 | 36.3 | 198.1 | 35.3 |
| Some | 65 | 8.6 | 50.8 | 9.0 |
| None (of the listed supplies) | 6 | 0.89 | 5.2 | 0.9 |
| No emergency plan | 412 | 54.4 | 308.1 | 54.8 |
| Preparation-with-Warning | **(*n* = 750)** | | **(*n* = 556.7)** | |
| Very prepared | 95 | 12.7 | 70.1 | 12.6 |
| Prepared | 375 | 50.0 | 278.2 | 50.0 |
| Not very prepared | 180 | 24.0 | 131.5 | 23.6 |
| Not prepared at all | 100 | 13.3 | 76.9 | 13.8 |
| Preparation-with-Time | **(*n* = 743)** | | **(*n* = 547.5)** | |
| Completely prepared | 92 | 12.4 | 67.9 | 12.4 |
| Mostly prepared | 261 | 35.1 | 192.0 | 35.1 |
| Partly prepared | 203 | 27.3 | 145.5 | 26.6 |
| Not really prepared | 187 | 25.2 | 142.1 | 26.0 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)

Table 3 presents similar descriptive statistics for the NCDP 2008 older adults' frequency and percentage distribution of the independent variables and dependent variable. A total of 819 community-dwelling older adults participated in the NCDP 2008 survey with an average age of 65.2 and a standard deviation of 10.4.

Table 3

*2008 Adults 50 and Older: Frequency and Percentage of Demographic Data*

| Independent Variables | 2008 Unweighted Adults 50 and Older (*N* = 819) | | 2008 Weighted Adults 50 and Older (*N* = 672.6) | |
|---|---|---|---|---|
| | Freq. (N) | % | Freq. (N) | % |
| Education | **(*n* = 814)** | | **(*n* = 667.4)** | |
| Less than High School | 46 | 5.7 | 43.9 | 6.6 |
| High School | 245 | 30.1 | 224.0 | 33.6 |
| Earned Some College Credits | 149 | 18.3 | 121.4 | 18.2 |
| College Degree | 374 | 46.0 | 278.2 | 41.7 |
| Registered to Vote | **(*n* = 818)** | | **(*n* = 671.3)** | |
| No | 64 | 7.8 | 58.0 | 8.6 |
| Yes | 754 | 92.2 | 613.3 | 91.4 |
| Income | (***n* = 697)** | | **(*n* = 575.6)** | |
| Less than $15,000 a year | 97 | 13.9 | 96.6 | 16.8 |
| $15,000 to just under $25,000 | 88 | 12.6 | 63.0 | 11.0 |
| $25,000 to just under $50,000 | 194 | 27.8 | 180.6 | 31.4 |
| $50,000 to just under $75,000 | 139 | 19.9 | 93.3 | 16.2 |
| $75,000 to just under $100,000 | 89 | 12.8 | 68.0 | 11.8 |
| $100,000 or more | 90 | 12.9 | 74.1 | 12.9 |
| Gender | **(*n* = 819)** | | **(*n* = 672.6)** | |
| Female | 545 | 66.5 | 388.8 | 57.8 |
| Male | 274 | 33.5 | 283.8 | 42.2 |
| Ethnicity | **(*n* = 785)** | | **(*n* = 601.0)** | |
| White | 702 | 89.4 | 490.3 | 81.6 |
| Non-White | 83 | 10.6 | 110.8 | 18.4 |
| Geographic Location | **(*n* = 819)** | | **(*n* = 672.6)** | |
| East | 186 | 22.7 | 162.6 | 24.2 |
| Central | 190 | 23.2 | 153.2 | 22.8 |
| South | 256 | 31.3 | 203.9 | 30.3 |
| West | 187 | 22.8 | 152.9 | 22.7 |
| Disaster Experience | **(*n* = 815)** | | **(*n* = 669.1)** | |
| No | 516 | 63.3 | 408.6 | 61.1 |
| Yes | 299 | 36.7 | 260.5 | 38.9 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)

In the 2008 older adult sample, Table 4 presents similar frequency and percentage distribution of measures for outcome factors. Emergency plan, preparation-with-warning, and preparation-with-time were the dependent measures examined in this study.

Table 4

*2008 Adults 50 and Older: Frequency and Percentage Measures for Outcome Factors*

| Dependent Variable | 2008 Unweighted Adults 50 and Older (*N* = 819) | | 2008 Weighted Adults 50 and Older (*N* = 672.6) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (N) | % |
| Emergency Plan | **(*n* = 817)** | | **(*n* = 671.2)** | |
| All | 295 | 36.1 | 246.5 | 36.7 |
| Some | 98 | 12.0 | 77.4 | 11.5 |
| None (of the listed supplies) | 6 | 0.73 | 6.5 | 1.0 |
| No emergency plan | 418 | 51.2 | 340.8 | 50.8 |
| Preparation-with-Warning | **(*n* = 807)** | | **(*n* = 661.3)** | |
| Very prepared | 134 | 16.6 | 102.9 | 15.6 |
| Prepared | 401 | 49.7 | 325.7 | 49.3 |
| Not very prepared | 165 | 20.5 | 140.5 | 21.3 |
| Not prepared at all | 107 | 13.3 | 92.1 | 13.9 |
| Preparation-with-Time | **(*n* = 808)** | | **(*n* = 661.7)** | |
| Completely prepared | 123 | 15.2 | 105.8 | 16.0 |
| Mostly prepared | 282 | 34.9 | 223.7 | 33.8 |
| Partly prepared | 212 | 26.2 | 169.2 | 25.6 |
| Not really prepared | 191 | 23.6 | 162.9 | 24.6 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)

## General Self-Efficacy Scale and Cronbach Alpha

In disaster preparedness research, self-efficacy is the capacity to calculate individual ability to secure appropriate resources by assessing individual skill, knowledge, health, and finances (Lindell & Whitney, 2000). Self-efficacy significantly influences individual intentions to prepare for a disaster (Paton et al., 2005). Schwarzer and Jerusalem (1995) developed the General Self-Efficacy Scale to measure an overall awareness of perceived self-efficacy, predict coping with everyday struggles, and adjust to life's challenges. The General Self-Efficacy Scale is

administered to adult participants, although it can be tested on children 12 and older. As in this study, general self-efficacy questions are usually part of a comprehensive survey; it is recommended the general self-efficacy questions be mixed at random throughout the larger survey. The General Self-Efficacy Scale does not target specific behavior change. As a result, it is important to include additional scales that measure the intended behavior modification or intervention. Normally, the General Self-Efficacy Scale is self-administered and takes approximately five minutes to complete. Responses are on a 4-point scale. The final composite score, a range from 10 to 40, is calculated by adding the response to each question. No recoding is necessary (Schwarzer & Jerusalem, 1995).

Research on general self-efficacy examines the relationship of psychological constructs. Luszczynska et al. (2005) described self-efficacy as prospective and functional in design. The National Center for Disaster Preparedness (2008) survey provides the following example: "I am confident that I could deal efficiently with unexpected events." This statement demonstrates knowledge, prospective, and action. General self-efficacy is identified as a universal and intrinsic human characteristic, extending across culture and populations. Luszczynska et al. distinguishes self-efficacy as either task specific or domain specific. Yet, other social scientists define general self-efficacy as unwavering competence and ability to engage realistically in stressful circumstances (Luszczynska et al., 2005). The 10 questions on the scale are designed to interact with these psychological constructs. Each question suggests a method of successful coping and implies an individual core human characteristic of achievement. In numerous studies, the General Self-Efficacy Scale measures health behaviors, life style modifications, coping with pain, and rehabilitation after surgery. In Luszczynska's et al. study the hypotheses

were the following: (1) general self-efficacy relates to targeted positive individual attitudes on exercise, healthy eating, and tobacco use; (2) study respondents with elevated general self-efficacy should have lower pessimism and optimistic outlook on life, seemingly decreased pain levels, and an increase of healthy activities; and (3) general self-efficacy will increase proactive coping techniques and decrease defeatism behaviors ( Luszczynska et al., 2005). According to Jerusalem and Schwarzer, the General Self-Efficacy Scale demonstrates acceptable reliability. To date, approximately 1,000 studies have utilized the General Self-Efficacy Scale in many countries and languages. Normally to test the reliability of the unidimensional General Self-Efficacy Scale, Cronbach's alphas ranged from .76 to .90, with the majority in the high .80s.

For this study, examining the influence of self-efficacy on emergency planning in community-dwelling older adults, I created a self-efficacy index. The index included both measures: (1) I can usually handle whatever comes my way. (2) I am confident that I could deal efficiently with unexpected events. In Table 5 the subscale demonstrates reliability among 2007 older adult respondents with internal consistencies when Cronbach's alpha was 0.72. In 2008 respondents, this subscale demonstrated reliability with internal consistencies when Cronbach's alpha was 0.77. To calculate the self-efficacy index, I added the two variables divided by two. The response for the new index ranges from one through four.

Table 5

*2007 and 2008 Cronbach's Alpha*

| NCDP | Factor | Cronbach's Alpha Raw | Number of Items |
|---|---|---|---|
| 2007 | Self-efficacy Index | 0.72 | 2 |
| | Emergency Plan Index | 0.72 | 3 |
| 2008 | Self-efficacy Index | 0.77 | 2 |
| | Emergency Plan Index | 0.73 | 3 |

2007 National Center for Disaster Preparedness Cohort Data

*Regression Analysis: Adults 50 and Older – Predicting Self-Efficacy*

This targeted research was designed to examine how self-efficacy, previous disaster experience, and demographic factors influence emergency planning in community-dwelling older adult respondents. Older adults are affected adversely by natural disasters and exposure to social vulnerabilities during the disaster cycle. A focused regression analysis further investigated the level of emergency planning among the NCDP population of older adults. The regression analysis model suggests the following hypotheses (see Figure 3):

1. Disaster experience affects the self-efficacy index.
2. Disaster experience affects the emergency planning index.
3. Self-efficacy affects the emergency planning index.
4. Self-efficacy mediates the effect on the emergency planning index of other factors.

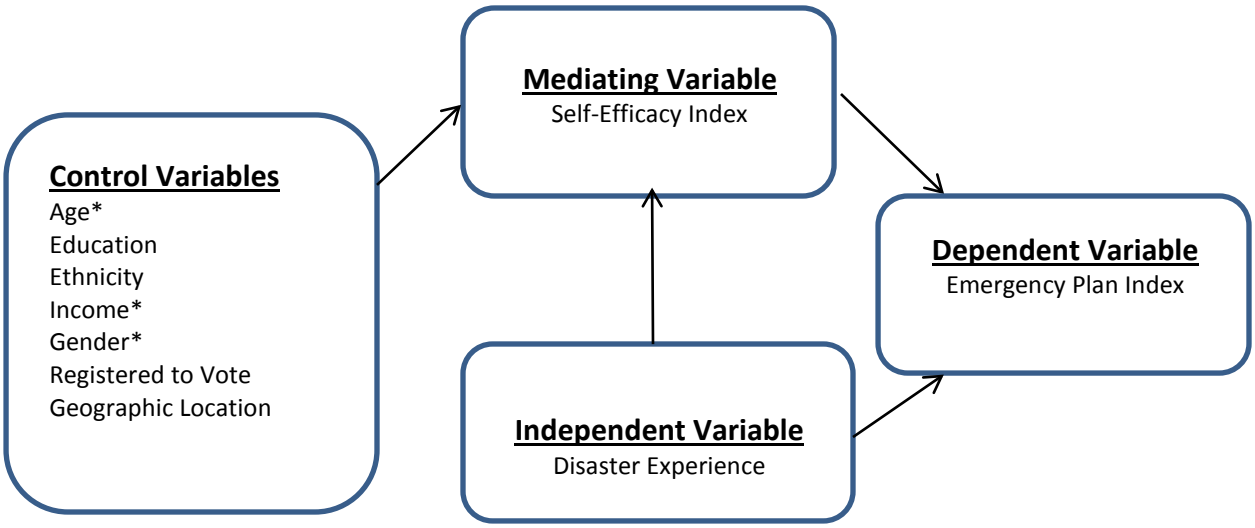


*Figure 3.* Proposed regression analysis model. Disaster experience and self-efficacy as factors influencing emergency planning in community-dwelling older adults.

*Research Question 1*

Research Question 1: Does self-efficacy influence emergency planning in community-dwelling older adults?

Table 6 presents the self-efficacy index used to determine the effect of demographic variables on self-efficacy among the older adult sample. The following variables were identified as statistically significant predictors: age increase (every 10 years), gender, and previous disaster experience. The measured effect size (multiple *R*-square 0.104) shows 10% of the variance of self-efficacy is explained by the overall model. For every 10 years of age in older adult respondents, self-efficacy is lower (β = -0.06). The data for male respondents 50 years of age and older, suggest self-efficacy is lower (β = -0.16) than in older female respondents. These results suggest that self-efficacy may have a dampen effect of age on emergency planning. This is consistent with Johnston et al. (2005) study on tsunami preparedness in coastal Washington.

Table 6

*2007 Regression Analysis: Self-Efficacy Index Predicted by Other Factors*

| | Self-Efficacy Index Adults 50 and Older | |
|---|---|---|
| Control Variables | Coefficient | *t*-score |
| Age (increase every 10 years) | **-0.06** | -2.00 |
| Education | | |
| High School | -0.17 | -1.58 |
| Earned Some College Credits | 0.09 | 1.08 |
| College Degree | -0.03 | -.50 |
| Registered to Vote | -0.06 | -.59 |
| Income | | |
| $15,000 to just under $25,000 | 0.05 | 0.31 |
| $25,000 to just under $50,000 | 0.22 | 1.59 |
| $50,000 to just under $75,000 | -0.07 | -1.05 |
| $75,000 to just under $100,000 | 0.14 | 1.61 |
| $100,000 or more | -0.16 | -1.69 |
| Gender (Male) | **-0.16** | -2.50 |
| Ethnicity (White) | 0.00 | 0.01 |
| Geographic Location | | |
| East | 0.11 | 1.58 |
| Central | 0.02 | 0.23 |
| West | -0.03 | -0.44 |
| Independent Variable | | |
| Disaster Experience | **0.26** | **4.43** |
| N = | 611 | 611 |
| Degrees of Freedom = | 16 | 16 |
| R-Square = | 0.104 | 0.104 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)
Coefficients in bold are significant at the .05 level
Underlined coefficients in bold are significant at the .01 level

Results indicated respondents with low to moderate levels of self-efficacy were more likely to show decreased preparedness behavior. Further examination of the respondents' data revealed low to moderate levels of preparedness intentions. Consequently, only 13% of the study respondents' reported a definite intention to prepare for a disaster (Johnston et al., 2005).

Discussion of Hypothesis 1

Hypothesis 1: Disaster experience affects the self-efficacy index.

At the same time, previous disaster experience has a strong effect on self-efficacy index in respondents ($\beta = 0.26$, $t = 4.43$). Self-efficacy is higher among respondents with previous disaster experience. This finding supports the ideas established by earlier research; individuals who have experienced a previous disaster may gain skills and knowledge that bolster protective behaviors and reduce property loss in future disasters (Hobfoll, 1989; Sattler et al., 2000).

*2007 Older Adult Population – Predicting Emergency Plan*

Research Question 2

Research Question 2: Does disaster experience influence emergency planning in community-dwelling older adults?

The emergency plan index included all three dependent measures: (a) emergency plan, (b) preparation-with-warning, and (c) preparation-with-time. In Table 5 the subscale demonstrates reliability among the 2007 respondents with internal consistencies when Cronbach's alpha was 0.72. In 2008 respondents, this subscale demonstrated reliability with internal consistencies when Cronbach's alpha was 0.73. The emergency plan dependent measure was designed to examine the sample population's level of disaster preparedness. According to the survey question, a well implemented emergency plan consist of a minimum two-day supply of water and food, a small battery operated radio, extra batteries, a flashlight, and emergency contact information for family and friends. Also, if evacuation is necessary, a safe designated meeting location for family members is essential. The preparation-with-warning measure was intended to examine older adults' personal preparedness level when a

specified pending disaster poses a threat to personal safety and property. The preparation-with-time dependent measure examined respondents' level of preparedness when a natural disaster is anticipated and will occur in a few days. These analyses also examined relationships between having an emergency plan index in the survey respondents and demographic variables.

Five of the eight demographic variables in the model, age increase (every 10 years), ethnicity, gender, geographic location, and registered to vote were not statistically significant predictors of having an emergency plan index among older adult respondents ($p > 0.05$). Of the variables examined only education, income, and previous disaster experience had the most influence on the emergency plan index. The effect size for multiple *R*-square 0.156 shows 15.6% of the variance of the emergency plan index is explained by the overall model.

The data for respondents indicates that older adults with a high school degree are likely to have a lower ($\beta = -0.36$) emergency plan index. Income also has an effect on emergency plan index, cutting at older adults below and those above $25,000 after taxes. The sample population within this income level is likely to have a higher ($\beta = 0.46$) emergency plan index. The results from this study corroborate earlier research that individuals receiving risk information tend to prioritize the warnings into three attributes: (a) environment, (b) social, and (c) psychological. Within the context of the social attribute and receiving risk information, socioeconomic status, ethnicity, age, and gender often determine how people respond to warning messages (Brodie et al., 2006; Cutter, 1996; Cutter, Boruff, & Shirley, 2003; Eisenman et al., 2007; Elder et al., 2007; Fothergill et al., 1999; Mileti & O'Brien, 1992).

Discussion of Hypothesis 2

Hypothesis 2: Disaster experience affects the emergency plan index.

The warning and response model developed by Lindell and Perry (1992); and Perry and Mushkatel (1984) identified individual traits (e.g., age, income, education, and previous disaster experience) that influence critical awareness and protective behaviors (Lindell & Perry, 1992; Perry & Mushkatel, 1984; Sattler et al., 2000). The warning and response model confirms the findings of this study demonstrating previous disaster experience strongly affects having an emergency plan index in the sample population (β= .50, *t* = 6.41). Respondents with previous disaster experience have a higher emergency plan index, than those respondents with no previous disaster experience.

*2007 Older Adult Population – Emergency Plan: Self-efficacy as the Mediator*

Discussion of Hypothesis 3

Hypothesis 3: Self-efficacy affects the emergency plan index.

Included in this analysis was a mediation model to identify and explain the mediating variable. Self-efficacy mediates the relationship between the demographic variables and having an emergency plan index among older adult respondents. The measured effect size (multiple *R*-square 0.194) shows 19% of the variance of the emergency plan index and the mediating variable, self-efficacy, are explained by the overall model. Table 7 shows self-efficacy revealed a strong indication that respondents with higher (β = 0.30, *t* = 4.94) self-efficacy are more likely to have an emergency plan index.

Discussion of Hypothesis 4

Hypothesis 4: Self-efficacy mediates the effect on emergency plan index of other factors.

As shown in Table 7, in this model, when examining the influence of the independent variables on self-efficacy and the likelihood of having a complete emergency plan index in respondents, the following independent variables were identified as statistically significant predictors: having a high school degree, income, and previous disaster experience. Education seems to be a significant factor in predicting if older adults have a complete emergency plan index. Respondents with a high school degree are likely to have a lower (β = -0.32) emergency plan index. Income seems to influence positively having an emergency plan index in respondents, cutting at older adults below and those above $25,000 after taxes. Respondents within this income level (β = 0.41) are more likely to have an emergency plan index. With the mediating variable, self-efficacy, included in the model, previous disaster experience continues to strongly affect having an emergency plan index in the older adult population (β = 0.43, *t* = 5.48); older adults are more likely to have an emergency plan index than those respondents with no previous disaster experience. This particular finding is similar to Luszczynska et al. (2005) that individuals with high self-efficacy tend to develop assertive goal setting strategies and as a result are more likely to realize the goal. Also, a propensity to plan for future events is apparent in individuals with high self-efficacy, this is referred to as action plans (Luszczynska et al., 2005).

Table 7

*2007 Regression Analysis: Emergency Plan Index Predicted by Other Factors*

| | Emergency Plan Index | | | |
|---|---|---|---|---|
| | Without Self-efficacy | | With Self-efficacy | |
| Control Variables | Coefficient | *t*-score | Coefficient | *t*-score |
| Self-Efficacy | ---------- | | **<u>0.30</u>** | 4.94 |
| Age (increase every 10 years) | -0.04 | 1.02 | -0.02 | -0.61 |
| Education | | | | |
| High School | **-0.36** | -2.31 | **-0.32** | -2.15 |
| Earned Some College Credits | 0.18 | 1.74 | 0.16 | 1.61 |
| College Degree | -0.08 | -0.85 | -0.07 | -.083 |
| Registered to Vote | 0.09 | 0.74 | 0.10 | 0.84 |
| Income | | | | |
| $15,000 to just under $25,000 | -0.18 | -1.31 | -0.22 | -1.58 |
| $25,000 to just under $50,000 | **<u>0.46</u>** | 3.60 | **<u>0.41</u>** | 3.32 |
| $50,000 to just under $75,000 | -0.03 | -0.29 | -0.01 | -0.14 |
| $75,000 to just under $100,000 | 0.06 | 0.45 | 0.02 | 0.14 |
| $100,000 or more | 0.00 | 0.01 | 0.06 | 0.47 |
| Gender (Male) | 0.03 | 0.38 | 0.06 | 0.86 |
| Ethnicity (White) | 0.02 | 0.25 | 0.04 | 0.41 |
| Geographic Location | | | | |
| East | -0.11 | -1.11 | -0.14 | -1.48 |
| Central | -0.10 | -0.98 | -0.10 | -1.01 |
| West | 0.10 | 0.96 | 0.12 | 1.21 |
| Independent Variable | | | | |
| Disaster Experience | **<u>0.50</u>** | 6.41 | **<u>0.43</u>** | 5.48 |
| N = | 598 | 598 | 596 | 596 |
| Degrees of Freedom = | 16 | 16 | 17 | 17 |
| R-Square = | 0.156 | 0.156 | 0.194 | 0.194 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)
Coefficients in bold are significant at the .05 level
Underlined coefficients in bold are significant at the .01 level

2008 National Center for Disaster Preparedness Cohort Data

*Regression Analysis: Adults 50 and Older – Predicting Self-Efficacy*

Similar outcomes were found in the 2008 NCDP cohort data. Table 8 shows the self-efficacy index used to determine the effect of demographic variables on self-efficacy among older adult respondents. The following variables were identified as statistically significant predictors: age increase (every 10 years), income, gender, and previous disaster experience. The measured effect size (multiple *R*-square 0.131) shows 13% of the variance of self-efficacy is explained by the overall model. For every 10 years of age in older adult respondents, self-efficacy is lower (β = -0.08). In the same way that self-efficacy showed a dampen effect of age on emergency planning in the 2007 NCDP cohort data, similar results are replicated in the 2008 sample of older respondents.

To explore further this finding, Bandura's (1997) social cognitive theory interprets outcome expectancies as positive or negative results of definite behaviors. Consequently, individuals with high self-efficacy are assumed to experience more affirming outcomes of future behaviors and less adverse outcomes (Bandura, 1997). Unlike the 2007 findings, income had an effect on self-efficacy, cutting at older adults below and those above $15,000 after taxes. Older adults within this income level are likely to have a higher (β = 0.28) self-efficacy. The data for male respondents, suggest that self-efficacy is higher (β = 0.11) than female respondents.

Discussion of Hypothesis 1

Hypothesis 1: Disaster experience effects the self-efficacy index.

Again, disaster experience has a detectable effect on self-efficacy in older adult respondents. Self-efficacy is higher (β = 0.14) in respondents with previous disaster experience.

Table 8

*2008 Regression Analysis: Mediating Variable Self-Efficacy Index Predicted by Other Factors*

| | Self-Efficacy Index Adults 50 and Older | |
|---|---|---|
| Control Variables | Coefficient | *t*-score |
| Age (increase every 10 years) | **-0.08** | -3.03 |
| Education | | |
| High School | 0.04 | 0.33 |
| Earned Some College Credits | 0.07 | 0.98 |
| College Degree | -0.10 | -1.52 |
| Registered to Vote | 0.12 | 1.14 |
| Income | | |
| $15,000 to just under $25,000 | **0.28** | **2.53** |
| $25,000 to just under $50,000 | -0.09 | -0.98 |
| $50,000 to just under $75,000 | 0.08 | 1.08 |
| $75,000 to just under $100,000 | 0.04 | 0.50 |
| $100,000 or more | 0.15 | 1.79 |
| Gender (Male) | **0.11** | 1.98 |
| Ethnicity (White) | 0.05 | 0.65 |
| Geographic Location | | |
| East | -0.01 | -0.13 |
| Central | -0.06 | -0.85 |
| West | -0.01 | -0.14 |
| Independent Variable | | |
| Disaster Experience | **0.14** | 2.65 |
| *N* = | 660 | |
| Degrees of Freedom = | 16 | |
| *R*-Square = | 0.131 | |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Coefficients in bold are significant at the .05 level.
Underlined coefficients in bold are significant at the .01 level

Discussion of Hypothesis 2

Hypothesis 2: Disaster experience effects the emergency plan index.

The definition for the emergency plan index remained the same for the 2008 older adult cohort. Table 9 presents the emergency plan index included are all three dependent measures: emergency plan, preparation-with-warning, and preparation-with-time. Also examined, was the relationship between having an emergency plan index and demographic variables. Seven of the eight demographic variables in the model, age increase (every 10 years), education, ethnicity, income, gender, geographic location, and registered to vote were not statistically significant predictors of having an emergency plan index among respondents ($p > 0.05$). Of the variables examined only previous disaster experience had the most influence on the emergency plan index. The effect size (multiple *R*-square 0.081) shows 8.1% of the variance of the emergency plan index is explained by the overall model. Previous disaster experience strongly affects having an emergency plan index in the older adult sample population ($\beta = 0.33$, $t = 3.94$). Respondents with disaster experience have a higher emergency plan index, than those with no disaster experience. This finding is consistent with Sattler et al. (2000) that people who have experienced extreme property loss and trauma are more responsive to warning messages and environmental cues than individuals who have not experienced a severe weather hazard.

Table 9

*2008 Regression Analysis: Emergency Plan Index Predicted by Other Factors*

| Control Variables | Emergency Plan Index | | | |
|---|---|---|---|---|
| | Without self-efficacy | | With Self-efficacy | |
| | Coefficient | *t*-score | Coefficient | *t*-score |
| Self-Efficacy | ---------- | | **<u>0.41</u>** | 6.29 |
| Age (increase every 10 years) | 0.06 | 1.55 | **0.10** | 2.52 |
| Education | | | | |
| High School | 0.22 | 1.28 | 0.21 | 1.29 |
| Earned Some College Credits | 0.03 | 0.22 | 0.01 | 0.06 |
| College Degree | -0.00 | -0.04 | 0.04 | 0.42 |
| Registered to Vote | 0.00 | 0.01 | -0.08 | -0.54 |
| Income | | | | |
| $15,000 to just under $25,000 | -0.05 | -0.35 | -0.18 | -1.23 |
| $25,000 to just under $50,000 | 0.14 | 1.04 | 0.16 | 1.23 |
| $50,000 to just under $75,000 | 0.13 | 1.12 | 0.09 | 0.83 |
| $75,000 to just under $100,000 | 0.09 | 0.69 | 0.08 | 0.65 |
| $100,000 or more | 0.01 | 0.11 | -0.04 | -0.29 |
| Gender (Male) | 0.07 | 0.89 | 0.03 | 0.43 |
| Ethnicity (White) | 0.05 | 0.39 | 0.02 | 0.19 |
| Geographic Location | | | | |
| East | -0.15 | -1.49 | -0.13 | -1.39 |
| Central | -0.18 | -1.80 | -0.14 | -1.40 |
| West | -0.12 | -1.15 | -0.08 | -0.74 |
| Independent Variable | | | | |
| Disaster Experience | **<u>0.33</u>** | 3.94 | **<u>0.24</u>** | 2.98 |
| N = | 649 | | 641 | |
| Degrees of Freedom = | 16 | | 17 | |
| R-Square = | 0.081 | | 0.142 | |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Coefficients in bold are significant at the .05 level.
Underlined coefficients in bold are significant at the .01 level

*2008 Older Adult Population – Emergency Plan: Self-efficacy as the Mediator*

Discussion of Hypothesis 3

Hypothesis 3: Self-efficacy effects the emergency plan index.

Included in this analysis was a mediation model to identify and explain the mediating variable. In Table 9 self-efficacy mediates the relationship between the demographic variables and having an emergency plan index among older adult respondents. The reported effect size (multiple *R*-square 0.142) shows 14% of the variance of the emergency plan index and the mediating variable, self-efficacy, are explained by the overall model. Self-efficacy revealed a strong indication that respondents with higher ($\beta = 0.41$, $t = 6.29$) self-efficacy are more likely to have an emergency plan index. This particular finding reiterates Luszczynska et al. (2005) study in examining people with self-efficacious behavior. A review of health-promoting behaviors revealed the willingness to embrace a particular behavior may be determined by the individual's ability to successfully perform the behavior. Similarly, persons with high self-efficacy tend to participate in healthy behaviors, continue a healthy life style, and often rebound after an obstacle or relapse (Luszczynska et al., 2005).

Discussion of Hypothesis 4

Hypothesis 4: Self-efficacy mediates the effect on the emergency plan index of other factors.

In this equation, Table 9 shows the influence of the independent variables on self-efficacy and the likelihood of having a complete emergency plan in older respondents, the following independent variables were identified as statistically significant predictors: age increase (every 10 years) and previous disaster experience. For every decade of age in older

adult respondents, the emergency plan index is higher (β = 0.10). With the mediating variable, self-efficacy, included in the model, previous disaster experience continues to strongly affect having an emergency plan index in the older adult population (β = 0.24, *t* = 2.98). Respondents are more likely to have an emergency plan index than those survey respondents with no previous disaster experience.

## Possible Disparate Effects on Measures

Ordinal logistic regression analyses identified important predictors of having an emergency plan in the older adult respondents. These analyses also examined relationships between having an emergency plan in the respondents and demographic variables. These variables included age increase (every 10 years), education, registered to vote, income, gender, ethnicity, and geographic location. In addition, examined was the relationship between having an emergency plan and previous disaster experience in older adults.

Table 10 presents results for the 2007 and 2008 NCDP sample population. Findings for 2007 showed statistically significant relationships between having an emergency plan in respondents and education, income, and previous disaster experience. Of the variables examined, education, income, and disaster experience had the most influence on the dependent measure. Respondents earning a high school degree are 62% less likely to be in a higher category to have an emergency plan. However, individuals attaining some college education are nearly two (*OR* = 1.81) times as likely to be in a higher category for having an emergency plan. People earning $25,000 to just under $50,000 before taxes were four (*OR* = 4.06) times as likely to be in a higher category for having an emergency plan. Disaster experience strongly effects having an emergency plan in the sample population (*t* = 4.69, *p* <

.001). Respondents with disaster experience are 2½ (*OR* = 2.52) times, more likely to be in a higher category for having an emergency plan than those respondents with no previous disaster experience. The remaining variables in the model, age, registered to vote, gender, ethnicity, and geographic location were not statistically significant predictors for having an emergency plan ($p > 0.05$).

Table 10

*2007 and 2008 Logistic Regression Analysis: Emergency Plan Measure*

| Dependent Measure | 2007 Older Adult Sample Emergency Plan | | | 2008 Older Adult Sample Emergency Plan | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Age (increase every 10 years) | 0.94 | 0.78 | 1.15 | 1.11 | 0.93 | 1.32 |
| Education | | | | | | |
| High School | **0.38** | 0.19 | 0.75 | 1.03 | 0.48 | 2.21 |
| Earned Some College Credits | **1.81** | 1.03 | 3.18 | 0.88 | 0.52 | 1.49 |
| College Degree | 0.66 | 0.40 | 1.09 | 0.96 | 0.61 | 1.51 |
| Registered to Vote | 1.02 | 0.54 | 1.92 | 0.86 | 0.44 | 1.69 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.58 | 0.26 | 1.28 | 1.23 | 0.62 | 2.43 |
| $25,000 to just under $50,000 | **4.06** | 2.00 | 8.25 | 1.29 | 0.72 | 2.32 |
| $50,000 to just under $75,000 | 0.90 | 0.54 | 1.50 | 1.40 | 0.85 | 2.31 |
| $75,000 to just under $100,000 | 1.13 | 0.60 | 2.13 | 0.92 | 0.53 | 1.60 |
| $100,000 or more | 0.79 | 0.42 | 1.48 | 1.05 | 0.57 | 1.95 |
| Gender (Male) | 0.86 | 0.60 | 1.24 | 0.96 | 0.68 | 1.35 |
| Ethnicity (White) | 1.01 | 0.61 | 1.67 | 0.97 | 0.57 | 1.67 |
| Geographic Location | | | | | | |
| East | 0.89 | 0.54 | 1.46 | 0.90 | 0.58 | 1.41 |
| Central | 0.91 | 0.55 | 1.51 | 0.78 | 0.49 | 1.23 |
| West | 1.14 | 0.68 | 1.90 | 0.98 | 0.61 | 1.57 |
| Disaster Experience | **2.52** | 1.71 | 3.71 | **2.05** | 1.43 | 2.93 |
| N = | | | 613 | | | 667 |
| Degrees of Freedom = | | | 16 | | | 16 |
| Model Chi-Square = | | | 3.67 | | | 1.84 |

*Note*. Source: 2007 and 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level.

Findings for 2008 NCDP sample population, showed one statistically significant relationship between having an emergency plan and disaster experience. Previous disaster experience strongly effects having an emergency plan in older individuals ($t = 3.92$, $p < .001$). Respondents with disaster experience are 2 ($OR = 2.05$) times, more likely to be in a higher category for having an emergency plan than those respondents with no disaster experience.

Preparation-with-warning measured an association between personal preparedness-with-warning for a major natural disaster in the older respondents and demographic variables. The demographic variables examined to determine an association are age increase (every 10 years), education, registered to vote, income, gender, ethnicity, geographic location, and disaster experience. Table 11 shows results for the 2007 and 2008 sample population. Survey results revealed statistically significant associations between personal preparedness-with-warning for a major natural disaster in older adult respondents and age, gender, and previous disaster experience.

Of the variables analyzed gender and disaster experience had the most influence on the dependent variable. Male respondents were 44% more likely to be in a higher category for being prepared-with-warning for a major natural disaster such as a hurricane, winter storm, wildfire, or flood. Disaster experience seems to predict a positive outcome on personal preparedness-with-warning for a major natural disaster ($t = 4.88$, $p < .001$). Consequently, people responding with disaster experience are over 2½ ($OR = 2.69$) times more likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community.

Findings for the 2008 sample population, showed statistically significant relationships between geographic location and disaster experience. Looking at the effect of geographic location, people living in the eastern region of the U.S. are 38% less likely to be in a higher category for personal preparedness-with-warning for a major natural disaster. Sample adults with disaster experience are 55% more likely to be in a higher category for being prepared-with-warning for a major natural disaster than those respondents with no previous disaster experience.

Table 11

*2007 and 2008 Logistic Regression Analysis: Preparation-with-Warning Measure*

| Dependent Measure | 2007 Older Adult Sample Preparation-with-Warning | | | 2008 Older Adult Sample Preparation-with-Warning | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Age (increase every 10 years) | 0.84 | 0.71 | 1.00 | 1.05 | 0.88 | 1.25 |
| Education | | | | | | |
| High School | 0.63 | 0.30 | 1.32 | 1.83 | 0.87 | 3.84 |
| Earned Some College Credits | 1.34 | 0.84 | 2.14 | 1.15 | 0.79 | 1.91 |
| College Degree | 1.00 | 0.65 | 1.53 | 0.98 | 0.63 | 1.53 |
| Registered to Vote | 1.24 | 0.71 | 2.16 | 1.17 | 0.63 | 2.17 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.94 | 0.45 | 1.95 | 0.83 | 0.40 | 1.69 |
| $25,000 to just under $50,000 | 1.55 | 0.83 | 2.92 | 1.31 | 0.73 | 2.37 |
| $50,000 to just under $75,000 | 1.02 | 0.64 | 1.62 | 1.19 | 0.73 | 1.94 |
| $75,000 to just under $100,000 | 0.99 | 0.55 | 1.79 | 1.36 | 0.80 | 2.32 |
| $100,000 or more | 1.39 | 0.76 | 2.52 | 1.11 | 0.62 | 1.97 |
| Gender (Male) | **1.44** | 1.01 | 2.05 | 1.13 | 0.78 | 1.64 |
| Ethnicity (White) | 1.35 | 0.84 | 2.15 | 1.40 | 0.84 | 2.34 |
| Geographic Location | | | | | | |
| East | 0.80 | 0.50 | 1.27 | **0.62** | 0.40 | 0.96 |
| Central | 0.81 | 0.50 | 1.33 | 0.75 | 0.47 | 1.18 |
| West | 1.38 | 0.85 | 2.23 | 0.77 | .047 | 1.25 |
| Disaster Experience | **2.69** | 1.81 | 4.01 | **1.55** | 1.09 | 2.21 |
| N = | | | 608 | | | 660 |
| Degrees of Freedom = | | | 16 | | | 16 |
| Model Chi-Square = | | | 4.34 | | | 2.46 |

*Note*. Source: 2007 and 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level. Underlined odds ratios in bold are significant at the .01 level.

Preparation-with-time measured respondents' level of preparedness when a natural disaster will occur in a few days. Logistic regression analyses identified strong predictors when having a few days to prepare for a pending disaster in the community-dwelling older adults. Within the sample population, these analyses also examined relationships between preparation-with-time and demographic variables. These variables included age increase (every 10 years), education, registered to vote, income, gender, ethnicity, geographic location. In addition, examined was the relationship between preparation-with-time and disaster experience. Table 12 findings for the 2007 and 2008 sample population showed one statistically significant relationship between preparation-with-time in adult respondents and disaster experience. Of the variables analyzed, previous disaster experience had the most influence on the dependent variable. Findings across the 2007 NCDP cohort continue to show that previous disaster experience strongly affects preparation-with-time in respondents ($t$ = 5.42, $p < .001$). Adults with previous disaster experience are almost three ($OR$ = 2.70) times, more likely to be in a higher category for being prepared-with-time for a major natural disaster.

Results for 2008 revealed people living in the east and central regions of the U.S. are less likely to be in a higher category for being prepared-with-time for a natural disaster, 35% and 41%, respectively. Similarly, older adults located in the western region of the U.S. are 37% less likely to be in a higher category for being prepared-with-time for a major natural disaster such as a tornado, winter storm, or flood. Previous disaster experience continues to strongly affect preparation-with-time in respondents ($t$ = 3.48, $p < .001$). Adults with previous disaster experience are nearly two ($OR$ = 1.87) times, more likely to be in a higher category for being prepared-with-time for a major natural disaster.

Table 12

*2007 and 2008 Logistic Regression Analysis: Preparation-with-Time Measure*

| Dependent Measure | 2007 Older Adult Sample Preparation-with-Time | | | 2008 Older Adult Sample Preparation-with-Time | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Age (increase every 10 years) | 1.00 | 0.83 | 1.20 | 1.14 | 0.97 | 1.35 |
| Education | | | | | | |
| High School | 0.58 | 0.26 | 1.28 | 1.49 | 0.64 | 3.45 |
| Earned Some College Credits | 1.14 | 0.68 | 1.90 | 1.13 | 0.67 | 1.89 |
| College Degree | 1.01 | 0.66 | 1.56 | 1.03 | 0.66 | 1.61 |
| Registered to Vote | 1.84 | 1.00 | 3.41 | 1.13 | 0.56 | 2.30 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.64 | 0.30 | 1.35 | 0.53 | 0.28 | 1.02 |
| $25,000 to just under $50,000 | 1.81 | 0.93 | 3.51 | 1.37 | 0.79 | 2.36 |
| $50,000 to just under $75,000 | 1.00 | 0.62 | 1.60 | 1.05 | 0.66 | 1.66 |
| $75,000 to just under $100,000 | 1.15 | 0.65 | 2.01 | 1.44 | 0.87 | 2.39 |
| $100,000 or more | 0.94 | 0.54 | 1.64 | 1.12 | 0.67 | 1.85 |
| Gender (Male) | 1.04 | 0.73 | 1.46 | 1.29 | 0.93 | 1.79 |
| Ethnicity (White) | 1.03 | 0.61 | 1.74 | 0.92 | 0.56 | 1.53 |
| Geographic Location | | | | | | |
| East | 0.76 | 0.49 | 1.16 | **0.65** | 0.44 | 0.98 |
| Central | 0.71 | 0.44 | 1.17 | **0.59** | 0.39 | 0.89 |
| West | 1.21 | 0.74 | 1.99 | **0.63** | 0.41 | 0.97 |
| Disaster Experience | **2.70** | 1.88 | 3.87 | **1.87** | 1.31 | 2.65 |
| N = | | | 603 | | | 658 |
| Degrees of Freedom = | | | 16 | | | 16 |
| Model Chi-Square = | | | 3.70 | | | 3.46 |

*Note*. Source: 2007 – 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level
Underlined odds ratios in bold are significant at the .01 level.

# CHAPTER 5

# SUMMARY, IMPLICATIONS, AND FUTURE RESEARCH

## Summary of Findings

Consistently in this study, previous disaster experience is shown to have a strong effect on self-efficacy between the 2007 and 2008 data cohorts. These findings align with existing studies in disaster preparedness literature. In particular, Hobfoll's (1989) model infers psychological anxiety is inevitable when there is a risk of resource loss, disrupted investment of resource growth, or depleted resources. However, this specific model also calculates the positive impact of resource gain on human response. For instance, someone who survives a natural hazard may learn invaluable skills about emergency planning. In addition, developed by disaster survivors are self-efficacy, increased social networks, strengthened family relationships, community resiliency, and positive coping strategies. More importantly, individuals who have experienced a previous disaster may gain skills and knowledge that bolster protective behaviors and reduce property loss in future disasters (Hobfoll, 1989; Sattler et al., 2000).

Further analysis of the NCDP 2007 and 2008 cohorts revealed the significant influence of self-efficacy on predicting if survey respondents would have a complete emergency plan. As discussed previously, an important construct of Paton's (2003) social-cognitive model is self-efficacy. This individual core human characteristic of achievement strengths the capacity to secure appropriate disaster preparedness resources by assessing skill, knowledge, physical ability, and finances (Paton, 2003; Sattler et al., 2000). In comparison, the proposed regression analysis model developed in this study demonstrates the relationship between disaster

experience, self-efficacy, and the strong effect on survey respondents having a complete emergency plan index.

Likewise, it is equally important to recognize the differences between the 2007 and 2008 data cohorts. Between the cohorts, older adults responded differently to having an emergency plan, with self-efficacy as the mediator. In 2007, the demographic variable education influenced having an emergency plan index. Findings showed lower educational attainment was a strong predictor of having a lower emergency plan. In 2008, age was a positive predictor of having a slightly higher emergency plan index. In contrast, when predicting self-efficacy between the 2007 and 2008 cohorts self-efficacy showed a dampen effect of age on emergency planning. Further analysis between the cohorts revealed males responded differently when predicting self-efficacy. The findings indicate males in the 2007 cohort had a lower self-efficacy index; while males in the 2008 cohort had a significantly higher self-efficacy index.

## Practical Implications and Future Research

This study design was to identify and examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. Often, contemporary research on natural disasters examines the aftermath of the storm and its impact on people. However, limited studies address the importance of adequately preparing for the unexpected natural disaster, especially among older adults and other vulnerable populations. Al-rousan et al.'s (2014) nationwide study on disaster preparedness in older adults reported the majority of survey respondents (81.5%) were White; while 14.8% of the sample population reported African American, and 3.7% reported other for ethnicity. These

percentages do not accurately reflect the current population demographics of the United States. Even more so, disaster research shows minority older adults are impacted significantly by natural disasters and often experience disproportionate deaths and property destruction (Bourque et al., 2006; NOAA, 2005).

Since 1980, the average annual number of natural disasters has more than tripled. Wildfires, drought, tornados, and hurricanes expose vulnerable populations to environmental threats (NOAA, 2011). Further, social barriers in marginalized neighborhoods hinder economic development and commerce, limit access to optimal health care, and affordable housing (Phillips et al., 2010). When a natural disaster devastates a poor community, these pre-existing vulnerabilities create an overwhelming burden on economic resources, health care services, and formal social support networks (Wells et al., 2013).

Hurricane Katrina provided a clear example of how a natural disaster impacted marginalized communities and vulnerable people. Temporarily housed at the Reliant Astrodome Complex (RAC) in Houston, Texas, frail older adults were quickly over shadowed by the 23,000 adults and children displaced by Hurricane Katrina and relocated to the RAC. Although medical services, resource and referral information, and social service benefits were readily available to citizens who were evacuated to the RAC; frail elders were unable to access these services due to limited mobility, cognitive and sensory impairment, poor health, and trauma associated with the relocation. Sixty percent of New Orleans' residents evacuated to the RAC were frail elderly and disabled adults (Baylor College of Medicine and the American Medical Association, 2006). Hurricane Katrina and other large scale environmental hazards

revealed the inadequacies in federal, state, and local infrastructures. As a result, disaster preparedness, response, and recovery efforts were compromised (Wells et al., 2013).

Community resilience, an emerging theoretical framework in contemporary disaster preparedness research, represents a shifting paradigm from individual and family emergency planning to equipping communities to prepare for disasters. The framework for community resilience is the community partner participatory research model. Community resilience exceeds the definition of self-efficacy in the context of individual and family emergency planning and recognizes the ability of communities to mitigate, prepare, and recover from natural disasters. Conceptualized within the framework of a community systems model, community resilience emphasizes strengths and appropriately utilizes resources of disenfranchised populations and marginalized neighborhoods. The goal is community empowerment. Vulnerabilities are assessed with the aim of developing strategic, applicable, and culturally aware program interventions (Plough et al., 2013).

Community resilience supports sustainable commerce, viable collaborative networks, transfer of ideas and dialogue, cultural respect, and healthy citizens. Social scientists have determined these characteristics with trusted political leadership and social solidarity sustain community resilience beyond the disaster. Within the community, collaborative partnerships are an important component of community resilience. Community-based organizations, private sector industry, local government, universities, and faith-based organizations can work together to increase community engagement and empowerment (Plough et al., 2013).

Mentioned earlier, the older adults relocated to the RAC were found to be suffering from dehydration, delirium, and limited mobility. However, health care professionals

recognized the depressed condition of the frail older adults who were unintentionally neglected. Gerontological social workers, geriatric nurses, and gerontologist associated with Baylor College of Medicine Geriatric Program at the Harris County Hospital District formed an alliance with the Texas Department of Family and Protective Services to provide medical care and advocacy services for the older residents. A team of Baylor geriatric health professionals and adult protective service workers accurately assessed the immediate needs of the older residents temporarily housed at the RAC. A health assessment and social service tool was developed to provide appropriate interventions. This coordinated response aligns with the goals of community resilience and empowering vulnerable populations (Baylor College of Medicine and the American Medical Association, 2006).

In marginalized neighborhoods, faith-based organizations are significant resources for information dissemination, food and clothing assistance, financial help, and health care services (Plough et al., 2013). According to Graddy (2006), faith-based organizations may be better equipped to deliver a specific type of assistance to individuals in need compared to other service providers. Numerous studies have identified the church as a significant fixture in many communities. Churches are a readily available community resource providing a building, an existing volunteer network, and established partnerships in the community. Churches with committed community relationships are positioned strategically to acknowledge and address the disparities within vulnerable populations. Likewise, faith-based organizations depend on dedicated volunteers that have the ability to offer more services or allocate additional attention to clients compared to other service providers (Graddy, 2006; Griener, 2000).

Hurricane Katrina increased the involvement of faith-based organizations in gulf coast communities. In New Orleans churches were vital conduits in supporting response and recovery efforts in vulnerable neighborhoods. DeVore (2007) quotes an editorial from the August 2006 edition of the *New Orleans Times-Picayune*: "Faith-based organizations and churches have been a godsend for the metro area . . . showing an ability to organize, mobilize and get things done that has frequently eclipsed the public sector" (p. 762). Historically the African American church has been a primary center of social, spiritual, and political life for African Americans. Hatch and Derthick (1992) emphasize that for over 200 years the Black church has helped African Americans to cope with harsh social conditions (DeVore, 2007; Hatch & Derthick, 1992).

The community resilience framework supports the use of local leadership to establish emergency planning interventions from within informal social support networks such as churches, community-based organizations, health departments, fire departments, and senior centers. The roles informal social support networks already assume in marginalized communities validate this concept. Community resilience supports what has already been establish in most neighborhoods. Informal social support networks readily can be adjusted to initiate and support emergency planning interventions and strategies. Neighbors can form disaster preparedness groups whose targeted focus is to promote critical awareness, resilience, and protective behavior skills. These empowering activities would decrease dependency on federal and state municipalities and strengthen community involvement and responsibility – especially in the elderly and vulnerable populations. This formula is already in practice when neighbors and friends open their doors to take in a less fortunate member of the community,

cook a meal when someone is sick, and provide transportation to the doctor. These established community networks can positively influence emergency planning among older adults and marginalized neighborhoods with the purpose of saving lives during times of disaster.

Participating in disaster preparedness interventions and adapting protective behaviors may help minimize feelings of perceived discrimination and empower populations on the fringes of society, especially when affected by a natural disaster. Future research derived from this study can be exploring how other ethnicities approach disaster experience, self-efficacy, emergency planning, and awareness strategies that support older adults within their informal social support network. This information is necessary to develop strategic, culturally appropriate, and sustainable community-based interventions that encourage local collaboration and inclusion of vulnerable populations.

## Limitations of the Study

This study presented potential limitations, the predictive relationships between previous disaster experience and emergency planning; and self-efficacy and emergency planning. Although the relationships exist in the study, it is difficult to distinguish between cause and effect. The data were self-reported in this cross-sectional study and may not depict actual emergency planning behaviors. The 10 questions on the General Self-Efficacy Scale are designed to interact with psychological constructs. Each question suggests a method of successful coping and implies an individual core human characteristic of achievement. The NCDP survey instrument had only two questions from the General Self-Efficacy Scale. Within the NCDP sample population, the number of non-White survey respondents was too small to

include in the data analysis. Finally, because there were many cases with unique weights in the data set, clusters with only one case each, the “MISSUNIT” specification was employed.

# APPENDIX

## 2007 and 2008 NATIONAL CENTER FOR DISASTER PREPAREDNESS COHORT DATA –

## LOGISTIC REGRESSION ANALYSIS: TOTAL POPULATION

## 2007 National Center for Disaster Preparedness Cohort Data

### Descriptive Statistics: Total Sample Population

The National Center for Disaster Preparedness, American Preparedness Project (Marist) survey data (2007-2008) was used for the secondary data analysis for this study. To examine how disaster experience, self-efficacy, and demographic factors influence emergency planning in community-dwelling older adults. Descriptive statistics and multivariate logistic regression analysis were employed to analyze data from the National Center for Disaster Preparedness, American Preparedness Project (Marist) survey data.

Descriptive statistics present the frequency and percentage distribution of the independent variables, mediating variable, and dependent variable. Table A.1 shows an overview of the 2007 respondents' general demographic characteristics by education levels, civic engagement, income levels, gender, ethnicity, geographic location, and previous disaster experience. A total of 1,352 community-dwelling adults participated in the NCDP 2007 survey with an average age of 52.2 (*n* = 1320), and a standard deviation of 16.2. The majority of the adult respondents reported earning a college degree (43.7%) while 8.2% (*n* = 109) of the population reported less than a high school education. Approximately 87.2% of the adult respondents reported being registered to vote. Income levels seem to be evenly distributed between survey respondents. The majority of respondents, 22.2% reported their annual household income level at $50,000 to just under $75,000 before taxes. Nearly 13% of adults reported their annual household income level at less than $15,000 before taxes. Community-dwelling adults were 63.6% female and 36.4% male; 83.6% of survey respondents reported White for ethnicity while 16.4% reported non-White.

Table A.1

*2007 Total Population Frequency and Percentage of Demographic Data*

| Independent Variables | 2007 Unweighted Total Population (*N* = 1352) | | 2007 Weighted Total Population (*N* = 1360.8) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Education | **(*n* = 1323)** | | **(*n* = 1328.9)** | |
| Less than High School | 109 | 8.2 | 127.3 | 9.6 |
| High School | 374 | 28.3 | 397.7 | 29.9 |
| Earned Some College Credits | 262 | 19.8 | 251.8 | 18.9 |
| College Degree | 578 | 43.7 | 552.1 | 41.6 |
| Registered to Vote | **(*n* = 1347)** | | **(*n* = 1354.1)** | |
| No | 175 | 13.0 | 243.4 | 18.0 |
| Yes | 1172 | 87.2 | 1110.7 | 82.0 |
| Income | **(*n* = 1165)** | | **(*n* = 1199.1)** | |
| Less than $15,000 a year | 142 | 12.9 | 172.6 | 14.4 |
| $15,000 to just under $25,000 | 125 | 10.7 | 134.4 | 11.2 |
| $25,000 to just under$50,000 | 247 | 21.2 | 314.4 | 26.2 |
| $50,000 to just under $75,000 | 258 | 22.2 | 236.4 | 19.7 |
| $75,000 to just under $100,000 | 167 | 14.3 | 149.7 | 12.5 |
| $100,000 or more | 226 | 19.40 | 191.6 | 15.9 |
| Gender | **(*n* = 1352)** | | **(*n* = 1360.8)** | |
| Female | 860 | 63.6 | 692.3 | 50.9 |
| Male | 492 | 36.4 | 668.5 | 49.1 |
| Ethnicity | **(*n* = 1279)** | | **(*n* = 1242.1)** | |
| White | 1069 | 83.6 | 888.5 | 71.5 |
| Non-White | 210 | 16.42 | 353.6 | 28.5 |
| Geographic Location | **(*n* = 1352)** | | **(*n* = 1360.8)** | |
| East | 294 | 21.8 | 299.2 | 21.9 |
| Central | 306 | 22.6 | 289.1 | 21.3 |
| South | 446 | 30.0 | 451.9 | 33.2 |
| West | 306 | 22.6 | 320.5 | 23.6 |
| Disaster Experience | **(*n* = 1348)** | | **(*n* = 1357.2)** | |
| No | 874 | 64.8 | 862.6 | 63.6 |
| Yes | 474 | 35.1 | 494.5 | 36.4 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)

Geographic location described the region of the country. Survey respondents seemed to be evenly distributed between south (33.0%) east (21.8%), central (22.6%), and western (22.6%) regions of the United States. Approximately 64.8% (*n* = 874) of community-dwelling

adults had no previous disaster experience; 35.1% (*n* = 744) reported previous disaster experience.

Table A.2 shows the 2007 frequency and percentage distribution of measures for outcome factors. Emergency plan, preparation-with-warning, and preparation-with-time are the dependent variable examined in this study. Each dependent variable has four corresponding categories. The majority of community-dwelling adults, 55.2% (*n* = 746) reported *no emergency plan* for their households; 33.4% reported having *all* of the recommended emergency supplies: at least two-days of food and water, flashlight, battery operated radio, emergency telephone numbers, and a safe designated meeting location for family members. Nearly 11% of respondents reported having *some* of the recommended emergency supplies; and 0.74% of the adults reported having *none* of the listed emergency supplies. The preparation-with-warning variable was intended to examine adults' personal preparedness level when a specified pending disaster poses a threat to personal safety and property. Forty-nine percent of survey respondents reported being *prepared* for a major natural disaster such as a hurricane, winter storm, wildfire, or flood in their community. Almost 24% of adults reported being *not very prepared*; while 14.1% reported being *not prepared at all;* and 13% of community-dwelling adults reported being *very prepared.* The preparation-with-time variable calculated respondents' level of preparedness when a natural disaster is anticipated and will occur in a few days. Approximately 35% of adults reported being mostly *prepared*; 28% responded *partly prepared*; while 25.6% responded *not really prepared*; and 11.1% reported *completely prepared*.

Table A.2

*2007 Total Population Frequency and Percentages of Measures for Outcome Factors*

| Dependent Variables | 2007 Unweighted Total Population (*N* = 1352) | | 2007 Weighted Total Population (*N* = 1360.8) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Emergency Plan | **(*n* = 1352)** | | **(*n* = 1360.8)** | |
| All | 452 | 33.4 | 421.4 | 31.0 |
| Some | 144 | 10.7 | 158.0 | 11.6 |
| None (of the listed supplies) | 10 | 0.74 | 10.7 | 0.8 |
| No emergency plan | 746 | 55.2 | 770.7 | 56.6 |
| Preparation-with-Warning | **(*n* = 1341)** | | **(*n* = 1350.4)** | |
| Very prepared | 174 | 13.0 | 169.2 | 12.5 |
| Prepared | 657 | 49.0 | 647.3 | 47.9 |
| Not very prepared | 321 | 23.9 | 322.4 | 23.9 |
| Not prepared at all | 189 | 14.1 | 211.5 | 15.7 |
| Preparation-with-Time | **(*n* = 1330)** | | **(*n* = 1335.9)** | |
| Completely prepared | 147 | 11.1 | 150.8 | 11.3 |
| Mostly prepared | 471 | 35.4 | 459.5 | 34.4 |
| Partly prepared | 372 | 28.0 | 357.3 | 26.7 |
| Not really prepared | 340 | 25.6 | 368.3 | 27.6 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)

## Logistic Regression Analysis: 2007 Total Sample Population

### Emergency Plan

The emergency plan variable measured community-dwelling adult respondents' level of disaster preparedness. According to the survey question, a well implemented emergency plan consist of a minimum two-day supply of water and food, a small battery operated radio, extra batteries, a flashlight, and emergency contact information for family and friends. Also, if evacuation is necessary, a safe designated meeting location for family members is essential. Logistic regression analyses identified important predictors of having an emergency plan in the community-dwelling adult respondents. These analyses also examined relationships between having an emergency plan in respondents and demographic variables. These variables included

age increase (every 10 years), education, ethnicity, income, gender, geographic location and registered to vote. In addition, the relationship between having an emergency plan and previous disaster experience in adults was examined.

Table A.3 presents results for the 2007 NCDP total study population. Findings for 2007, showed statistically significant relationships between having an emergency plan in respondents and age, income, geographic location, and previous disaster experience. Of the variables examined, age, income, geographic location, and previous disaster experience had the most influence on the dependent variable. Every decade of age has an estimated 14% higher likelihood of respondents having an emergency plan. Sample adults earning $25,000 to just under $50,000 before taxes were almost three (*OR* = 2.70) times as likely to be in a higher category for having an emergency plan. Community-dwelling adults living in the central region of the U.S. are 33% less likely to be in a higher category to have an emergency plan. Previous disaster experience strongly effects having an emergency plan in the sample population ($t$ = 5.58, $p < .001$). Respondents with previous disaster experience are 1½ times, more likely to be in a higher category for having an emergency plan than those respondents with no previous disaster experience. The remaining variables in the model, education, registered to vote, gender, and ethnicity were not statistically significant predictors for having an emergency plan ($p > 0.05$).

Table A.3

*2007 Total Population Logistic Regression: Dependent Variable Emergency Plan*

| | Equation 1 Dependent Variable Emergency Plan without self-efficacy | | | Equation 2 Dependent Variable Emergency Plan with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ------- | ------ | ------ | **1.99** | 1.44 | 2.75 |
| Age (increase every 10 years) | **1.14** | 1.04 | 1.25 | **1.15** | 1.05 | 1.27 |
| Education | | | | | | |
| High School | 0.82 | 0.47 | 1.43 | 0.72 | 0.41 | 1.24 |
| Earned Some College Credits | 1.29 | 0.82 | 2.03 | 1.34 | 0.84 | 2.12 |
| College Degree | 0.78 | 0.52 | 1.17 | 0.77 | 0.51 | 1.17 |
| Registered to Vote | 0.91 | 0.58 | 1.43 | 0.86 | 0.54 | 1.38 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.78 | 0.37 | 1.68 | 0.70 | 0.33 | 1.50 |
| $25,000 to just under $50,000 | **2.70** | 1.41 | 5.16 | **2.74** | 1.43 | 5.25 |
| $50,000 to just under $75,000 | 0.90 | 0.59 | 1.35 | 0.87 | 0.57 | 1.34 |
| $75,000 to just under $100,000 | 0.93 | 0.58 | 1.49 | 0.92 | 0.57 | 1.47 |
| $100,000 or more | 1.18 | 0.72 | 1.94 | 1.16 | 0.70 | 1.91 |
| Gender (Male) | 0.92 | 0.67 | 1.25 | 0.93 | 0.67 | 1.28 |
| Ethnicity (White) | 1.10 | 0.71 | 1.69 | 1.12 | 0.71 | 1.76 |
| Geographic Location | | | | | | |
| East | 0.75 | 0.50 | 1.13 | 0.71 | 0.46 | 1.08 |
| Central | **0.66** | 0.44 | 1.00 | **0.66** | 0.44 | 1.00 |
| West | 0.93 | 0.63 | 1.36 | 0.92 | 0.62 | 1.36 |
| Disaster Experience | **2.40** | 1.77 | 3.27 | **2.15** | 1.56 | 2.96 |
| N = | | | 1012 | | | 1008 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 4.13 | | | 4.81 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level
Underlined odds ratios in bold are significant at the .01 level

Included in this analysis was a mediation model to identify and explain the mediating variable. Self-efficacy mediates the relationship between the demographic variables and having an emergency plan in respondents. Logistic regression analysis was utilized to further explore

the influence of self-efficacy as a mediating variable in respondents. Adults with self- efficacy were nearly two (*OR* = 1.99) times more likely to be in a higher category for having an emergency plan ($t = 4.19$, $p < .001$). In equation two, when examining the effect of self-efficacy on the demographic variables and the likelihood of having an emergency plan in respondents, the following variables were identified as statistically significant predictors: age, income, geographic location, and previous disaster experience.

For every decade of increase in age, an estimated 15% (*OR* = 1.15) of adult respondents have a higher likelihood of having an emergency plan. People earning $25,000 to just under $50,000 before taxes were almost three (*OR* = 2.47) times as likely to be in a higher category for having an emergency plan, as those with incomes of $15,000 to $24,999 that is the only breaking point in income that explains having an emergency plan. Sample populations living in the central region of the U.S. are 33% less likely to be in a higher category for having a developed emergency plan than respondents living in southern states. The mediating variable, self-efficacy, as well as previous disaster experience strongly affects having an emergency plan in the adult population ($t = 4.67$, $p < .001$). Sample adults with previous disaster experience are two (*OR* = 2.15) times, more likely to be in a higher category for having an emergency plan than those respondents with no observable effects of self-efficacy and no previous disaster experience.

## Preparation-with-Warning

### 2007 Total Sample Population

The preparation-with-warning variable measured an association between personal preparedness-with-warning for a major natural disaster in the respondents and demographic

variables. The demographic variables examined to determine an association are age increase (every 10 years), education, ethnicity, income, gender, geographic location, registered to vote, and previous disaster experience. Survey results revealed statistically significant associations between personal preparedness-with-warning for a major natural disaster in respondents and income, ethnicity, geographic location, and previous disaster experience.

Table A.4 shows the variables analyzed income, ethnicity, geographic location, and previous disaster experience had the most influence on the dependent variable. Survey respondents earning $25,000 to just under $50,000 before taxes were almost two (*OR* = 1.95) times as likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community. White respondents were nearly two (*OR* = 1.70) times as likely to be in a higher category for being prepared-with-warning for a major natural disaster such as a hurricane, winter storm, wildfire, or flood.

Community-dwelling adults living in the eastern region of the U.S. are 40% less likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community. Similarly, adults located in the central region of the U.S. are 44% less likely to be in a higher category for personal preparedness-with-warning for a major natural disaster. Past disaster experience seems to predict a positive outcome on personal preparedness-with-warning for a major natural disaster ($t = 3.45$, $p < .001$). Consequently, people responding with past disaster experience are almost two (*OR* = 1.83) times more likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community.

Table A.4

*2007 Total Population Logistic Regression Analysis: Dependent Variable Preparation-with-Warning*

| | Equation 1 Dependent Variable Preparation-with-Warning without self-efficacy | | | Equation 2 Dependent Variable Preparation-with-Warning with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ---------- | --------- | -------- | **1.69** | 1.33 | 2.15 |
| Age (increase every 10 years) | 1.00 | 0.91 | 1.09 | 1.00 | 0.92 | 1.09 |
| Education | | | | | | |
| High School | 0.68 | 0.37 | 1.26 | 0.63 | 0.35 | 1.14 |
| Earned Some College Credits | 0.92 | 0.59 | 1.43 | 0.92 | 0.59 | 1.44 |
| College Degree | 1.23 | 0.81 | 1.86 | 1.23 | 0.80 | 1.87 |
| Registered to Vote | 1.53 | 0.97 | 2.41 | 1.45 | 0.93 | 2.25 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.60 | 0.30 | 1.19 | 0.53 | 0.27 | 1.05 |
| $25,000 to just under $50,000 | **1.95** | 1.09 | 3.48 | **1.99** | 1.11 | 3.56 |
| $50,000 to just under $75,000 | 0.99 | 0.65 | 1.50 | 1.01 | 0.66 | 1.54 |
| $75,000 to just under $100,000 | 1.12 | 0.69 | 1.81 | 1.09 | 0.68 | 1.74 |
| $100,000 or more | 1.07 | 0.64 | 1.77 | 1.05 | 0.63 | 1.73 |
| Gender (Male) | 1.32 | 0.99 | 1.76 | **1.38** | 1.03 | 1.85 |
| Ethnicity (White) | **1.70** | 1.10 | 2.63 | **1.76** | 1.14 | 2.72 |
| Geographic Location | | | | | | |
| East | **0.60** | 0.40 | 0.90 | **0.60** | 0.40 | 0.90 |
| Central | **0.56** | 0.38 | 0.82 | **0.57** | 0.39 | 0.85 |
| West | 0.86 | 0.56 | 1.31 | 0.87 | 0.57 | 1.34 |
| Disaster Experience | **1.83** | 1.30 | 2.58 | **1.65** | 1.16 | 2.34 |
| N = | | | 1005 | | | 1001 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 4.62 | | | 5.93 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level

Further analysis of self-efficacy, the mediating variable, revealed a strong indication that respondents are 69% more likely to prepare-with-warning for a major natural disaster in their

community ($t$ = 4.26, $p$ < .001). In the equation, when examining the influence of self-efficacy on the demographic variables and the likelihood of the sample adults preparing-with-warning for a natural disaster, the following variables were identified as statistically significant predictors: income, gender, ethnicity, geographic location, and previous disaster experience.

People earning $25,000 to just under $50,000 before taxes were almost two (*OR* = 1.99) times as likely to be in a higher category for preparing-with-warning for a natural disaster, as those with incomes of $15,000 to $24,999 that is the only breaking point in income that explains personal preparedness-with-warning for a major natural disaster in survey respondents. Gender seems to be a significant factor in predicting the ratio of preparedness-with-warning; males are approximately 1⅕ times more likely to be in a higher category for preparing-with-warning for a natural disaster than are female survey respondents. White adults are about two (*OR* = 1.76) times more likely to be in a higher category for being prepared-with-warning for a major natural disaster than are other ethnicities in the data sample. Looking at the effect of geographic location, people living in the east and central regions of the U.S. are less likely to be in a higher category for personal preparedness-with-warning for a major natural disaster, 40% and 43%, respectively. Sample adults with previous disaster experience are 65% more likely to be in a higher category for being prepared-with-warning for a major natural disaster than those respondents with no observable effects of self-efficacy and no previous disaster experience ($t$ = 2.80, $p$ < .001).

## Preparation-with-Time

### 2007 Total Sample Population

The preparation-with-time variable measured respondents' level of preparedness when a natural disaster will occur in a few days. Logistic regression analyses identified strong predictors when having a few days to prepare for a pending disaster in the community-dwelling adults. Within the sample population, these analyses also examined relationships between preparation-with-time and demographic variables. These variables included age increase (every 10 years), education, ethnicity, income, gender, geographic location, and registered to vote. In addition, the relationship between preparation-with-time and previous disaster experience was examined. Table A.5 highlights findings that showed statistically significant relationships between preparation-with-time in adult respondents and ethnicity, geographic location and previous disaster experience. Of the variables analyzed, ethnicity, geographic location and previous disaster experience had the most influence on the dependent variable.

Findings across the 2007 NCDP cohort continue to show that white adults were 64% more likely to be in a higher category for being prepared-with-time for a major disaster in their community. The sample population living in the eastern region of the U.S. is 36% less likely to be in a higher category for being prepared-with-time for a natural disaster. Likewise, adults located in the central region of the U.S. are 40% less likely to be in a higher category for being prepared-with-time for a major natural disaster such as a tornado, winter storm, or flood. Previous disaster experience continues to strongly affect preparation-with-time in respondents ($t = 3.88$, $p < .001$). Adults with previous disaster experience are nearly two ($OR = 1.94$) times, more likely to be in a higher category for being prepared-with-time for a major natural disaster.

Table A.5

*2007 Total Population Logistic Regression Analysis: Dependent Variable Preparation-with-Time*

| | Equation 1 Dependent Variable Preparation-with-Time without self-efficacy | | | Equation 2 Dependent Variable Preparation-with-Time with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ------- | ------ | ------ | **1.43** | 1.08 | 1.90 |
| Age (increase every 10 years) | 0.99 | 0.90 | 1.09 | 1.00 | 0.91 | 1.10 |
| Education | | | | | | |
| High School | 0.67 | 0.34 | 1.33 | 0.67 | 0.34 | 1.34 |
| Earned Some College Credits | 1.19 | 0.77 | 1.83 | 1.18 | 0.76 | 1.82 |
| College Degree | 1.10 | 0.75 | 1.61 | 1.11 | 0.75 | 1.62 |
| Registered to Vote | 1.45 | 0.90 | 2.33 | 1.38 | 0.86 | 2.24 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.72 | 0.35 | 1.48 | 0.68 | 0.33 | 1.44 |
| $25,000 to just under $50,000 | 1.32 | 0.69 | 2.53 | 1.30 | 0.67 | 2.54 |
| $50,000 to just under $75,000 | 1.02 | 0.66 | 1.57 | 1.02 | 0.66 | 1.59 |
| $75,000 to just under $100,000 | 0.98 | 0.65 | 1.48 | 0.97 | 0.64 | 1.47 |
| $100,000 or more | 0.94 | 0.63 | 1.39 | 0.93 | 0.62 | 1.37 |
| Gender (Male) | 1.25 | 0.93 | 1.67 | 1.26 | 0.93 | 1.69 |
| Ethnicity (White) | **1.64** | 1.05 | 2.55 | **1.66** | 1.06 | 2.60 |
| Geographic Location | | | | | | |
| East | **0.64** | 0.44 | 0.93 | **0.64** | 0.44 | 0.93 |
| Central | **0.60** | 0.40 | 0.89 | **0.61** | 0.41 | 0.91 |
| West | 0.74 | 0.49 | 1.13 | 0.76 | 0.50 | 1.17 |
| Disaster Experience | **1.94** | 1.39 | 2.71 | **1.81** | 1.29 | 2.56 |
| N = | | | 999 | | | 995 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 3.24 | | | 3.16 |

*Note*. Source: 2007 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level.

Repeated analysis of self-efficacy, the mediating variable, revealed an increasing positive trend toward disaster preparedness. Data suggest adults are 43% more likely to prepare-with-time for a major natural disaster in their community ($t = 2.50$, $p < .01$). In equation two, when examining the influence of self-efficacy on the demographic variables and

the likelihood of the respondents preparing-with-time for a natural disaster, the following variables were identified as statistically significant predictors: ethnicity, geographic location, and previous disaster experience. Ethnicity seems to be a significant factor in predicting the percentage of preparation-with-time; white respondents were 66% more likely to be in a higher category for being prepared-with-time for a major disaster than are other ethnicities in the study.

Considering the continued impact of geographic location, people living in the east and central regions of the U.S. are less likely to be in a higher category for preparedness-with-time for a major natural disaster 36% and 39%, respectively. Sample adults with previous disaster experience are nearly 2 (*OR* = 1.81) times more likely to be in a higher category for being prepared-with-time for a major natural disaster than those respondents with no observable effects of self-efficacy and no past disaster experience.

2008 National Center for Disaster Preparedness Cohort Data

Descriptive Statistics: Total Sample Population

Table A.6 presents similar descriptive statistics for the NCDP 2008 older adults' frequency and percentage distribution of the independent variables.

Table A.6

*2008 Total Population Frequency and Percentage of Demographic Data*

| Independent Variables | 2008 Unweighted Total Population (*N* = 1579) | | 2008 Weighted Total Population (*N* = 1579) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Education | **(*n* = 1560)** | | **(*n* = 1555.7)** | |
| Less than High School | 96 | 6.2 | 120.7 | 7.8 |
| High School | 489 | 31.2 | 537.2 | 34.5 |
| Earned Some College Credits | 276 | 17.7 | 260.4 | 16.7 |
| College Degree | 699 | 44.8 | 637.4 | 40.9 |
| Registered to Vote | **(*n* = 1573)** | | **(*n* = 1570.9)** | |
| No | 215 | 13.7 | 259.2 | 16.5 |
| Yes | 1358 | 86.3 | 1311.2 | 83.5 |
| Income | **(*n* = 1353)** | | **(*n* = 1357.9)** | |
| Less than $15,000 a year | 166 | 12.3 | 205.3 | 15.1 |
| $15,000 to just under $25,000 | 159 | 11.8 | 157.9 | 11.6 |
| $25,000 to just under$50,000 | 332 | 24.5 | 363.2 | 26.7 |
| $50,000 to just under $75,000 | 293 | 21.7 | 252.6 | 18.6 |
| $75,000 to just under $100,000 | 184 | 13.6 | 157.9 | 11.6 |
| $100,000 or more | 219 | 16.2 | 221.1 | 16.3 |
| Gender | **(*n* = 1579)** | | **(*n* = 1579)** | |
| Female | 980 | 62.1 | 821.1 | 52.0 |
| Male | 599 | 37.9 | 757.9 | 48.0 |
| Ethnicity | **(*n* = 1481)** | | **(*n* = 1357.9)** | |
| White | 1257 | 84.9 | 1010.6 | 74.4 |
| Non-White | 224 | 15.12 | 347.9 | 25.6 |
| Geographic Location | **(*n* = 1579)** | | **(*n* = 1579)** | |
| East | 341 | 21.6 | 345.2 | 21.9 |
| Central | 356 | 22.6 | 344.9 | 21.9 |
| South | 511 | 32.7 | 510.4 | 32.3 |
| West | 371 | 23.5 | 378.4 | 23.9 |
| Disaster Experience | **(*n* = 1573)** | | **(*n* = 1572.8)** | |
| No | 1046 | 66.5 | 1024.4 | 65.1 |
| Yes | 527 | 33.5 | 548.4 | 34.9 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)

Table A.7 presents similar descriptive statistics for the 2008 frequency and percentage distribution of measures for outcome factors. Emergency plan, preparation-with-warning, and preparation-with-time are the dependent variable examined in this study.

Table A.7

*2008 Total Population Frequency and Percentage of Measures for Outcome Factors*

| Dependent Variables | 2008 Unweighted Total Population (*N* = 1579) | | 2008 Weighted Total Population (*N* = 1579) | |
|---|---|---|---|---|
| | Freq. (*N*) | % | Freq. (*N*) | % |
| Emergency Plan | **(*n* = 1577)** | | **(*n* = 1577.6)** | |
| All | 500 | 31.7 | 501.9 | 31.8 |
| Some | 210 | 13.3 | 198.4 | 12.6 |
| None (of the listed supplies) | 10 | 0.63 | 10.2 | 0.65 |
| No emergency plan | 857 | 54.34 | 867 | 54.9 |
| Preparation-with-Warning | **(*n* = 1558)** | | **(*n* = 1555.3)** | |
| Very prepared | 253 | 16.24 | 255.8 | 16.5 |
| Prepared | 776 | 49.8 | 749.4 | 48.2 |
| Not very prepared | 340 | 21.8 | 356.1 | 22.9 |
| Not prepared at all | 189 | 12.1 | 194.0 | 12.5 |
| Preparation-with-Time | **(*n* = 1540)** | | **(*n* = 1526.4)** | |
| Completely prepared | 203 | 13.2 | 212.4 | 13.9 |
| Mostly prepared | 513 | 33.3 | 479.0 | 31.4 |
| Partly prepared | 432 | 28.1 | 414.3 | 27.1 |
| Not really prepared | 392 | 25.5 | 420.7 | 27.6 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)

## Logistic Regression Analysis: 2008 Total Sample Population

### Emergency Plan

Logistic regression analysis was used to further examine the 2008 NCDP total data sample and the effects of the independent variables on the likelihood that adult respondents will have an emergency plan. These variables included age increase (every 10 years), education, ethnicity, income, gender, geographic location and registered to vote. Also, the relationship between having an emergency plan and previous disaster experience was examined.

Table A.8 presents results for statistically significant relationships between having an emergency plan in adult respondents and the independent variables age and previous disaster experience. The remaining variables in the model, education, ethnicity, income, gender,

geographic location and registered to vote, were not statistically significant predictors of having an emergency plan ($p > 0.05$). Of the variables examined, age and previous disaster experience had the most influence on the dependent variable. Every decade of age has an estimated 11% higher likelihood of respondents having an emergency plan. Previous disaster experience strongly effects having an emergency plan in the sample population ($t = 4.78$, $p < .001$). Respondents with previous disaster experience are nearly two ($OR = 1.98$) times, more likely to be in a higher category for having an emergency plan than those respondents with no previous disaster experience.

Similar to the 2007 NCDP data analysis, self-efficacy mediates the relationship between the demographic variables and having an emergency plan in respondents. Logistic regression analysis was utilized to further explore the influence of self-efficacy as a mediating variable in respondents. Adults with self-efficacy were an estimated two ($OR = 2.31$) times more likely to be in a higher category for having an emergency plan ($t = 6.44$, $p < .001$). In this equation, when examining the effect of self-efficacy on the demographic variables and the likelihood of having an emergency plan in respondents, the following variables were identified as statistically significant predictors: age, gender, and previous disaster experience. For every decade of increase in age an estimated 13% of respondents have a higher likelihood of having an emergency plan. Noticing the effect of gender on disaster preparedness, males are 27% less likely to be in a higher category for having an emergency plan than are female survey respondents. The mediating variable, self-efficacy, as well as previous disaster experience strongly affects having an emergency plan in the survey population ($t = 4.12$, $p < .001$). Sample adults with previous disaster experience are almost two ($OR = 1.82$) times, more likely to be in a

higher category for having an emergency plan than those respondents with no observable effects of self-efficacy and no previous disaster experience.

Table A.8

*2008 Total Population Logistic Regression Analysis: Dependent Variable Emergency Plan*

| | Equation 1 Dependent Variable Emergency Plan without self-efficacy | | | Equation 2 Dependent Variable Emergency Plan with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ------- | ------ | ------ | **<u>2.31</u>** | 1.79 | 2.99 |
| Age (increase every 10 years) | **<u>1.11</u>** | 1.03 | 1.19 | **<u>1.13</u>** | 1.05 | 1.22 |
| Education | | | | | | |
| High School | 1.04 | 0.55 | 1.97 | 0.93 | 0.48 | 1.79 |
| Earned Some College Credits | 0.86 | 0.57 | 1.29 | 0.88 | 0.58 | 1.32 |
| College Degree | 0.93 | 0.65 | 1.34 | 0.96 | 0.66 | 1.40 |
| Registered to Vote | 1.29 | 0.85 | 1.96 | 1.23 | 0.82 | 1.84 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 1.33 | 0.70 | 2.54 | 1.21 | 0.64 | 2.27 |
| $25,000 to just under $50,000 | 1.61 | 0.95 | 2.71 | 1.60 | 0.95 | 2.70 |
| $50,000 to just under $75,000 | 0.89 | 0.61 | 1.28 | 0.88 | 0.59 | 1.29 |
| $75,000 to just under $100,000 | 1.14 | 0.76 | 1.72 | 1.08 | 0.70 | 1.66 |
| $100,000 or more | 0.91 | 0.60 | 1.38 | 0.82 | 0.53 | 1.28 |
| Gender (Male) | 0.78 | 0.60 | 1.02 | **0.73** | 0.56 | 0.96 |
| Ethnicity (White) | 1.28 | 0.81 | 2.03 | 1.29 | 0.79 | 2.09 |
| Geographic Location | | | | | | |
| East | 0.80 | 0.56 | 1.15 | 0.86 | 0.59 | 1.25 |
| Central | 0.95 | 0.67 | 1.35 | 0.98 | 0.68 | 1.40 |
| West | 0.93 | 0.65 | 1.34 | 0.96 | 0.66 | 1.39 |
| Disaster Experience | **<u>1.98</u>** | 1.50 | 2.63 | **<u>1.82</u>** | 1.37 | 2.41 |
| *N* = | | | 1094 | | | 1083 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 3.34 | | | 5.41 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level.

## Preparation-with-Warning

### 2008 Total Sample Population

In the 2008 NCDP data cohort, the preparation-with-warning variable measured an association between personal preparedness-with-warning for a major natural disaster in the respondents and demographic variables. The demographic variables examined to determine an association are age increase (every 10 years), education, ethnicity, income, gender, geographic location, registered to vote, and previous disaster experience. Table A.9 survey results revealed statistically significant association between personal preparedness-with-warning for a major natural disaster in adult respondents and income, geographic location, and previous disaster experience.

Of the variables analyzed income, geographic location, and previous disaster experience had the most influence on the dependent variable. Survey respondents earning $75,000 to just under $100,000 before taxes were 48% more likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community. People living in the eastern region of the U.S. are 38% less likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community. Likewise, adults located in the central region of the U.S. are 27% less likely to be in a higher category for personal preparedness-with-warning for a major natural disaster. The data indicates that past disaster experience is a strong predictor of a positive outcome on personal preparedness-with-warning for a major natural disaster ($t = 2.52$, $p = .012$). Consequently, people responding with past disaster experience are 40% more likely to be in a higher category for being prepared-with-warning for a major natural disaster in their community.

Table A.9

*2008 Total Population Logistic Regression Analysis: Dependent Variable Preparation-with-Warning*

| | Equation 1 Dependent Variable Preparation-with-Warning without self-efficacy | | | Equation 2 Dependent Variable Preparation-with-Warning with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ---------- | --------- | -------- | **2.23** | 1.76 | 2.82 |
| Age (increase every 10 years) | 0.98 | 0.92 | 1.06 | 1.00 | 0.93 | 1.07 |
| Education | | | | | | |
| High School | 1.30 | 0.72 | 2.33 | 1.10 | 0.62 | 1.95 |
| Earned Some College Credits | 1.36 | 0.94 | 1.96 | 1.36 | 0.94 | 1.98 |
| College Degree | 1.03 | 0.74 | 1.44 | 1.10 | 0.78 | 1.55 |
| Registered to Vote | 1.22 | 0.84 | 1.77 | 1.15 | 0.78 | 1.68 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 1.25 | 0.65 | 2.41 | 1.01 | 0.50 | 2.05 |
| $25,000 to just under $50,000 | 1.25 | 0.74 | 2.11 | 1.20 | 0.70 | 2.07 |
| $50,000 to just under $75,000 | 0.83 | 0.60 | 1.15 | 0.82 | 0.59 | 1.15 |
| $75,000 to just under $100,000 | **1.48** | 1.02 | 2.13 | **1.46** | 1.01 | 2.12 |
| $100,000 or more | 0.85 | 0.57 | 1.27 | 0.75 | 0.50 | 1.13 |
| Gender (Male) | 1.29 | 0.98 | 1.68 | 1.26 | 0.96 | 1.65 |
| Ethnicity (White) | 1.49 | 0.94 | 2.36 | 1.46 | 0.90 | 2.38 |
| Geographic Location | | | | | | |
| East | **0.62** | 0.44 | 0.87 | **0.67** | 0.47 | 0.95 |
| Central | **0.73** | 0.53 | 1.01 | 0.74 | 0.54 | 1.03 |
| West | 0.90 | 0.64 | 1.27 | 0.96 | 0.68 | 1.37 |
| Disaster Experience | **1.40** | 1.08 | 1.83 | 1.25 | 0.95 | 1.63 |
| N = | | | 1086 | | | 1076 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 3.26 | | | 6.38 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level.

Additional analysis of self-efficacy, the mediating variable, demonstrated a strong indication that respondents are two (*OR* = 2.23) times more likely to prepare-with-warning for a

major natural disaster in their community ($t$ = 6.73, $p$ < .001). In equation two, when examining the influence of self-efficacy on the demographic variables and the likelihood of the sample adults preparing-with-warning for a natural disaster, the following variables were identified as statistically significant predictors: income and geographic location. The data suggest people earning $75,000 to just under $100,000 before taxes are 46% more likely to be in a higher category for preparing-with-warning, as those with incomes of $50,000 to $74,999 that is the only breaking point in income that explains personal preparedness-with-warning for a major natural disaster in survey respondents. Sample populations living in the eastern region of the U.S. are 33% less likely to be in a higher category for preparedness-with-warning than respondents living in southern states.

### Preparation-with-Time

#### 2008 Total Sample Population

The preparation-with-time variable measured respondents' level of preparedness when a natural disaster will occur in a few days. Within the sample population, logistic regression analyses examined relationships between preparation-with-time and demographic variables. Table A.10 shows 6 of the 8 demographic variables revealed a statistically significant relationship with preparation-with-time in the respondents. The remaining variables in the model, income and ethnicity, were not statistically significant predictors of preparation-with-time in adult respondents ($p$ > 0.05). Of the variables analyzed, age (every 10 years), education, registered to vote, gender, geographic location, and previous disaster experience had the most influence on the dependent variable.

Findings across the 2008 NCDP cohort indicate for every decade of age, respondents have an estimated 8% higher likelihood of being prepared-with-time for a major disaster in their community. Adult respondents earning a high school degree are two (*OR* = 2.09) times as likely to be in a higher category for being prepared-with-time for a natural disaster. Within the sample population, adults registered to vote are 71% more likely to be in a higher category for being prepared-with-time for a major disaster. Male respondents are 50% more likely to be in a higher category for being prepared-with-time for a natural disaster in their community.

People living in the east and central regions of the U.S. are both 35% less likely to be in a higher category for being prepared-with-time for a natural disaster. Similarly, adults located in the western region of the U.S. are 38% less likely to be in a higher category for being prepared-with-time for a major natural disaster such as a tornado, winter storm, or flood. Previous disaster experience continues to strongly affect preparation-with-time in respondents ($t = 5.31$, $p < .001$). Adults with previous disaster experience are two (*OR* = 2.13) times, more likely to be in a higher category for being prepared-with-time for a major natural disaster.

Table A.10

*2008 Total Population Logistic Regression Analysis: Dependent Variable Preparation-with-Time*

| | Equation 1 Dependent Variable Preparation-with-Time without self-efficacy | | | Equation 2 Dependent Variable Preparation-with-Time with self-efficacy | | |
|---|---|---|---|---|---|---|
| Independent Variables | Odds Ratio | Lower Bound | Upper Bound | Odds Ratio | Lower Bound | Upper Bound |
| Self-Efficacy | ------- | ------ | ------ | **2.14** | 1.66 | 2.76 |
| Age (increase every 10 years) | **1.08** | 1.01 | 1.16 | **1.11** | 1.03 | 1.19 |
| Education | | | | | | |
| High School | **2.09** | 1.07 | 4.08 | **2.24** | 1.08 | 4.63 |
| Earned Some College Credits | 1.19 | 0.80 | 1.77 | 1.23 | 0.83 | 1.83 |
| College Degree | 1.00 | 0.72 | 1.39 | 1.05 | 0.75 | 1.45 |
| Registered to Vote | **1.71** | 1.10 | 2.64 | **1.65** | 1.05 | 2.60 |
| Income | | | | | | |
| $15,000 to just under $25,000 | 0.97 | 0.51 | 1.85 | 0.90 | 0.47 | 1.71 |
| $25,000 to just under $50,000 | 1.13 | 0.69 | 1.87 | 1.04 | 0.63 | 1.72 |
| $50,000 to just under $75,000 | 0.83 | 0.58 | 1.18 | 0.79 | 0.54 | 1.16 |
| $75,000 to just under $100,000 | 1.22 | 0.85 | 1.75 | 1.19 | 0.81 | 1.74 |
| $100,000 or more | 0.96 | 0.67 | 1.37 | 0.85 | 0.58 | 1.24 |
| Gender (Male) | **1.50** | 1.17 | 1.93 | **1.46** | 1.13 | 1.89 |
| Ethnicity (White) | 1.75 | 0.96 | 3.20 | 1.74 | 0.96 | 3.15 |
| Geographic Location | | | | | | |
| East | **0.65** | 0.47 | 0.92 | **0.69** | 0.49 | 0.97 |
| Central | **0.65** | 0.47 | 0.91 | **0.68** | 0.48 | 0.97 |
| West | **0.62** | 0.44 | 0.89 | **0.66** | 0.47 | 0.95 |
| Disaster Experience | **2.13** | 1.61 | 2.82 | **1.96** | 1.49 | 2.58 |
| N = | | | 1070 | | | 1059 |
| Degrees of Freedom = | | | 16 | | | 17 |
| Model Chi-Square = | | | 6.48 | | | 8.08 |

*Note*. Source: 2008 National Center for Disaster Preparedness Data (NCDP, 2008)
Odds ratios in bold are significant at the .05 level.
Underlined odds ratios in bold are significant at the .01 level.

In the 2008 NCDP cohort, analysis of self-efficacy, the mediating variable, revealed a strong indication respondents are two (*OR* = 2.14) times more likely to prepare-with-time for a major natural disaster in their community ($t = 4.78$, $p < .001$). In this equation, when examining the influence of self-efficacy on the demographic variables and the likelihood of the sample adults preparing-with-time for a natural disaster, the following variables were identified as statistically significant predictors: age (every 10 years), education, registered to vote, gender, geographic location, and previous disaster experience.

For every 10 years of age, an estimated 11% of respondents have a higher likelihood of being prepared-with-time for a major disaster in their community. Respondents earning a high school degree are two (*OR* = 2.24) times more likely to be in a higher category for being prepared-with-time for a natural disaster than are adult respondents who did not earn a high school diploma. Sample adults registered to vote are 65% more likely to be in a higher category for being prepared-with-time for a major disaster than adults not registered to vote. Male respondents are 46% more likely to be in a higher category for being prepared-with-time for a natural disaster in their community than are female survey respondents. Observing the effect of geographic location, adults living in the east, central, and western regions of the U.S. are less likely to be in a higher category for being prepared-with-time for a major natural disaster, 31%, 32%, and 34%, respectively.

The mediating variable, self-efficacy, as well as previous disaster experience strongly affects being prepared-with-time in the population ($t = 4.78$, $p < .001$). Sample adults with previous disaster experience are almost two (*OR* = 1.96) times more likely to be in a higher

category for being prepared-with-time than those respondents with no observable effects of self-efficacy and no previous disaster experience.

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