

SOCIALLY VULNERABLE POPULATIONS AND THE HURRICANE PREPARATION
DECISION PROCESS

By

MOLLY KAY MOON

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To my husband

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Abstract of Dissertation Presented to the Graduate School
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Molly Kay Moon

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Research in disaster has generally focused on whether a household is prepared or not for various types of disaster events, e.g., hurricane, flooding, etc. However, little has been written about why individuals choose to prepare or not prepare. This study fills a gap in the existing disaster literature by focusing on hurricane preparation intentions by socially vulnerable communities. Grounding the research in social cognitive theories moves the discussion beyond 'do' socially vulnerable communities prepare to one in which attention is given to why do they choose to prepare or not prepare for hurricanes. This study tests a model developed by Douglas Paton in New Zealand where he examined individual disaster preparedness intention and actions as it related to earthquakes. The same social cognitive constructs were examined in this research, but focused on socially vulnerable populations and hurricane preparation.

Using a cross-sectional design, two populations (vulnerable and non-vulnerable) were compared at one point in time in terms of differences on the outcome variable of hurricane preparation. Data from 153 households in Escambia County, Florida, were collected using a mail-out questionnaire. Correlation analyses and structural equation modeling were used to determine the effect of 11 different variables on the outcome

variable of hurricane preparation. Comparisons were made between the combined sample (n=153) and the two sub-population samples of vulnerable (n = 53) and non-vulnerable (n=100).

Results show a much less complex model than Paton's. In my model, there are three directional paths to disaster preparation. In the first path individuals go from risk perception directly to individual intentions with the result being hurricane preparations. A second path indicates risk perception leads to perceived control resulting in hurricane preparations. The final path individuals go from risk perception to perceived control to individual intentions through action coping.

Due to the small sub-samples, a model comparison between the two groups was not possible. However, correlation analyses indicate that the non-vulnerable population uses a much more complex decision process in deciding to prepare for hurricanes than the vulnerable population. The vulnerable sample appears to "react" by preparing and not contemplate what would happen if they did not prepare.

CHAPTER 1 INTRODUCTION

Distant Memories

The 2004 hurricane season is slowly becoming a distant memory to many Floridians who experienced one or more hurricanes. During 2004, Florida experienced one of its busiest hurricane seasons ever with four hurricanes occurring between August 13 and September 25 (Fig. 1-1). One or more of the hurricanes (Charley, Frances, Ivan and Jeanne) affected all 67 Florida counties (Kapucu, 2008).



Figure 1-1: The paths of the 2004 Florida Hurricanes. Source: National Weather Service/National Hurricane Center

Following on the heels of the 2004 hurricane season, 2005 was the most active on record and produced three hurricanes (Katrina, Rita and Wilma) that reached Category Five (Cutter et al., 2006) (Fig. 1-2). Millions watched the devastating images of New Orleans and the Gulf Coast struggle through the aftermath of Hurricane Katrina. The inadequate national and local response during the aftermath of Hurricane Katrina

resonated across the nation and brought to light the vulnerability that many of our communities face (Cutter et al., 2006).



Figure 1-2: 2005 Category 5 Hurricanes. Source: National Weather Service/National Hurricane Center

In the disaster literature, Blaikie, Cannon, Davis, and Wisner (1994) argue that vulnerability to natural hazards is not based on the event itself but rather social, economic and political processes that create the different conditions under which individuals have to face hazards. Studies have shown that racial and ethnic populations in the US are more vulnerable to natural hazard events due to “language, housing patterns, building construction, community isolation and cultural insensitivities” (Fothergill, Maestas, and Darlington, 1999, p. 156).

Historically, natural events such as floods, earthquakes, and hurricanes have caused millions of deaths. In many cases, it is not the event itself that causes human suffering and deaths, but the follow-on effects such as job loss and household displacement that impact socioeconomic processes within the human-environment system (Haque and Etkin, 2007). Mileti (1999) argues that we, as humans, must accept

responsibility for hazards and disasters. Human beings make the choices about where and how development will proceed. For example, development decisions made in New Orleans destroyed buffers between the city and the sea resulting in an increased vulnerability to flooding when major storms come inland (Steinberg, 2008). Technology cannot make the world safe from forces of nature. Effective disaster mitigation can take place only when this is understood. Mitigation could involve the modification of the hazard as well as reducing vulnerabilities. Unfortunately, the processes associated with vulnerability (social, economic and political) that determine the resilience of the community are rarely pursued in developing mitigation strategies (Cannon, 1994).

Hurricanes and Florida

Hurricanes are intense weather phenomena and can cause tremendous amounts of damage either through direct impact on a location or through after-effects such as flooding. The most destructive hurricane seasons in history occurred in 2004 and 2005 and four hurricanes directly impacted Florida in 2004 (Smith and McCarty, 2009). Charley made landfall on the southwest coast and caused extreme damage in Charlotte County. Frances and Ivan struck the southeast coast and caused flooding in Dade County. Ivan made landfall in the panhandle. According to the National Hurricane Center (2005), the storms were responsible for at least 47 deaths and \$45 billion in

damages (Smith and McCarty, 2009; Blake, Jarrell, and Rappaport, 2006).

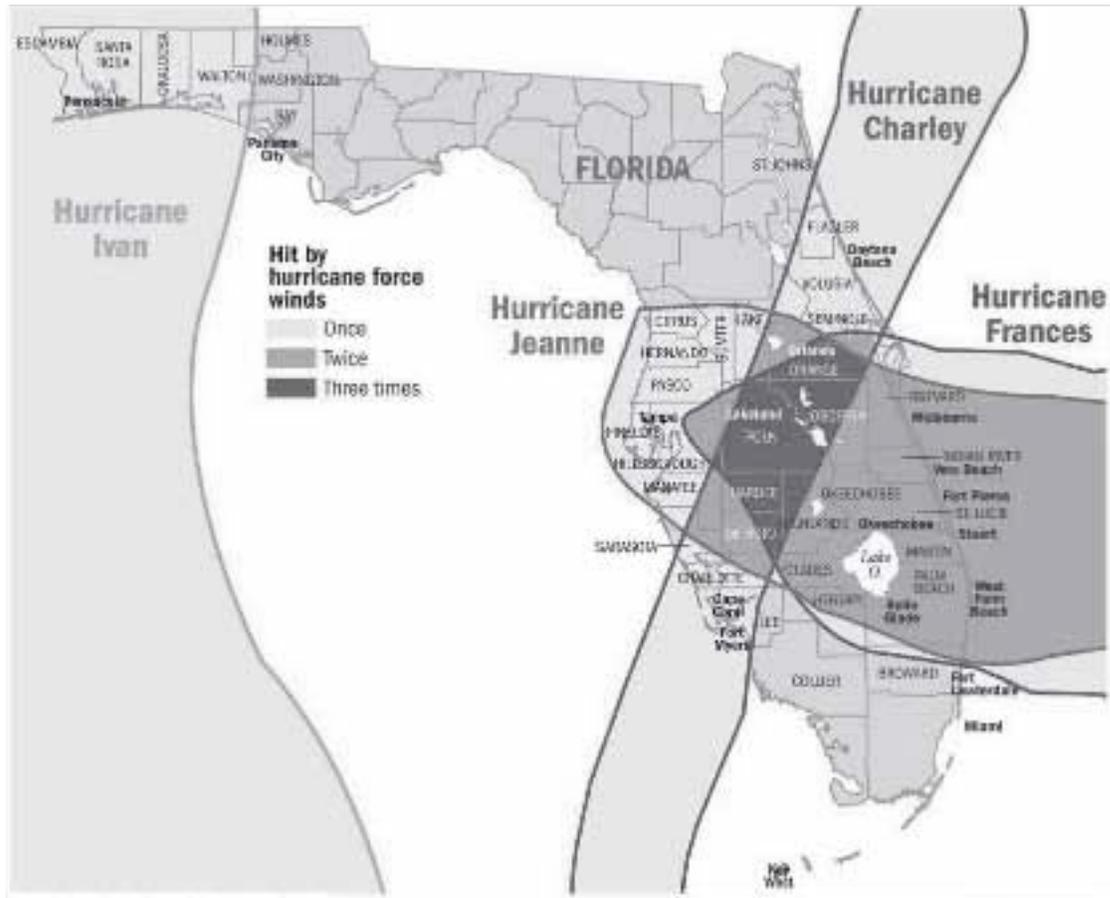


Figure 1-3: Paths followed by 2004 Florida Hurricanes. *Source:* National Weather Service/National Hurricane Center (Smith & McCarty, 2009)

The National Weather Service (NWS) provides the following information for the United States. (1) Fourteen out of the fifteen deadliest hurricanes were category three or higher. (2) Large death tolls were primarily a result of 20 feet or greater storm surge. (3) Inland floods caused by torrential rains resulted in four of the twenty costliest storms. (4) One-third of the deadliest hurricanes were category four or higher. In light of these facts, Florida is an ideal location to study the phenomena of hurricane preparation actions. Historically, Florida has experienced more hurricanes than any other state

(Table 3-1), 37 major hurricanes (Category 3 or above) and eight category 4 or 5 hurricanes.

Table 1-1: Hurricane strikes 1851-2006 on the mainland US coastline, and for individual states, including inland areas if effects were only inland portions of the state, by Saffir/Simpson category (Blake, Rappaport, and Landsea, 2007)

AREA	CATEGORY NUMBER					ALL	MAJOR HURRICANES
	1	2	3	4	5		
U.S. (Texas to Maine)	110	73	75	18	3	279	96
Texas	23	18	12	7	0	60	19
(North)	12	7	3	4	0	26	7
(Central)	7	5	2	2	0	16	4
(South)	7	7	7	1	0	22	8
Louisiana	18	14	15	4	1	52	20
Mississippi	2	5	8	0	1	16	9
Alabama	16	4	6	0	0	26	6
(Inland only)	6	0	0	0	0	6	0
Florida	43	33	29	6	2	113	37
(Northwest)	26	17	14	0	0	57	14
(Northeast)	12	8	1	0	0	21	1
(Southwest)	18	10	8	4	1	41	13
(Southeast)	13	13	11	3	1	41	15
Georgia	15	5	2	1	0	23	3
(Inland only)	9	0	0	0	0	9	0
South Carolina	18	6	4	2	0	30	6
North Carolina	24	14	11	1	0	50	12
(Inland only)	3	0	0	0	0	3	0
Virginia	7	2	1	0	0	10	1
(Inland only)	2	0	0	0	0	2	0
Maryland	1	1	0	0	0	2	0
Delaware	2	0	0	0	0	2	0
New Jersey	2	0	0	0	0	2	0
Pennsylvania (Inland)	1	0	0	0	0	1	0
New York	6	1	5	0	0	12	5
Connecticut	5	3	3	0	0	11	3
Rhode Island	3	2	4	0	0	9	4
Massachusetts	6	2	3	0	0	11	3
New Hampshire	1	1	0	0	0	2	0
Maine	5	1	0	0	0	6	0

Notes:

*State totals will not equal U.S. totals, and Texas or Florida totals will not necessarily equal sum of sectional totals. Regional definitions are found in Appendix A

*Gulf Coast state totals will likely be underrepresented because of lack of coastal population before 1900

The National Weather Service reports that although there has been an increase in overall activity, the number of strong hurricane landfalls has not increased. During the past 35 years in the United States, only a few category 4 or stronger hurricanes have made landfall. On average, a category 4 or stronger hurricane strikes the United States about once every seven years (Blake et al., 2007). The NWS is quick to note, however, that fewer hurricanes do not lessen the threat of disaster. As the NWS noted,

Hurricane Andrew, the second costliest hurricane in history, occurred in a year with below-average hurricane activity (Blake et al., 2007).

An analysis of hurricanes and landfall indicate that 40 percent of all US hurricanes and major hurricanes hit Florida and 83 percent of category 4 or higher hurricanes have struck either Florida or Texas. This, of course, can be attributed to the extensive coastlines that each state has. Unfortunately, these are the same coastlines that were experienced high population growth until 2008. Also, low hurricane experience levels are a problem and would likely impact preparation decisions by individuals.

Current Florida guidelines

Title XVII, Chapter 252 of the 2008 Florida statutes recognized the vulnerability of the state to a wide range of emergencies including natural, technological, and manmade disasters. It is the Legislature's intent "to reduce the vulnerability of the people and property of this state" (Title XVII, Chap 252.311). This statute established a state emergency management agency, the Division of Emergency Management. The statute further requires the development of state and local comprehensive emergency management plans. Specific elements in this statute are to: (1) establish guidelines for annual exercises for political subdivisions to respond to minor, major and catastrophic disasters; (2) assist political subdivisions in preparing and maintaining emergency management plans; and (3) review periodically political subdivision emergency management plans for consistency with the state comprehensive emergency management plan.

The State of Florida Comprehensive Emergency Management Plan 2004 (FL CEMP 2004) outlines specific responsibilities for counties, special districts, state

government and federal government. Counties are directed to: (1) coordinate emergency management needs for all municipalities within their counties; (2) implement a broad-based public awareness, education and information program designed to reach all citizens of the county; and (3) maintain an emergency management program that is designed to avoid, reduce and mitigate the effects of hazards (FL CEMP 2004). The state also has the responsibility to “maintain a broad-based public awareness, education and preparedness program designed to reach a majority of the citizens of Florida” (FL CEMP 2004, p. 14).

The guidelines and policies set forth by the state of Florida should serve as impetus for local government and emergency planners to develop comprehensive emergency plans. Local governments are required to submit their emergency management plans for approval (FL CEMP 2004). I reviewed emergency management plans from various counties. Some county plans are specific with detailed guidelines while others provide only general guidelines. A consistent element in the various plans is that individuals need to be encouraged to take responsibility for their own preparations. The next section explores the literature and research with regard to individual preparations.

Why and How do Individuals Prepare for Disaster?

Individuals living in risk prone areas have demonstrated limited knowledge and motivation to prepare for natural hazards (McIvor and Paton, 2007; Johnston, Bebbington, Lai, Houghton, and Paton, 1999; Lechliter and Willis, 1996; Rustemli and Karanci, 1999). A national study conducted for the American Red Cross in the immediate aftermath of Hurricane Katrina and Rita found: 1) People were no more prepared after Katrina and Rita than before; 2) few people prepared emergency kits; 3)

few had communication plans; 4) preparedness was approached with a detached sense of reality; 5) and individuals still lacked knowledge of preparation activities (American Red Cross, 2005). This was a national study and not focused on any specific type of disaster (natural or man-made). However, the researchers isolated results from areas that are hurricane prone, such as the south. Although the results from these areas reflected a slightly higher preparation awareness and activity level than those in other parts of the country, the Red Cross study described the American public as “ill-prepared” (American Red Cross, 2005, p. 3). Kapucu (2008) conducted a study to determine how prepared Central Florida households were for an emergency. His results reflected similar numbers to the earlier 2005 American Red Cross study and he concluded that households in Central Florida (Orange, Osceola and Seminole County) were ill prepared for emergencies (Kapucu, 2008).

There are many studies that have examined the level of preparedness of individuals and households, but only a few studies have examined why individuals prepare or choose not to prepare for natural hazards. The hazard literature lacks in-depth study of socially vulnerable individuals and social cognitive constructs as they relate to individual motivations, individual intention, networks and preparedness actions. Hazard information does not determine action. Rather, how individuals perceive this information in the context of their own life experiences determines action. Researchers have argued that risk perception is “culturally and socially constructed, and social groups construct different meanings for potentially hazardous situations” (McIvor and Paton, 2007, p. 80).

State and local leaders continue to focus on dissemination of information as a major form of disaster preparation. It is often assumed that the mere dissemination of disaster preparation information will encourage individuals to take preparedness actions (Paton, 2003; Smith, 1993). However, researchers have found that, despite the increase in disaster hazard education and information dissemination, preparation levels remain low (Paton, 2003; Ballantyne, Paton, Johnston, Kozuch, and Daly, 2000; Duval and Mulilis, 1999). In fact, Ballantyne et al. (2000) found that increased public education reduced preparation levels as individuals tended to transfer responsibility from self to others, supporting their decision to not prepare. A more thorough examination of why and how individuals prepare for disaster could provide relevant and useful information to state and local leaders as they develop and implement community disaster preparedness and mitigation plans.

Research Questions

This current study will examine hurricane preparation actions by socially vulnerable populations in Florida. A thorough discussion of social vulnerability and disaster is provided in Chapter 2. However, in context of my research, I have decided *a priori* to use specific indicators (age, income and disability) to designate households as vulnerable or non-vulnerable. Also, instead of focusing on natural disasters in general, my research focuses on hurricane preparations specifically.

I use two theoretical frameworks in my research. The first is the transactional model of stress and coping (Wenzel, Glanz, and Lerman, 2002) provides the theoretical basis for Paton's social cognitive hazard preparation model (Paton, 2003). I also incorporated constructs from social network theory to examine the role of social networks in preparedness decisions. My research will focus on hurricane preparedness

actions by disadvantaged individuals and their motivations to prepare or not prepare for hurricanes. I pose four questions.

1. How do socially vulnerable populations perceive risk as it relates to hurricane preparation?
2. Do socially vulnerable populations prepare for hurricanes? Of those who prepare, what motivates them to do so?
3. What coping resources (if any) do vulnerable populations use?
4. To what extent is intention to act linked to preparedness?

Summary

This study seeks to fill a gap in the existing disaster literature by focusing on disaster preparation intentions by socially vulnerable communities. Whereas research conducted by Douglas Paton in New Zealand examined individual disaster preparedness intention and actions as it related to earthquakes, this study will focus on the same social cognitive constructs but will focus on socially vulnerable communities and hurricanes in Florida. Grounding the research in social cognitive theories moves the discussion beyond 'do' socially vulnerable communities prepare to one in which attention is given to why do they choose to prepare or not prepare for hurricanes.

This dissertation is organized around five chapters. This introductory section serves as Chapter 1. Chapter 2 provides the literature review and theoretical constructs. Chapter 3 describes the research design and methodology employed in this study. Chapter 4 analyzes the information as a product of our primary data collection activities and examines the data in the context of our key research questions. Finally, Chapter 5 presents conclusions, final remarks and direction for future research.

CHAPTER 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter presents background information for this research. The first section reviews the concepts of disaster and social vulnerability. The second section describes the theoretical frameworks used in this research. Thorough discussions of social cognitive theory, transactional model of stress and coping and social network theory are presented. I conclude with a synthesis of the concepts and theories and my research hypotheses.

Disasters and Social Vulnerability

What is Disaster?

Numerous scholars have tried to answer the question...what is disaster? Quarantelli (1998) challenged several disaster researchers to define this concept. A review of the responses Quarantelli received indicates the answer is linked to the academic background of the scholars. Cutter (2005) argues that risk, hazards and disaster research communities do not understand each other's "science." She questions how social science perspectives can be strengthened if researchers are unaware of the totality of the social science perspectives. One truism that is evident throughout the literature is that no one definition applies in every situation. Quarantelli (1987) argues there is little hope in trying to devise a useful definition that is universally accepted (Perry, 2006). As a result, there is some concern about the "intellectual health of the field" (Quarantelli, 1985, 1995; Oliver-Smith, 1999). However, Oliver-Smith (1999) argues that disaster research does not necessarily have to have definitional consensus. There are many academic fields that encounter the same issue. A

definitional debate is fruitful because it encourages exploration of new dimensions of disaster (Oliver-Smith, 1999).

Quarantelli (2005) believes that the audience who will be exploring the concept is key to the definition of disaster. Sociologists focus on “sociological context and tradition, attending in particular to delimiting the phenomenon to become a focus for the processes of social science” (Perry, 2006, p. 6). Research about the impact of bombing in Europe and Japan during World War II focused on social disruption caused by the event rather than the event itself. Three interrelated definitions emerged: (1) pattern of interrupted stability; (2) adaptation to the interruption; and (3) resumption of behavior in a stable period (Perry, 2006). The system/descriptive approach to disaster is similar to the interrelated definitions provided by Perry. Porfiriev (1998) says a disaster is an event that destabilizes and disrupts the connections of a social system, results in destruction, and overloads physical and psychological systems, making it necessary for extraordinary response measures.

Gilbert (1998) approached Quarantelli’s question theoretically and outlined three main paradigms: (1) disaster as a duplication of war in that an external agent disrupts the social system; (2) disaster as vulnerabilities in the social order; and (3) disaster as uncertainty—disruption of systems in society. Disaster as duplication of war explores the linkages between external agents (arms and enemies) and communities are through conflict (Gilbert, 1998). The exploration of this concept emerged in the United States during the Cold War when United States government institutions funded research exploring reactions of people to possible air raids. The more contemporary paradigm eliminates the notion of “agent” and examines disaster linkages to local communities

through social vulnerabilities (Gilbert, 1998). This change in paradigm shows how disaster research is moving from studying disaster as an effect to disaster as “a result of the underlying logic of the community” (Gilbert, 1998, p. 14). Gilbert’s (1998) final paradigm of disaster as uncertainty considers three points: Uncertainty results from a lack of defined causes and effects of disasters; modern communities are growing in complexity that may increase uncertainty; and modern communities are finding it difficult to define disaster situations.

Dombrowsky (1998) argues that defining the social processes of disaster is different than defining disaster. He uses the example of how the German Red Cross defines disaster as an “extraordinary situation in which the everyday lives of people are suddenly interrupted and thus protection, nutrition, clothing, housing, medical and social aid or other vital necessities are requested” (Katastrophen-Vorschrift, 1988, p. 2 as cited by Dombrowsky, 1998). Similar to this, the United States has also established a set of constructs that formally define disaster. Codified in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, a major disaster:

... means any natural catastrophe (including hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this chapter to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship or suffering caused thereby (FEMA 2003).

The hazards-disaster tradition comes from geographers and geophysical scientists. This perspective focused on the hazard—earthquakes, tornadoes, floods and so forth—and understanding the hazard (Perry, 2006). Quarantelli (2005) argues that focus on the event itself may limit the analysis of disasters because there are some

disasters, such as famine or computer system failures, that have no identifiable originating agent. Carr (1932) suggests that the collapse of cultural protections constitutes a disaster. Not every event is catastrophic. If a hurricane hits and the community survives intact, there is no disaster (Carr, 1932). In the broad context, Mileti (1999) emphasizes that disasters flow from overlaps of the physical, built, and social environments, but that they are “social in nature.” In defining and studying disasters, one should look first at social systems, since they (not the agent) are the real source of vulnerability (Quarantelli, 2005). The issue is not disaster as events, but instead human “vulnerability (and resilience) to environmental threats and extreme events” (Cutter, 2005, p. 39).

Based on the idea that disaster is a social phenomenon, Quarantelli (2005) emphasizes that disasters are based on vulnerabilities caused by changes in the social structure or system, and not on the event itself. Oliver-Smith (1998) also espouses a social definition of disaster, placing disruption and vulnerability within the social structure. Oliver-Smith (1998) also takes an ecological perspective of disaster. He suggests the need for an understanding of the relationship between society and environment. The focus is on how society adapts to the total environment to include the natural, modified and constructed contexts of which the community is a part (Oliver-Smith, 1998). Oliver-Smith (1998) defines disaster as:

... a process/event involving the combination of potentially destructive agent(s) from the natural, modified and/or constructed environment and a population in a socially and economically produced condition of vulnerability, resulting in a perceived disruption of the customary relative satisfactions of individual and social needs for physical survival, social order and meaning (p. 186).

In line with the social construction of disaster, Dynes (1998) defines disaster as events when norms fail and communities utilize extraordinary efforts to protect their social resources. Of note, Dynes (1998) uses community as the social unit that provides an initial conceptualization of disaster. His reasoning is that the community is a social unit that has cross-national and cross-cultural applicability, and it has the capacity and resources to respond to a disaster. He argues that the community is a multi-organizational system, and, as such, the location of social action is the community (Dynes, 1998). Dynes (1998) synthesizes his concept of disaster as being a “normatively defined occasion in a community when extraordinary efforts are taken to protect and benefit some social resource whose existence is perceived as threatened” (p. 113).

Kreps (1985) describes the social constructs of disaster as alternative structural forms that occur before, during and after events. He argues that the basic sociological constructs such as collective behavior, formal organizing, and social networking can be used to describe disasters as social constructions (Kreps, 1998). Quarantelli (2005, p. 339) argues there are two fundamental ideas in defining disasters: “(1) disasters are inherently social phenomena. It isn’t the hurricane or storm surge—those are the source of damage; (2) disaster is rooted in the social structure and reflects the processes of social change.”

Rosenthal (1998) compares the “traditional” world of disasters to the “contemporary” world of disasters. He argues that the traditional world of disasters is a world of “un-ness.” Disaster characteristics are negative. Disasters are unexpected, unprecedented and unmanaged phenomena derived from natural processes or events

that are uncertain. Human victims are unaware and unready. Simply put, disasters in North America are “unscheduled events” (Hewitt, 1998). The contemporary world of disasters involves linkages, chains and processes. Compared to the traditional view, the dominant view about contemporary disasters is that disasters have consequences. It is the “disaster after the disaster” that provides a new dimension to defining disaster (Rosenthal, 1998). Rosenthal (1998) indicates the process-oriented approach is defined by the interrelationship between characteristics, conditions and consequences of disasters.

Social Vulnerability

The one common theme in all of the definitions and models of disaster has been the focus on vulnerable groups in society. The social science community agrees that many factors influence social vulnerability. Vulnerable communities have been identified based on nominal variables such as gender, race, or socioeconomic status that stratify wealth, power and status (Mileti, 1999). Class, caste, and immigration status have also been included as factors (Bolin, 2006). Special needs categories such as physically or mentally challenged, homeless, transients, non-English speaking immigrants and seasonal tourists have also been included in the definition (Cutter, Brouff, and Shirley, 2003). Some researchers have expanded the definition to include factors that are not as easily defined. Cutter et al., (2003) go further and include lack of access to resources, limited political power and representation, social capital, beliefs and customs, age of built environment, and infrastructure and lifelines.

There is disagreement, however, about the specific variables used to represent these concepts (Cutter et al., 2003). Cutter (2005) submits that disaster studies have spent too much time defining the phenomena under study rather than researching the

vulnerabilities (and resiliency) to environmental threats and extreme events. The linkages and interdependencies between human systems, natural (or environmental) and technological systems and the built environment define vulnerability (Cutter, 2005). While each can be studied independently, it is the interaction that is important in understanding vulnerability. Cutter (2005) states, "...the whole (vulnerability) is greater than the sum of its parts (human systems, the built environment, technological systems, natural systems)" (p. 40).

Cannon (1994) argues that vulnerability is a complex set of characteristics based on an individual's place in society and it is a combination of these factors that cause hazards to have varying degrees of impact. Wisner et al. (2004, p 11) defines vulnerability as "...*the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard*" (Italics in original).

Researchers are moving past the nominal variables as measures of vulnerability and are researching vulnerability as a process.¹ Oliver-Smith (1996) indicates that current research emphasizes political and economic inequalities as well as processes of racial and ethnic marginalization. Social vulnerability should be understood in terms of social, economic, political and cultural processes that make the society vulnerable (Haque and Etkin, 2007). Cannon (1994) states the processes are not necessarily those that may generate differences in wealth, resources or power. "The vulnerability concept is a means of 'translating' known everyday processes for the economic and political separation of people into a more specific identification of those who may be at

¹ Nominal variables refer to age, race, ethnicity, gender, disability, housing type, etc.

risk in hazardous environments” (Cannon, 1994, p. 17). Bolin (2006) argues that factors in social processes such as race, class and ethnicity affect a community’s legal and political rights and access to resources and livelihoods. Further, a process model of vulnerability proposed by Wisner et al (2004) linked three elements, root causes, dynamic pressures and unsafe conditions.

Haque and Etkin (2007) suggest there is a link between social and political vulnerability and the extent to which a community treats hazards through prevention, mitigation, preparedness, response and recovery. Some scholars have made a distinction between passive and active vulnerability. Passive vulnerability is based on the amount of resources available to community members and active vulnerability is based on the ability of community members to change their situation (Bradshaw, 2004). Viewing vulnerability through the social capital lens, Murphy (2007) argues that vulnerability may be increased or decreased due to place-based or interest/kinship-based communities.

Ethnographic data from Hurricane Andrew informed a discussion of race, class, gender and poverty. Data showed that political and economic processes created vulnerable groups, especially among Caribbean immigrant and African American communities (Bolin, 2006). The Chicago heat wave of 1995 serves as an example of social vulnerability. Fatalities increased because community residents were elderly. Their fear of crime influenced their decision about responding to community workers who came to help them and they would not leave their apartments to go to shelters or cooler areas. In researching Hurricane Mitch and its impact on Central American republics, Comfort et al. (1999, p.41) found that many of the residents were aware of

their vulnerability to natural hazards but “none were aware of the degree to which cumulative economic and environmental changes had set the stage for a major disaster.”

Gilbert (1998) suggests that social and political vulnerability is based on a community’s lack of “social and political boundaries” (p. 15). Vulnerability can be defined as a type of “political ecology” in that disasters center on the relationship between the human population and “socially generated and politically enforced productive and allocative patterns, and its physical environment” (Oliver-Smith, 1998 in Tierney, Lindell, and Perry, 2001, p 21). In *At Risk (1994)*, Blaikie and his co-authors develop a framework that characterizes disasters as involving the convergence of socially produced vulnerability and exposure to hazards. Vulnerability to disasters results ultimately from political, economic, and ideological/cultural processes that put individuals and groups at risk by institutions that fail to provide adequate protection.

Contributions over the past 20 years have examined the importance of socioeconomic factors in household preparedness decisions. All things being equal, households with higher socioeconomic status are better prepared for disasters than financially less well off households and ethnic minorities show a low propensity to engage in emergency preparedness activities (Tierney et al., 2001). Smith (1996) implies that vulnerability is based on a measure of risk combined with the social and economic abilities of a community to respond to a hazard event. Further, resilience and reliability are factors in determining vulnerability. Resilience refers to a community’s capacity to absorb and recover from a hazard event and reliability describes how effective a community’s preparation efforts are (Smith, 1996).

Tierney et al. (2001) state that hazard vulnerability, along with the inability to prepare or respond, may be related to social and economic inequality. However, Hewitt (1998) argues that the vulnerability paradigm involves the idea of voluntary and involuntary risks. Choices are made by groups or persons to share some or all of the risk (Hewitt, 1998).

Theoretical Framework

This section presents the theories that were used in the development of the hypothesized research model. Specifically, this section explores three theories: social cognitive, transactional model of stress and coping and social network. The section further discusses Paton's (2003) proposed social-cognitive preparation model and explains how the model was used to develop the hypothesized research model employed in this study.

Social Cognitive Theory

Social cognitive theory (SCT) addresses many of the psychosocial constructs that explain why people make the choices they do. The theory dates back to 1962 when it was developed to understand social learning and personality development (Baranowski, Perry, and Parcel, 2002). The theory has evolved over time and now includes constructs that explain the human-decision making process. Social cognitive theory's premise is that human consciousness is the critical factor of mental life and is what makes life manageable. This involves accessing information, processing information, and constructing and determining courses of action (Bandura, 2001).

Social cognitive theory is used extensively in the development of health behavior modification programs. The same approach is applicable to disaster preparedness research because the SCT used in health research examines the same decision-making

processes used by individuals, be they health behavior decisions or disaster preparedness decisions. Therefore, disaster researchers have used the same concepts found in the original SCT. However, they have included additional variables, such as problem-focused coping, self-efficacy, and sense of community, to construct a more comprehensive social-cognitive model of natural hazard preparedness (Paton, 2003).

Since its conception in the 1960s by Albert Bandura, SCT has evolved from a theory of pre-determined human behavior to one that recognizes that the individual has control over his/her own life (Baranowski et al., 2002). Bandura (2001) further describes social cognitive theory as a model of interactive agency where people are more than onlookers within the environment. People are agents of experiences. "The sensory, motor, and cerebral systems are tools people use to accomplish the tasks and goals that give meaning, direction and satisfaction to their lives" (Bandura, 2001, p 4). Human agency is comprised of core features such as intentionality, forethought, self-reactiveness and self-reflectiveness, concepts that are explained more fully below. These concepts directly relate to disaster preparedness. Human agency is a critical factor in an individual's disaster preparedness decision-making process.

According to Bandura (2001), intention is a representation of future courses of action. It is not merely the expectation that something will happen. It is a commitment to bring the intention to action. Intention is a representation of an action that is to be performed. Intentions and actions are separated by time. Therefore, intentions may be viewed as motivators that affect future actions (Bandura, 2001). Similarly, Paton (2003) describes the link between motivators and preparation as intentions. He uses social cognitive concepts of outcome expectancy, self-efficacy, problem-focused coping

and response efficacy as the intention formation phase in his model. Intentions are linked to preparation through a number of concepts (see Figure 2-2) (Paton, 2003).

Forethought is another extension of the decision-making process. Forethought is what motivates individuals and will guide their actions in regards to future events. As Bandura (2001) explains, future events do not exist and therefore cannot be causes of current motivation. However, if future events are represented cognitively, they can be transformed into motivators (Bandura, 2001). As Bandura (1986) states, "People construct outcome expectations from observed conditional relations between environmental events in the world around them, and the outcomes given actions produce" (p. 7).

Bandura's (2001) self-reactiveness concept links intentions to disaster preparations in Paton's (2003) model. Not only must individuals make decisions to prepare and take courses of action, they must have the ability to act on those decisions. Self-reflectiveness allows individuals to evaluate their motivations and actions in regard to their decisions. Bandura (2003) states that the factors that guide and motivate individuals are rooted in the individual's belief that he/she has the power to produce effects by their actions. Efficacy plays a central role in human agency. People choose what they want to pursue, decide how much effort they want to put into their actions, and decide how long to continue with their actions (Bandura, 2003).

In summary, the SCT model provides a framework to examine the decision-making processes individuals use in deciding to prepare or not for a natural hazard. Do individuals rely on their beliefs and experiences when making disaster preparation

decisions? Do individuals consider their abilities and capacity to take actions prior to making preparation decisions?

Transactional Model of Stress and Coping

Contemporary research on stress and coping has evolved from a concept of defense and unconscious processes. Coping is now looked at through a cognitive behavioral lens (Folkman and Moskowitz, 2004). Lazarus' (1966) seminal work emphasized cognitive and behavioral responses to how people manage problems and stress found in everyday life. In the 1970s, Folkman and Lazarus (Folkman and Lazarus, 1980; Lazarus and Folkman, 1984) further defined coping as "thoughts and behaviors that people use to manage the internal and external demands of situations that are appraised as stressful" (Folkman and Moskowitz, 2004, p. 746).

Numerous measures have been created to analyze coping behaviors. As a result, many studies have relied on the prevailing cognitive approach. An examination of numerous studies indicates that stress and coping are social cognitive constructs that applicable to numerous situations. In fact, Lazarus and Folkman (1984) argue that coping is a process directly linked to a situation or condition and the individual's resources (Folkman and Moskowitz 2004). Lazarus and his colleagues developed a theory of psychological stress and coping. The Transactional Model of Stress and Coping is a framework for examining the process of coping with stressful events (Wenzel et al., 2002) (Fig. 2-1). The theory identifies cognitive appraisal and coping as factors that influence person-environment relations and their near-term and long-range outcomes (Folkman et al, 1986).

The process starts with an initial appraisal of events or stressors that could cause harm or loss. Folkman and Moskowitz (2004) indicate that the emotions associated

with this initial appraisal are often negative and intense. The negative, intense emotions may often regulate or interfere with forms of coping. Thus, reappraisal is conducted as one works through control over outcomes and emotions (Folkman and Moskowitz, 2004). The two-appraisal process is illustrated in the model provided by Wenzel et al. (2002) (Fig. 2-1).

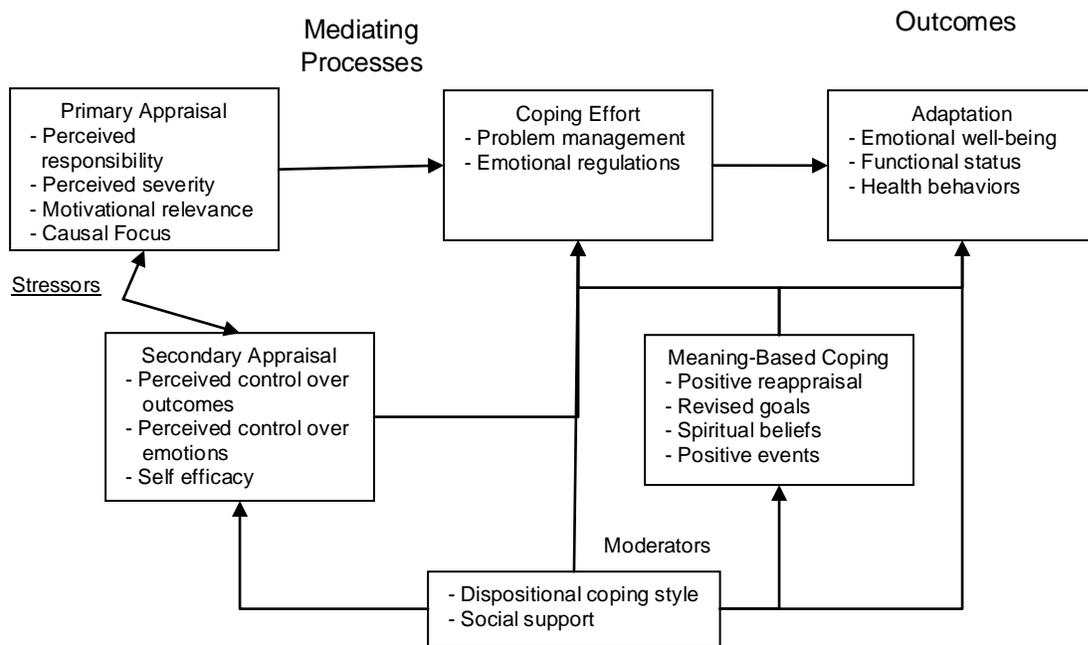


Figure 2-1: Transactional Model of Stress and Coping (Wenzel et al., 2003)

Stressors are defined as internal or external environmental demands that may impact physical or psychological well being (Wenzel et al., 2002). As explained by Wenzel et al. (2002), when an individual is faced with a stressful situation, the individual evaluates the threat (primary appraisal) as well as their ability to cope with the situation (secondary appraisal).

Coping strategies mediate primary and secondary appraisals. Lazarus and Folkman (1984) define coping as a process that focuses on what an individual thinks or does in response to stressful situations. Additionally, they argue that coping is

contextual because it is influenced by a person's appraisal of the situation and available resources for managing the situation (Lazarus and Folkman, 1984). Wenzel et al. (2002) describe problem-management strategies for coping as active coping, problem solving and information seeking. In contrast, emotion-focused coping is directed at changing an individual's feelings or attitude about the stressful situation (Wenzel et al., 2002). Generally, the model predicts that problem-focused strategies are better when the stressor is changeable and that emotion-focused strategies may be used when the stressor is unchangeable or all problem-focused strategies have been exhausted (Wenzel et al., 2002).

Most coping research has focused on how people cope with events that have happened in the past or are occurring. A new development in coping research is what is referred to as future-oriented proactive coping (Folkman and Moskowitz, 2004). Aspinwall and Taylor (1997) state, "Proactive coping consists of efforts undertaken in advance of a potentially stressful event to prevent it or modify its form before it occurs" (p. 417). They argue that it can be differentiated from coping and anticipatory coping in three ways (Aspinwall and Taylor, 1997). First, it involves acquiring resources to prepare in general--not prepare for a specific stressor. Second, proactive coping requires different skills such as the skill to identify a stressor before it occurs. Third, skills that may be successful for proactive coping may not be adequate for coping or anticipatory coping.

Aspinwall and Taylor (1997) examined ways in which people cope in advance to negate or alleviate the stressors of future events, such as a pending lay-off or results of a medical test. There are five components to the proactive coping process: (1) Building

resources that can be used to offset projected losses; (2) recognition of potential stressors; (3) initial appraisal of stressors; (4) preliminary coping efforts; and (5) use of feedback about one's efforts (Aspinwall, 2003).

Folkman and Moskowitz (2004) argue that future-oriented or proactive coping deserves additional attention. However, they also state that we need measures that can tap into future-oriented coping methods so that we can examine how individuals cope with adverse impacts of future events. In summary, stress and coping can be researched and examined in many different ways. However, approaches to understanding stress and coping treat coping as a complex, multidimensional process that is sensitive to the environment and its demands (Folkman and Moskowitz, 2004).

Social Network Theory

Social network theory is the study of relationships between individuals and formal or informal groups and how those relationships affect behavior. For example, an individual's relationships with a formal organization, such as a church or community organization, may influence how he/she copes with a stressful event. An informal network of family and friends might also influence the individual's coping.

Granovetter (1973, 1983) articulates the differences between strong and weak ties in his examination of network theory. He argues that individual behavior and action depend on whether relationships are based on strong ties or weak ties (Granovetter, 1973, 1983). In his analysis, Granovetter (1973) refers to the "strength" of weak or strong ties. Strength is defined as a linear model combining "the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter, 1973, p. 1361). The more one interacts with someone, the stronger the tie will be (Homans, 1950; Granovetter, 1973). It is also

hypothesized that the more homogenous the individuals, the stronger the tie will be. Therefore, family and close friends may be considered strong ties.

Weak ties, on the other hand, are those that may be nothing more than an acknowledgement of an individual, such as an “acquaintance” at work. Granovetter (1973, 1983) argues that weak ties can have a tremendous impact on individual behavior because there are a large number of them. Research has shown that the fewest people were reached through strong ties (family and friends), whereas the most people were reached through weak ties (acquaintances) (Rapoport and Horvath, 1961; Granovetter, 1973). The weak tie network is generally presumed to be larger than the strong tie network, thus providing additional resources. How would weak or strong networks influence disaster preparedness decisions? “Weak ties provide people with access to information and resources beyond those available in their own social circle; but strong ties have greater motivation to be of assistance and are typically more easily available” (Granovetter, 1983, p. 209).

Let us now consider how strong ties and weak ties may affect a vulnerable community. Peter Blau (1974) argues that class structure lends itself to creating groups of individuals based on homogeneity. That is, individuals will choose to interact with like individuals. Blau (1974) argues that the lower one’s class status the greater likelihood they depend on strong ties. In a study conducted in Philadelphia, Ericksen and Yancey (1977) concluded that the “structure of modern society is such that some people typically find it advantageous to maintain strong networks and we have shown that these people are more likely to be young, less well educated, and black” (p. 23). They found strong networks to be linked to economic insecurity and lack of social services

(Ericksen and Yancey, 1977). Other studies have demonstrated the same point (see Stack, 1974 and Lomnitz, 1977). Economic pressures present particular challenges to a vulnerable population. Strong ties are evident because the vulnerable population depends on the reciprocity of close friends and families for support during challenging times (Granovetter, 1983).

Weak ties are an important resource. As Granovetter (1973) explains, the increased number of weak ties allows for more information dissemination. Vulnerable communities may have to depend on a large, weak-tied network to ensure they receive the necessary information to make disaster preparation decisions. As mentioned above, the strong tie network is based on homogeneity. Therefore, the information flow may not be as extensive. A larger weak tie network may result in increased resources and information available for disaster preparation decisions.

A Proposed Social-Cognitive Preparation Model

Douglas Paton of the University of Tasmania in Australia recognized the need to understand the “reasoning and judgment that underpin decisions regarding disaster preparedness” (Paton, 2003, p. 210). Using a psychological perspective, he has developed and proposed a disaster preparedness social cognitive preparation model (Paton, 2003) (Fig. 2-2). Paton’s (2003) model draws from social cognitive theory and stress and coping theory.

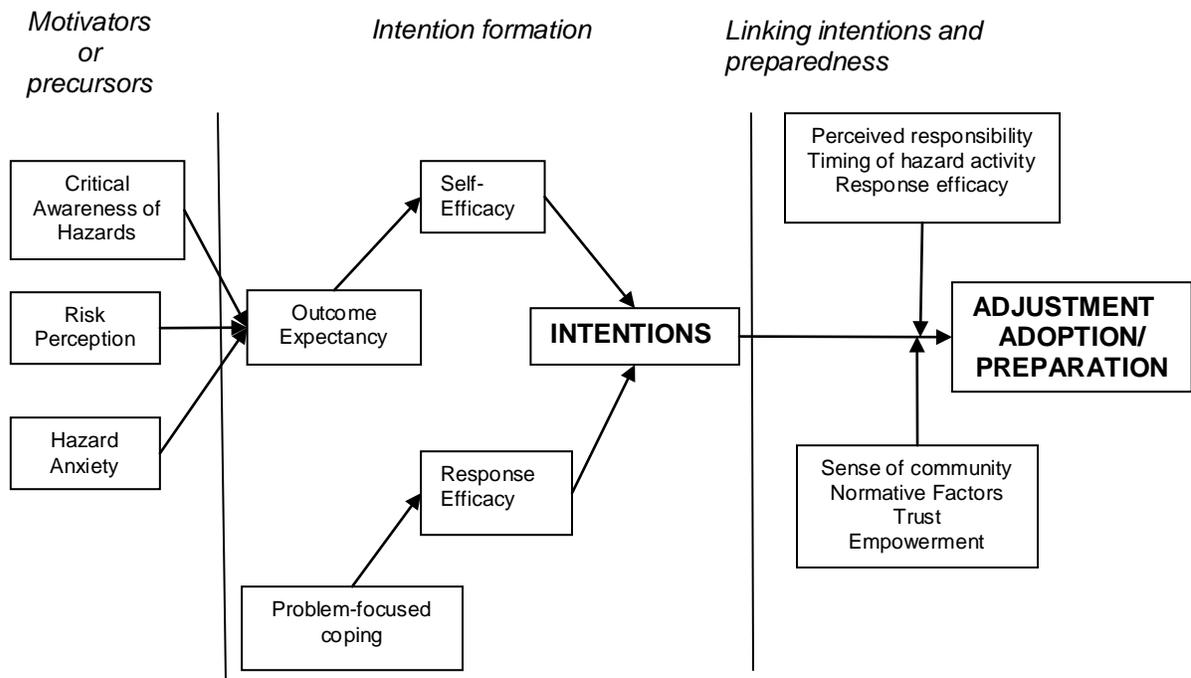


Figure 2-2: Paton's Proposed Social-Cognitive Model (2003)

Several models of protective behavior from the research about health behaviors influenced Paton (2003). His model comprises three phases (see Figure 2-2). The first phase contains the precursors or what motivates individuals. The second phase links the initial motivation to intention formation. The third phase links intentions to actual preparations (Paton, 2003).

The health protective behavior literature indicates that risk perception is a valid precursor variable. Paton (2003) argues that other attributes may also influence intention. Thus, the variables of critical awareness and hazard anxiety are included in his framework (Paton, 2003). Critical awareness is the extent to which people discuss and think about a particular hazard. Only when an individual perceives a hazard as critical will he/she be motivated to take action (Paton, 2003). Paton (2003) further

states that a certain amount of anxiety is associated with a hazard because natural hazards are unpredictable and may cause extensive destruction.

Consistent with social-cognitive approaches, Paton's (2003) model shows that individuals will decide if their actions can, in fact, mitigate the hazard once they are motivated to think about a threat. Thus, linking outcome expectancy to intentions is a function of self-efficacy (Paton, 2003). Response efficacy describes perceptions as they relate to availability of resources. Problem-focused coping might encourage individuals to confront the problem. However, if they do not believe they have the resources to cope, they may not act on the problem (Mulilis and Duval, 1995; Paton, 2003).

Finally, Paton (2003) includes additional variables that may influence the link between intentions and preparations. Variables like sense of community and perceived responsibility are moderating factors that may contribute to or affect an individual's decision to prepare or not prepare.

Research Concepts and Hypothesized Model

Disaster

Although researchers tend to define disaster in many different ways, there is a common theme in their discussions. Researchers agree that vulnerability to the specific type of event and resilience to the event are factors that may define an event as a disaster whether it is a natural or man-made disaster (Cutter, 2005; Rosenthal, 1998; Gilbert, 1998). Vulnerability and resiliency are not the same for every type of disaster, but most studies focus on one type of event, such as an earthquake, wildfire, hurricane, or terrorism.

My research examines hurricane preparation decisions. Hurricanes are one of several naturally occurring weather phenomena in Florida. Hurricanes come with warnings and warrant specific preparation actions. I chose to examine hurricane preparation actions for this reason. Individuals make decisions about the extent of their preparation actions and I intend to examine the decision processes that they use.

Social Vulnerability

The discussion about social vulnerability has focused on examining political, economic and cultural processes that create socially vulnerable populations (Tierney et al., 2001; Blaikie, 1994; Oliver-Smith, 1996). Although many researchers discuss vulnerability as a process, their discussions often lead back to demographic and socioeconomic factors as precursors to vulnerability. The challenge is to determine the specific variables that represent these processes. Measuring social vulnerability as a process is difficult. Therefore, researchers tend to categorize vulnerability based on specific characteristics (Cutter et al., 2003).

Cutter et al. (2003) attempted to measure social vulnerability by creating a social vulnerability index. The index uses 11 independent factors derived from demographic, socioeconomic, and built-environment information for an area. Cutter et al.'s (2003) index has been used to identify areas (state, county, census block) as vulnerable. However, I have not found any research where it has been used to measure vulnerability at the household level.

My research examines the household decision process as it relates to hurricane preparations. Therefore, I chose to use the characteristics of age, income and disability to define a vulnerable or non-vulnerable household. These are characteristics commonly used in disaster studies to define vulnerability. Additionally, Florida statutes

identify the elderly and disabled as populations requiring specific preparation actions in regards to emergency management (FL CEMP 2004). A more extensive discussion of age, disability and income is provided in Chapter 3.

Hypothesized Model

I use a hybrid of Paton's proposed social-cognitive preparation model is being adapted to examine my own hypotheses. Similar to Paton's model, the proposed model includes social cognitive variables as well as variables drawn from the transactional model of stress and coping. The model examines similar moderators to those proposed by Paton (2003). Paton used his model to study earthquake preparations, and I will test Paton's model with regard to hurricane preparations.

A primary departure from Paton's model is the inclusion of social networks as a possible link between intentions and preparation in the hypothesized model. The goal of this research is not to analyze the formal and informal networks that individuals may be part of, but the goal is to determine whether formal or informal networks affect preparation decision processes. The addition of strong and weak social networks as mediating variables in Paton's model may improve the explanatory power of the model.

Finally, Paton's research was conducted with general populations in different communities and did not make a distinction among various sub-populations, e.g., vulnerable or non-vulnerable. It has been argued that there is a difference in preparation levels and preparation decisions based on vulnerability. My research will test the model on the two sub-populations of vulnerable or non-vulnerable households to determine if, in fact, there is a difference in their decision-making process and hurricane preparations.

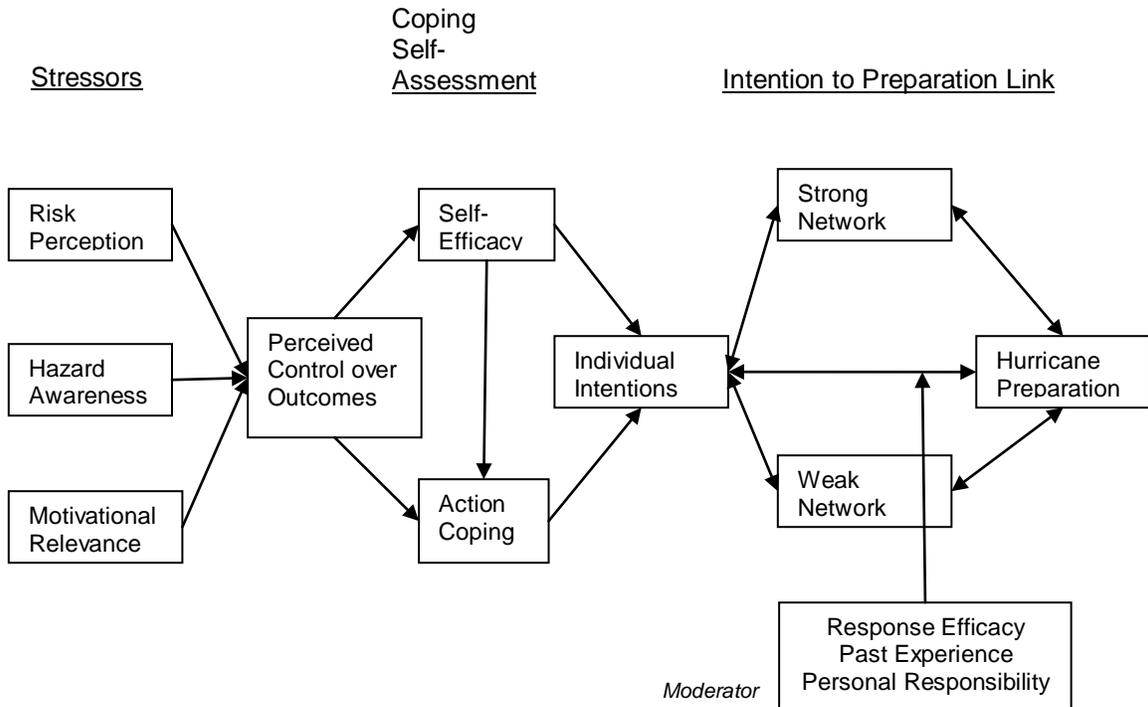


Figure 2-3: Proposed hypothesized model.

Therefore, my research will examine the hurricane preparation decision process by testing Paton’s proposed social-cognitive model on vulnerable and non-vulnerable populations. The following hypotheses are presented:

H1: The causal pathways found in Paton’s social-cognitive model for earthquake preparation decisions will be the same for the hurricane preparation decision process.

H2: Strong and weak social networks added as a link between intentions and hurricane preparations increase the explanatory power of the model.

H3: Vulnerable and non-vulnerable populations differ in their hurricane preparation decision process

CHAPTER 3 METHODOLOGY

This chapter presents the methods and scientific reasoning used in this research. This study measures attitudes toward disaster preparation. Included is a discussion of the conceptual framework linking variables, units of analysis, site selection, sampling framework, data collection, and the overall research design used in this study.

Conceptual Framework

This study focuses on factors that influence an individual household's decision to prepare or not prepare for hurricanes. Using Paton's (2003) proposed social-cognitive preparation model and other disaster preparation research, a conceptual framework was developed to assess relationships among variables. I used variables similar to Paton et al.'s (2003) model (Fig. 2-2) because predictive validity had been established in his research. The conceptual framework for this research posits that social cognitive factors link stressors to disaster preparation through coping and intention actions (Fig. 3-1).

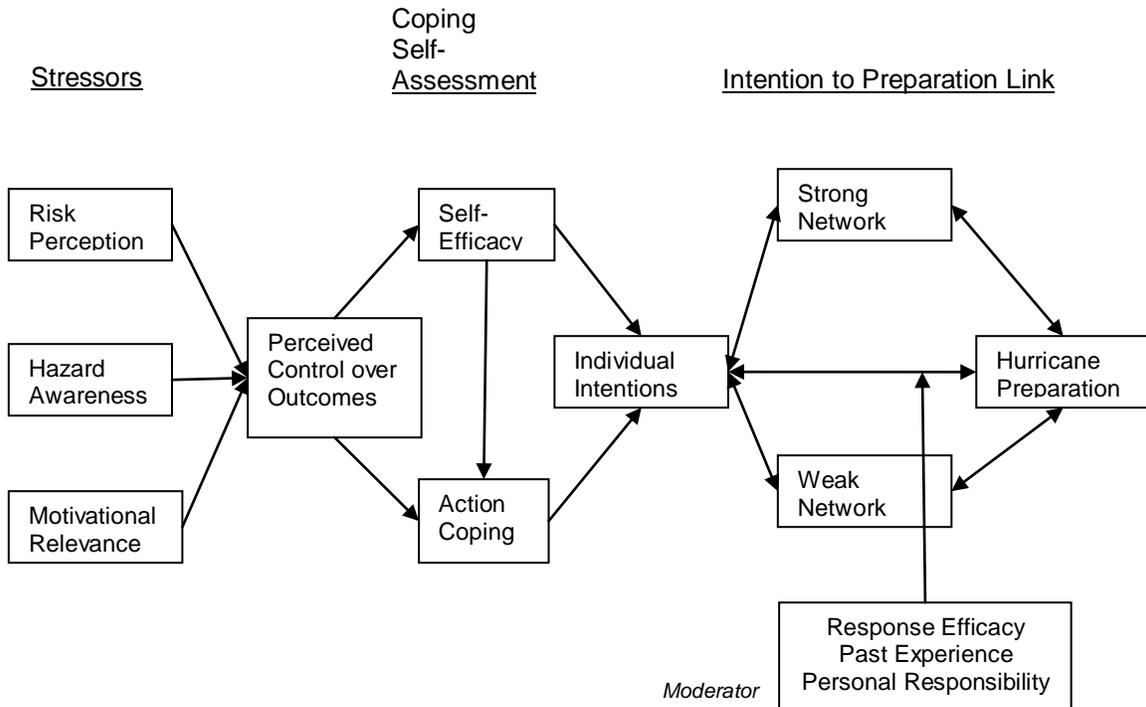


Figure 3-1. Hypothesized Hurricane Preparation Decision Model

Research Design

A cross-sectional design was used for this research. Two populations at one point in time were compared in terms of differences on the outcome variable (hurricane preparation). Analysis relied on the differences in the samples at that point in time. Unlike other research designs, a cross-sectional design has no time dimension, no intervention and groups are based on existing differences between groups (DeVaus, 2001).

Cross-sectional studies are widely used because they can be accomplished quickly and are cost-effective. However, the cross-sectional design is weak in showing direct causality. Lindell and Perry (2000) reviewed 23 different cross sectional studies that looked at earthquake hazard perceptions and earthquake hazard adjustments. They found the correlations in the various studies made it difficult to determine if hazard

perception caused hazard adjustment or if hazard adjustment caused hazard perception. Due to the weakness in establishing direct causality, Lindell and Perry (2000) argue that “cross sectional studies of factors associated with the adoption of seismic adjustments would be well advised to supplement reports of current adjustment adoption with the collection of either retrospective reports of past adoption or behavioral intentions for future adoption” (p. 498). They believe that although a “quasi-longitudinal” design, or repeated points in time cross-sectional design, is inferior to a true longitudinal design, it is better than a single point in time cross-sectional design (Lindell and Perry, 2000).

Despite this limitation, the cross-sectional design is appropriate for understanding relationships between a number of variables. It allows the researcher to include many more variables than the experimental group of designs, enhancing explanatory power. Further, the design can be greatly strengthened when multiple comparison groups are used, the case here, and when the selection of variables for the study are theoretically based, which is also the case here. Marsh (1982) argues that by using models and theories as guides, the researcher is able to draw causal conclusions. Based on previous theories and research, variables that have been shown to influence an individual’s decision making process in regards to earthquake preparations (Paton et al., (2003) were selected and will be applied to the hurricane preparation decision process in my research. The objective is to understand how these variables interact in two populations, the socially vulnerable and the non-vulnerable. The conceptual model presented in the previous section was developed based on previous research and was used to guide decisions about which data to select. Furthermore, cross-sectional

models are very effective in demonstrating where causal relationships do not exist. Eliminating relationships is as important as showing causal relationships (DeVaus, 2001).

Cross-sectional designs require statistically representative samples to enhance external validity. External validity refers to the degree to which the conclusions reached, based on the evidence from one study, can be generalized to other conditions. That may be the theoretical population but also commonly includes other times, places, or phenomena. This research compared two samples which should represent two theoretical populations in Escambia County, Florida and their individual household decision process in making hurricane preparations. To enhance external validity, it was necessary to obtain a statistically representative sample from each group. The question may be asked if the specific results of a locale-focused study can be generalized to the wider population. I don't believe external validity can be ensured. However, the intent of this study is to examine the hypothesized model. I am more concerned with the theoretical generalizations associated with the constructs in the model, which are derived from social cognitive theory, stress and coping theory and social network theory.

Unit of Analysis

Individual households are the unit of analysis for this research because hurricane disaster preparation generally focuses on household preparation, e.g., disaster kits that include enough supplies for the household, an evacuation plan for the household, etc.

The US Census Bureau defines a household a unit that

...consists of all the people who occupy a housing unit...includes the related family members and all the unrelated people, if any, such as lodgers, foster children, wards, or employees who share the unit. A person

living alone in a housing unit, or a group of unrelated people sharing a housing unit such as partners or roomers, is also counted as a household. (US Census Bureau, n.d.)

I made the assumption that one individual in the household generally makes hurricane preparation decisions for everyone that resides in that residence. Therefore, the questionnaire asked that the person responsible for making hurricane decisions for the household complete the questionnaire.

Sample and Site Selection

This study will examine preparation decisions by socially vulnerable populations, the theoretical population of interest. The Federal Emergency Management Agency (FEMA) defines socially vulnerable or disadvantaged populations as individuals or households that are more likely to suffer from a hazard because of social or economic marginalization (i.e., minority, low-income, non-English speaking, etc.). These individuals may be disadvantaged by a lack of resources, services, and/or capability to take care of themselves (FEMA EPD Project, 2009). Additionally, the theoretical population is defined as at-risk, meaning the household is physically located in an area that is vulnerable to hazards like hurricanes, flooding, etc (FEMA EPD Project, 2009).

Escambia County, Florida, was selected as the research site for this study. It is the westernmost county in the state and shares a north and west border with Alabama. This county is vulnerable because it is located directly on the Gulf of Mexico. Escambia County experienced numerous hurricanes in the past (NWS, nd). The population is diverse in relation to socioeconomic factors (US Census Bureau, 2000). Wealthier residents tend to live close to the coast, while disadvantaged residents reside throughout the county. Of particular interest, the county has mapped vulnerable populations and residents for disaster planning purposes since Hurricane Ivan struck in

2004. I obtained copies of these maps from the Escambia County Public Safety Office to locate areas where low-income, elderly and registered special needs residents are concentrated (Appendix 1, 2 and 3). The ability to identify a disadvantaged population is essential to ensuring the appropriate households are being sampled for this study.

The hurricane preparation decision process is the primary focus of this research. Participants in the research should have been exposed to hurricane preparation information and programs and have had the opportunity to decide whether or not they should prepare for hurricanes and to what extent. Escambia County initiated a robust emergency preparedness program after Hurricane Ivan in 2004. They created the Be Ready Alliance Coordinating for Emergencies organization, an umbrella agency that provides hurricane preparation information to all county residents. The BRACE organization has identified vulnerable residents and BRACE partners extensively with support and service organizations to ensure information reaches the vulnerable population (BRACE, 2009). It is probable that residents in Escambia County have adequate knowledge level of hurricane preparation actions and have decided to prepare or not prepare based on that knowledge. I want to determine whether disadvantaged populations differ in their decision-making process from other populations, not the effect of knowledge on the decision-making process. Therefore, it is important that I conduct the research in a place where all residents, including vulnerable residents, receive similar information. Escambia County provides these conditions.

This study measures the extent to which certain social-cognitive factors influence hurricane preparation decisions for socially vulnerable and non-vulnerable populations. I am particularly interested in understanding if there are significant differences in the

role that the theoretical factors play in hurricane preparedness for this population, compared to a population that is not socially vulnerable or disadvantaged. Theoretical considerations guided my selection of research participants in that I needed a large enough sample from the disadvantaged population to establish external validity. Based on the variance of the outcome variable (39.097), my set precision level (.625) and confidence interval (95 percent), I determined that a sample size of 239 was needed. A desirable sample size for structural equation modeling is a 20:1 ratio of cases to the number of parameters. A 10:1 ratio may be more realistic (Kline, 2005). Using the 10:1 ratio, a minimum sample size of 130 would be required. Kline (2005) notes that the more complicated the model, the more cases needed.

In order to identify the accessible population, several commercial listing services were contacted. Based on their information, there are approximately 128,000 residential mail listings for the county. Using 2000 US Census data, I conducted a demographic analysis by county zip code to define and locate the accessible population (Appendix 4). Additionally, I compared the US census data information and overlaid the county zip code map (Appendix 5) with the vulnerable population maps mentioned previously to identify areas with high concentrations of vulnerable households. Based on this analysis, zip codes 32501, 32505, 32535 and 32568 were targeted. I used the same process to identify zip codes for non-vulnerable households. Zip codes 32508, 32514, and 32533 were targeted. A commercial listing service was used to obtain a list of 5,000 residences to include names from these two sets of zip codes. Using a random number generator, a random sample of 1,000 residences was selected for the first mailing. I decided to send 70 percent of my surveys to the zip codes that were

selected for its number of vulnerable residents and 30 percent to the “non-vulnerable” selected zip codes. Assuming that the vulnerable population may be less inclined or able to complete the survey, I decided a 70/30 split might provide the best opportunity to obtain statistically representative sample from each group. The first mailing resulted in approximately 160 returned surveys. Another round of surveys was mailed to an additional 500 residences. Of those, approximately 85 were returned, for a total sample size of 245. Descriptive statistics for the sample are in Table 3-1.

Table 3-1. Frequencies of socioeconomic characteristics for all respondents in study assessing hurricane preparedness and factors influencing preparedness in 245 households in Escambia County, Florida, 2009

Demographic Characteristics (n=245)	Frequency	Relative Frequency	Cumulative Frequency
AGE (Years)			
18 – 39	37	15.2%	15.3%
40 – 59	98	40.0%	55.8%
60 – 67	44	18.2%	74.0%
68+	63	25.7%	100.0%
GENDER			
Male	127	52.3%	52.3%
Female	114	46.9%	100.0%
ETHNICITY			
African American	39	16.4%	16.4%
Asian	4	1.7%	18.5%
Native American	7	2.9%	21.4%
Caucasian	175	73.5%	95.0%
Other	12	5.0%	100.0%
EDUCATION			
Did not complete HS	16	6.6%	6.6%
Completed HS	41	17.0%	23.7%
Some college or 2 yr college deg	95	38.8%	63.1%
Completed 4 yr deg	89	37.0%	100.0%
HOUSEHOLD INCOME (Mean annual income)			
Under 34,999	83	38.4%	38.4%
\$35,000 - \$49,999	36	16.7%	55.1%
\$50,000 - \$74,999	37	17.1%	72.2%
\$75,000 or more	60	24.5%	100.0%
DISABLED			
No	190	79.8%	79.8%

Yes	48	20.2%	100.0%
HS - High School; Yr – Year			

Since I had no way of determining the vulnerability status of a household *a priori*, I assigned households to comparison groups *post hoc*. I used the following factors to determine vulnerability: age (born 1941 or before); income (less than \$35,000); or disabled or a disabled individual in the household.

Disaster literature refers to “elderly” as being vulnerable. However, no specific ages are equated with the term. Therefore, I selected age 68 as this is one year past the age that all individuals would be considered “full retirement age” as defined by the Social Security Administration (Social Security Administration, 2010). I used income of less than \$35,000 as the income threshold to examine the questionnaires more closely to determine vulnerability. There were cases where a respondent might fall into the vulnerability category based on income, but other factors or notes on the survey may have indicated the individual was non-vulnerable. An example is a respondent falling into the vulnerable status based on income level, but notes on the survey indicated that he/she was a “navy pilot.” I would not consider this a member of a socially vulnerable population. Another example might be where an individual makes less than \$35,000 and there is only one person in the household. Finally, I used “disabled” as that is a category defined in Florida statutes as vulnerable citizens in local emergency management plans (CEMP 2004). As a result of my decision to use a 70/30 split in the mail-outs and criteria used to determine vulnerability, 124 surveys from vulnerable households and 121 surveys from the non-vulnerable households were received. A *t-test* for independent samples was conducted to evaluate differences between the vulnerable and non-vulnerable samples with regard to the outcome variable.

Distribution of scores for the outcome variable was normal for both groups and variance was equal (Levene’s test of homogeneity, $p = .111$). Therefore, I concluded the two groups to be homogenous. The sample size of 245 is adequate for analysis.

Additional questions were asked regarding hurricane experience. Ninety-five percent of all respondents had experienced a hurricane within the last ten years. Over 70 percent of the respondents experienced some damage or loss from a hurricane. Finally, close to 70 percent think there is a good chance a hurricane will affect them within the next three years.

Table 3-2. Frequencies of hurricane experience factors in study assessing hurricane preparedness and factors influencing preparedness in 245 households in Escambia County, Florida, 2009

Hurricane Experience (n=242)	Frequency	Relative Frequency	Cumulative Frequency
PAST EXPERIENCE			
No	10	4.0%	4.0%
Yes	232	96.0%	100.0%
DAMAGE			
No	57	24.4%	24.4%
Yes	176	75.6%	100.0%
WILL AFFECT			
This Year	38	16.2%	16.2%
Next Year	11	4.5%	20.9%
Within Next 3 Years	115	48.9%	69.8%
Within Next 5 Years	71	30.2%	100.0%

Instrument Development

I based the questionnaire used for this research on Paton et al.’s (2003) instrument used in earthquake preparation research. This questionnaire addresses the same social-cognitive factors used in the earthquake research. I added questions to address social network factors that may influence preparation decisions, and, where necessary, changed questions to reflect hurricane preparation versus earthquake

preparation. Dr. Douglas Paton granted permission to adapt his instrument for this research. Paton et al.'s (2003) reported that a factor analysis, using maximum likelihood estimation, was applied to each set of indicators on their phase one questionnaires. The confirmatory factor analysis in their study confirmed that the properties of the scales were sufficient for further analyses (Paton et al., 2003). However, I did not presume that the same instrument would be reliable and valid in my study. Therefore, I assessed reliability, validity and precision for my instrument.

Cross-sectional designs rely on individuals (participants) and reliability varies between individuals (Wikman, 2006). This theoretical population may be educationally challenged or have other impediments to understanding the questionnaire. Therefore, I tested instruments to ensure that a similar population would be able to understand what was being asked. I have experience working with vulnerable populations and used my own contacts to locate individuals to test the instrument. Seven people tested the instrument. Wikman (2006) argues that reliability of surveys is dependent on language used and the clarity of the questions. Therefore, I conducted a cognitive evaluation of the questionnaire with each test participant to evaluate their understanding of what I asked and the words I used. The use of the cognitive approach greatly reduces the number of test cases needed to establish validity and reliability because of the insights the procedure provides to the researcher. A large test group is therefore not necessary. Changes to the questionnaire were made based on the analysis to improve reliability and validity. Reliability tests for each instrument were conducted *post-hoc*. Based on the reliability results, indicators were eliminated for each subsequent analysis. Reliability test results are noted in Chapter 5.

The next consideration is validity. Adcock and Collier (2001) argue that measurement validity is a synonym for construct validity. They define measurement validity as, "...whether operationalization and the scoring of cases adequately reflect the concept the researcher seeks to measure" (Adcock and Collier, 2001, p. 259). In my research, I operationalized several concepts such as risk perception, self-efficacy, individual intentions and others, that I believe result in hurricane disaster preparedness actions. How can I determine if the concept, the items used to measure the concept and the scoring of the cases are valid? Concepts originating from theory provide a stable foundation for research (Adcock and Collier, 2001). A good theory should provide better concepts that, in turn, result in improved theory (Kaplan, 1964; Adcock and Collier, 2001). This study originates from theories as discussed in Chapter 2; social cognitive theory, stress and coping theory and social network theory. I chose the concepts found in these theories because they have been researched extensively and there is a body of literature that supports the use of the concepts. After deciding what concepts to use, consideration must be given to the proposed items to measure the concept. A concern with selecting the proposed items is what Adcock and Collier (2001) refer to as "contextual specificity." This occurs when a score on one item may have a different meaning in a different context (Adcock and Collier, 2001). For example, one concept I am exploring is hazard awareness. Hazard awareness as it relates to hurricane preparedness may be different than hazard awareness as it relates to living next to a nuclear power plant. To address this challenge of contextual specificity, I used items to measure hazard awareness, as well as most of the other concepts, that were hurricane specific.

Convergent/discriminant validation examines each item and its relationship to the concepts and the focus is on shared and nonshared variance among items (Adcock and Collier, 2001). Finally, Adcock and Collier (2001) refer to nomological/construct validation as a process to tease out factors not identified in convergent/discriminant validation. This process serves as confirmation that the item scores fit the concepts.

An association of concepts validly measured in a hypothesized model is positive evidence for validity (Adcock and Collier, 2001). Structural equation modeling is a common tool used for convergent/discriminant validation. My research hypothesizes a decision making model for hurricane preparation. Results of the structural equation model analysis (further discussion in Chap 5) for my research shows a causal relationship between risk perception and individual intentions resulting in disaster preparation. This is positive evidence of validity.

Finally, Cohen (1988, p. 6) defines the precision of a sample statistic as “the closeness with which it can be expected to approximate the relevant population value. It is necessarily an estimated value in practice, since the population value is generally unknown.” The outcome variable of hurricane preparation is a cumulative score of ‘yes’ responses to 31 different items. I determined a value of ± 5 as the acceptable error in the mean, resulting in a precision of .625 that was used in determining required sample size.

The construction and distribution of the questionnaire followed the tailored design method (Dillman, 2007). The questionnaire was constructed for ease of reading and answering questions quickly. The questionnaire was six pages long and was designed to take less than 30 minutes to complete. It was mailed with a cover letter addressed by

name to the resident. The cover letter included informed consent information. Additionally, a self-addressed, stamped envelope was included for ease of response. I also included a Florida Division of Emergency Management hurricane preparation pamphlet checklist in the mail-out as a token of appreciation for participation. A follow-up postcard was mailed approximately one week after the questionnaires were mailed out. This process was used for all 1,500 mail-outs.

Concepts and Variables

This study focused on three primary constructs as they relate to preparedness, motivational factors, coping self-assessment and intentions to prepare. Motivational factors are defined as risk perception, hazard awareness and motivational relevance. Motivations are linked to intention by coping self-assessment that includes perceived control over outcomes, self-efficacy and action coping. Finally, intentions are linked to preparation by individual actions or actions taken working through a social network. A table of variables and items are provided at Appendix A.

Predictor Variables

The following explains each variable and provides the items used to measure that variable. Scoring for all variables except the outcome variable of hurricane preparation was mean cumulative (total divided by number of items). The scoring for the outcome variable was cumulative (number of 'yes' responses to 31 items).

Motivational Factors

Risk perception. Perceived risk has been examined in many different ways. Risk perception probably includes at least three dimensions, real risk, risk experience and risk target (Sjoberg, 2000). Real risk may be one determinant of perceived risks in some contexts (Sjoberg, 2000). For example, Lichtenstein et al., 1978, estimated

mortality rates for illnesses and accidents were related to statistical data and as a result, "...risks were perceived, by the average person, in a rather veritical manner" (Sjoberg, 2000, p. 2). Risk experience may also influence risk perception (Thompson and Mingay, 1991). An individual participating in a FEMA roundtable discussion regarding hurricanes shared an example of how her experience influenced her risk perception. The individual stated that she had never experienced a hurricane and was therefore unaware of the associated risk. After her personal experience with Hurricane Ivan, where she suffered serious damage to her home, her perception has changed and she now recognizes the risks associated with hurricanes. Finally, risk target is important in risk perception. Individuals will make different risk perception estimates based on whether the risk is to themselves, their family, or people in general (Sjoberg, 2000).

Numerous studies conducted by Paton and others in examining volcanic hazard perceptions linked perceived risk to proximity to the hazard, likelihood of future disasters and past experience (Paton et al., 2003; Johnston et al., 1999; Lindell and Whitney, 2000). Johnson et al. (1999) found, in a study of two communities, that direct experience affected risk perception, but did not necessarily influence preparedness (Johnston et al, 1999). In this research, participants were asked to express their opinions and perceptions from strongly agree to strongly disagree on hurricanes as a threat to their person and property. The following statements were used:

- A hurricane could pose a threat to your personal safety
- A hurricane could pose a threat to your daily life
- A hurricane could pose a threat to your property

Additionally, a question was asked concerning the timing and impact of future hurricanes:

The most likely time within which a damaging hurricane could affect me is:

This year _____
Next year _____
Within next 3 years _____
Within next 5 years _____

Hazard awareness. Paton (2003) refers to awareness as how often someone thinks or talks about hazards. Deriving from the community psychology literature, Dalton et al. (2001) refer to this as critical awareness. This is a process that “involves conscious reasoning about issues people perceive as critical or salient” (Paton et al., 2003, p. 6). Paton (2003) argues that critical awareness is necessary because natural hazard events are rare. Hurricane preparations in Florida take place in the spring prior to the start of the hurricane season in June. Hurricanes compete with other problems for attention. The attention paid to hurricane preparation will be evident in how much people think or talk about it (Paton, 2003). Bagozzi and Dabholar (2000) state that how and what people communicate with one another affects their decision-making processes. Thus, the frequency that individuals discuss hurricanes would represent the importance they place on that natural hazard (Paton, 2003). To address this factor in this research, respondents were asked to reply on a scale of 1 being “not at all” to 5 being “a great deal” to the following:

- How much do you think about hurricanes?
- How much do you talk about hurricanes?

Motivational Relevance. The transactional model of stress and coping defines stressors in two categories, primary and secondary appraisal. Wenzel et al. (2002) define primary appraisal as a person’s judgment about the significance of an event. An individual will determine if the event is “stressful, positive, controllable, challenging, benign, or irrelevant” (Wenzel et al., 2002). Primary appraisal consists of several

factors. I examined two of these factors, motivational relevance and causal focus as precursors to hazard preparation decision-making in this research. Motivational relevance refers to a stressor that will have a major impact on an individual's well-being (Wenzel et al., 2002; Folkman et al., 1986). In the case of high motivational relevance, an individual may experience distress or anxiety. Hurricanes are unpredictable and uncontrollable. Therefore, hurricanes can cause a certain amount of anxiety or fear for individuals often threatened by them. In studying earthquake response, it has been argued that earthquake anxiety may cause individuals to prepare less for earthquakes (Duval and Mulilis, 1999; Lamontaigne and LaRochelle, 2000; Paton, 2003). In order to lessen their anxiety levels, individuals may choose to ignore information about what is causing their anxiety (Paton, 2003). In reviewing the disaster literature, I was unable to locate a scale that addressed hurricane anxiety. However, Paton et al. (2003) addressed earthquake anxiety in his research. Adopting similar statements to reflect hurricane anxiety, the respondents were asked to reply on a scale from 1 being "not at all" to 5 being "a great deal" to the following:

- I get nervous when there is discussion about approaching hurricanes
- When hurricane ads come on TV, I change the channel or don't pay attention
- I avoid things that remind me of hurricanes
- If I believe a hurricane is approaching, I make sure I know the evacuation route
- If I believe a hurricane is approaching, I make sure I know where my shelter is
- I avoid thinking about hurricanes

Coping Self Assessment

Perceived control over outcomes. Assessing an individual's coping resources and options falls into the secondary appraisal category of the transactional model of stress and coping (Wenzel et al., 2002). Whereas primary appraisal focuses on the situation, secondary appraisal focuses on what one can do about the situation.

Perceived control over outcomes is similar to what Paton et al. (2003) labels outcome expectancy. Once individuals are aware of a particular hazard, such as a hurricane, they then make individual judgments with regard to what actions to take and whether or not those actions constitute successful preparation actions for the hurricane (Paton, 2003). Paton et al. (2003) argues that outcome expectancy precedes self-efficacy. Individuals will make assumptions about whether preparatory actions will be successful or not before deciding to take a particular preparation action (Paton et al., 2003). They are more likely to take those actions that they believe will be successful. The same outcome expectancy measures used by Paton et al. (2003) were used in this research. On a scale of strongly agree to strongly disagree, respondents were asked to respond to the following statements.

- Hurricanes are too destructive to bother preparing for
- A serious hurricane is unlikely to occur during your lifetime
- Preparing for hurricanes will reduce damage to my home should a hurricane occur
- Preparing for hurricanes will improve my everyday living conditions
- Preparing for hurricanes will improve the values of my house/property
- Preparing for hurricanes will reduce the disruption to family/community life following a hurricane.
- Preparing for hurricanes is a hassle for me

Self-efficacy. Health behavior research has shown that self-efficacy plays a central role in one's health decisions (Wenzel et al, 2002). Bennett and Murphy (1997) argue that efficacy beliefs may be generalized ('I can cope with events in my life'), or may be behavior-specific, such as making decisions about using drugs or even preparing for a natural hazard such as a hurricane. Paton (2003, p. 212) argues that

“...if a person forms a favorable outcome expectancy, whether or not they progress towards the formation of preparedness intentions is a function of the level of their self-efficacy beliefs.” The person-relative-to-event (PrE) theory postulates that self-efficacy refers to self-assessments of one’s “knowledge, skill, ability, energy, and financial resources” in relation to the hazard event (Lindell and Whitney, 2000, p. 14). Paton et al.’s (2003) analysis of self-efficacy tends to emphasize the generalized version, whereas his statements focus on issues and problems that one might deal with in everyday life. On a scale of strongly agree to strongly disagree, respondents were asked to respond to the following statements:

- I have considerable control over what happens in my life
- I can solve most of the problems I have by myself
- What happens to me in the future mostly depends on me
- I can do a lot to change many of the important things in my life
- I can do just about anything if I really set my mind on it
- I rarely feel helpless in dealing with the problems of my life

Action Coping. Carver et al. (1989) describe a number of dimensions of coping. Active coping is the process of taking active steps to prevent the stressor or taking action to improve the stressful situation (Carver et al., 1989). Active coping is similar to what Lazarus and Folkman (1984) and others label problem-focused coping. Paton et al.’s (2001) research on volcanic hazard preparedness concluded that problem-focused coping should be included as a factor in determining preparation for natural hazards. The problem-focused coping predictor is also a factor found in the person-relative-to-event (PrE) model (Duval and Mulilis, 1999; Lindell and Whitney, 2000; and Patonet al., 2003). Paton et al. (2003) used Carver et al.’s (1989) measure of action coping in his disaster research, and I used the same measure in this research. On a scale of one to four (I usually don’t do this at all to I usually do this a lot), respondents were asked to

respond to the following statements in regard to dealing with their everyday life problems.

- I try to come up with a strategy about what to do
- I make a plan of action
- I think hard about what steps to take
- I think about how I might best handle the problem

Individual Intentions. Health behavior models have shown that intentions are an indicator of whether an individual adopts preventative behavior with regards to health threats (Paton et al., 2003). Paton et al. (2003, p. 10) define intentions as a “...precursor to adjustment adoption.” Paton et al. (2003) incorporated measures cited by Bennett and Murphy (1987) in his survey. Responding on a scale of no, possibly or definitely, I asked respondents to respond to the following with regards to their hurricane preparation actions over the next month or so:

- Check your level of preparedness for hurricanes
- Increase your level of preparedness for hurricanes
- Become involved with a local group to discuss how to reduce hurricane damage or loss
- Seek information on hurricane risk
- Seek information on things to do to prepare

Strong and Weak Social Networks and Social Support. Social networks are the links between people and the relationships they share (Heaney and Israel, 2002). Individuals have various forms of relationships with others that may impact their decision-making processes about everyday life events or specific actions such as hurricane preparedness. Granovetter (1973) distinguishes between strong and weak ties in networks. The strength of a tie is probably linear and has characteristics of reciprocity, intensity, complexity, density, homogeneity and geographic dispersion

(Granovetter, 1973; Heaney and Israel, 2002). Granovetter (1973) states that weak ties link members of small groups and strong ties are concentrated within particular groups. Using this definition, one might consider linkages with family and close friends a strong tie. A weak tie may be a relationship that one has with an acquaintance at church or school. Granovetter (1983, p. 209) states that, "Weak ties provide people with access to information and resources beyond those available in their own social circle; but strong ties have greater motivation to be of assistance and are typically more easily available" (p. 209).

During a recent FEMA project, a roundtable discussion with disadvantaged community members in a rural county reflected how vulnerable groups are dependent on family and friends (strong ties) for assistance with disaster preparedness. One individual stated that her son helped her with obtaining filled sandbags in preparation for possible flooding. Another individual stated that the local sheriff called to inform of possible flooding problems and where they could go for assistance. Whereas a sheriff in a community may be considered a "weak tie," this was a rural community where everyone knows each other quite well. In this case, the sheriff may be considered a "strong tie" (FEMA Emergency Preparedness Demonstration Project, 2009).

My research explores the strong and weak ties that a disadvantaged community member may or may not use in executing disaster preparedness actions. Review of the research has shown that disadvantaged people tend to rely on strong ties more than others (Ericksen and Yancey, 1977; Granovetter, 1983). Responding to the question, "Where do you look to get information about how to prepare for hurricanes?" participants were asked to rate on a scale of never to always their family, friends,

neighbors, churches, local government, co-workers, social clubs, county cooperative extension, TV, radio and other. The respondents were also asked: Who do you turn to when you need to prepare for a hurricane? Based on Granovetter's (1983) definition of strong and weak ties, I classified strong ties as family, friends, neighbors and co-workers and weak ties as local government, social clubs, TV, and radio.

Moderator Variables: Response Efficacy, Past Experience, Perceived Responsibility:

Disaster research has included additional variables, like personal responsibility, past experience and response efficacy that might be considered in predicting preparedness (Bishop et al., 2000; Duval and Mulilis, 1999; Lindell and Whitney, 2000; Paton et al., 2000). Paton et al. (2003) refers to these variables as moderating variables. Paton et al. (2003) argue that these variables influence the link between intention and preparation. I have included the same variables in this research.

Response efficacy describes the resources and capabilities an individual may or may not have in regard to preparation (Paton et al, 2003eqc). Examples are time, skill, financial, and physical resources. Even if people intend to prepare for a hurricane, they may not have the resources to do so. Participants were asked to answer the question, "To what extent might each of the following prevent you preparing for hurricanes?" They responded on a scale from 1 being "not at all" to 5 being "a great deal" to the following:

- The cost
- The skill or knowledge required
- Time to do them
- Other things to think about
- Need for co-operation with others

Personal responsibility is an important consideration in hurricane preparations. Researchers have found a relationship between an individual's acceptance of personal responsibility for their own safety and preparation actions (Ballantyne et al., 2000; Duval and Mulilis, 1999; Lindell and Whitney, 2000; Mulilis and Duvall, 1995; Paton et al., 2000). Ballantyne et al. (2000) found that the availability of hazard information lessened preparedness action by individuals. People are less likely to prepare if they perceived that others (local government agencies) are responsible for the safety of citizens. Disadvantaged residents made numerous comments about individuals taking personal responsibility for their safety during the FEMA project (FEMA Emergency Preparedness Demonstration Project, 2009). Several individuals stated others should not depend on local government for their safety. Participants in my research were asked to describe the extent to which they agree or disagree (scale of 1-5) with each of the following statements:

- I feel responsible for preparing for a hurricane
- The local government is responsible for making sure that I am prepared for a hurricane

Past experience assesses whether an individual has experienced a hurricane and whether or not they have incurred damage or loss due to that hurricane.

Participants were asked the following questions:

- Have you been in a hurricane in the last 10 years?
- If yes, what year(s) did this occur?
- If yes, did you experience damage or loss (i.e., requiring repairs/insurance claims)?

Outcome Variable

Hurricane Preparation. Preparation is assessed using a preparedness scale created from the Ready.gov website. The website provides a step-by-step plan to prepare for hurricanes. Research participants were asked to respond to the following items by checking 'yes' or 'no':

- I have an emergency kit containing:
 - * Water, one gallon of water per person per day for at least three days, for drinking and sanitation
 - * Food, at least a three-day supply of non-perishable food
 - * Battery-powered radio and extra batteries
 - * NOAA Weather Radio with tone alert and extra batteries
 - * Flashlight and extra batteries
 - * First aid kit
 - * Whistle to signal for help
 - * Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place
 - * Moist towelettes, garbage bags and plastic ties for personal sanitation
 - * Wrench or pliers to turn off utilities
 - * Can opener for food (if kit contains canned food)
 - * Local maps
 - * Cell phone with charger
 - * Medications and glasses
 - * Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container
 - * Cash or traveler's checks and change

- * Emergency reference material such as a first aid book or information from www.ready.gov
- * Sleeping bag or warm blanket for each person
- * Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes.
- * Household chlorine bleach and medicine dropper
- * Fire Extinguisher
- * Matches in a waterproof container
- *Personal hygiene items
- * Mess kits, paper cups, plates and plastic utensils, paper towels
- * Paper and pencil
- Do you have a family emergency plan?
- Do you know where your family will meet, both within and outside of your immediate neighborhood?
- Do you have an out-of-town contact to communicate with?
- Do you have a plan for evacuation?
- Do you know the evacuation route?
- Do you know your designated shelter?

Also, to test respondents' hurricane knowledge, three true/false questions were asked about the meaning of a hurricane watch, a hurricane warning and hurricane categories:

- A **hurricane watch** means a hurricane could hit within 24 hours?
- A **hurricane warning** means a hurricane could hit within 36 hours?
- Hurricane categories (for example, Category 1, 2, 3, 4 or 5) are based on wind speed?

Analyses

Demographics

Demographic variables included age, ethnicity, average annual household income, gender, residence, transportation resources, household characteristics, e.g., education and disability. As stated previously, age, income level and disability were the only factors used to determine vulnerability.

Comparison of Central Tendency

Several of the research hypotheses compare the vulnerable population to the non-vulnerable population and the impact of the predictor variables on the outcome variable. The *t*-test is a parametric test that provides reliable information about the sampling distribution (Sheskin, 2007). Therefore, *t*-tests for two independent samples were ran on all the variables to determine equal variances.

Pearson Correlation

Measures of correlation are inferential statistical measures that reflect the strength of the relationship between variables. The hypothesis that particular variables in the model are correlated with the outcome variable requires an analysis that can compare the correlations for the two different populations.

Structural Equation Modeling

Although regression analysis provides information about relationships, the researcher cannot draw conclusions regarding directionality of causal relationships (Sheskin, 2007). However, researchers use past studies to support their argument that there is causality. Hair et al. (1995, p. 622) explain structural equation modeling as a series of "...separate but interdependent multiple regression equations." Structural

equation modeling allows analysis of multiple relationships and multiple independent and dependent variables (Sheskin, 2007).

Paton and his colleagues used structural equation modeling in their 2003 earthquake research (Paton et al, 2003). The model I am using in my research is similar to the Paton model. Therefore, it is appropriate to analyze the results in much the same way.

Summary

This chapter presented the methods and scientific reasoning used in this research. Included was a discussion of the conceptual framework linking variables, units of analysis, site selection, sampling framework, data collection, and the overall research design and analysis used in this study.

CHAPTER 4 RESULTS

I conducted several statistical analyses to explore social cognitive factors that impact hurricane preparation decisions by vulnerable and non-vulnerable populations. First, I conducted a reliability analysis on all instruments and eliminated items as necessary. I then examined the data to identify useable cases. After discarding incomplete responses, useable responses remained. The sample size limited the types of analyses I could use to compare the two groups. I used correlation to estimate the relationships between variables for each group and binary logistic regression to analyze the hypothesized model, as a precursor to the structural equation model (SEM) analysis. Finally, the SEM analysis was conducted for the hypothesized model. Due to sample size limitations, I was unable to conduct an SEM on the two groups. However, the SEM for the entire group resulted in a revised model.

Reliability Testing of Instruments

A reliability coefficient test was conducted for each variable. Cronbach alpha scores were used to determine the extent to which item responses correlate with each other. Alpha scores were used to determine if and what items should be eliminated from each variable. I used the cut-off of .70 for alpha as this is the widely-accepted reliability coefficient in the social sciences for a set of items to be considered a scale (Nunnally, 1978). The results of this analysis resulted in indicators being eliminated from risk perception, motivational relevance and perceived control (see Table 4-1).

Table 4-1. List of Variables and Scalar Response Range

Variables	#Questions /Items	Scalar Response Range	Cronbach alpha
Mediators:			
Risk Perception	3	1-5 Strongly disagree to strongly agree	.750*
Hazard Awareness	2	1-5 Not at all to a great deal	.731
Motivational Relevance	2	1-5 Not at all to a great deal	.740*
Perceived Control	4	1-5 Strongly disagree to strongly agree	.757*
Self Efficacy	6	1-5 Strongly disagree to strongly agree	.766
Action Coping	4	1-4 I usually don't do this at all to I usually do this a lot	.878
Individual Intention	5	1-3 No, possibly, definitely	.842
Strong Social Ntwk	8	1-5 Never to always	.862
Weak Social Ntwk	14	1-5 Never to always	.829
Moderators:			
Response Efficacy	5	1-5 Not at all to a great deal	.795
Personal Responsibility	1	1-5 Strongly disagree to strongly agree	.840*
Past Experience	3	-- Nominal responses	.098**
Outcome:			
Hurricane Prep	31	0, 1 No or Yes	.881

* Items deleted.

** Removed from further analyses due to low reliability scores

Items removed:

Risk Perception – one item removed

The most likely time within which a damaging hurricane could affect me is:

This year _____
Next year _____
Within next 3 years _____
Within next 5 years _____

Motivational Relevance – four items removed

I get nervous when there is discussion about approaching hurricanes
When hurricane ads come on TV, I change the channel or don't pay attention
I avoid things that remind me of hurricanes
I avoid thinking about hurricanes

Perceived Control – three items removed

Hurricanes are too destructive to bother preparing for
A serious hurricane is unlikely to occur during your lifetime
Preparing for hurricanes is a hassle for me

Personal Responsibility – one item removed

The local government is responsible for making sure that I am prepared for a hurricane

There were many data missing in the strong social network and weak social network variables. Although respondents were asked to “fill in one circle for each item,” it appeared that many of them chose to select only those items that applied to them. Therefore, I decided to recode missing data on surveys where some but not all items had been checked in questions 14 and 15 to ‘never’. The recoded responses were not used in the structural equation model analysis.

Preliminary Screening of Cases

A total of 72 participants were missing large portions of data in a non-random pattern. Therefore, these responses were discarded. Of the remaining 170 participants, less than one percent of data points were missing. When the amount of missing data are few (i.e., <5%), the patterns of missing data are nonconsequential (Kline, 2005). An expectation-maximization procedure available in SPSS 17 was utilized to impute missing values. This procedure has been shown to yield more accurate parameter estimates and standard errors than more traditional methods of handling missing data (e.g., listwise or pairwise deletion; Schafer, 1997). An alternative approach, full-information maximum likelihood (FIML) estimation was considered. However, this approach would have required estimation of the model using latent (unobserved) constructions instead of examining a path model with observed variables (i.e., total scores). In the present study, the latter approach is preferred because analysis of latent variables introduces a larger number of parameters, and thus a larger sample size would be required.

Items other than those that comprise the individual intention and hurricane preparation scales were screened for univariate outliers, defined as responses greater than 3.29 standard deviations from the mean. The intention and preparation items were not continuous, and therefore they do not need to conform to the assumption of univariate normality. A total of 16 univariate outliers were identified and deleted from the sample, resulting in a final sample of 154 participants. After deletion of outliers, all items met standard criteria for univariate normality (i.e., skew between -2 and 2; kurtosis between -7 and 7; Kline, 2005).

Mean scores for all scales were then computed. It should be noted that the following items were reverse scored so that directionality was consistent within scales:

- Hurricanes are too destructive to bother preparing for
- A serious hurricane is unlikely to occur during your lifetime
- Preparing for hurricanes is a hassle for me
- The local government is responsible for making sure that I am prepared for a Hurricane

All total scores met criteria for univariate outliers and normality. One dichotomous variable (past hurricane experience) was created by recoding past experiences into either 'Yes' or 'No'.

All variables included in the path analysis were also screened for multivariate outliers using a regression procedure outlined by Tabachnick and Fidell (2007). With eight variables in the regression analysis, the critical $\chi^2 = 26.1$. Thus, multivariate outliers were operationalized as cases with Mahalanobis Distance Values greater than 26.1. Using this method, one multivariate outlier was detected and deleted. The subsample of participants retained for all further analyses consisted of the remaining

153 cases. Means, standard deviations, and intercorrelations among variables are presented in Table 4-4.

Frequency of Response Data

Socio-Demographic Characteristics

Analysis began with a review of the socio-demographic characteristics of the remaining 153 cases to assign vulnerability status. An individual was coded as vulnerable if they were 68 years of age or older, and/or had a household income of less than \$35,000², and/or indicated there was a ‘disabled’ person in the home. The heading on the questionnaire requested that the person responsible for making hurricane decisions for the household complete the questionnaire.

Table 4-2. Frequency distribution by sample by key demographic and socioeconomic characteristics of respondents in 153 households in Escambia County, Florida, 2009

Demographic Characteristics (n=153)	Frequency	Relative Frequency	Cumulative Frequency
AGE			
18 – 39	31	20.4%	20.4%
40 – 59	73	47.7%	68.4%
60 – 67	24	15.7%	84.2%
68+	24	15.7%	100.0%
GENDER			
Male	79	51.6%	52.6%
Female	72	47.1%	100.0%
ETHNICITY			
African American	16	10.5%	11.4%
Asian	2	1.3%	12.8%
Native American	2	1.3%	14.1%
Caucasian	121	79.1%	95.3%
Other	7	4.6%	100.0%
HOUSEHOLD INCOME			
Under \$34,999	37	24.1%	27.4%
\$35,000 - \$49,999	28	18.3%	48.1%

² \$35,000 was used as the threshold to examine surveys for vulnerability. If someone listed household income as less than \$35,000, it is possible that other socioeconomic characteristics (e.g., number in household) may have determined individual was not vulnerable.

\$50,000 - \$74,999	27	17.6%	68.1%
\$75,000 or more	43	29.8%	100.0%
DISABLED			
No	134	87.6%	88.2%
Yes	18	11.8%	100.0%

Data in Table 4-2 are categorical and are presented as frequencies, relative frequencies and cumulative frequencies. Six age categories were used. The majority of the respondents were under the age of 59 (68%). The number of respondents who met the age criteria for vulnerability determination was 24 (~16%). There were 79 (52%) male and 72 female (48%) respondents and the majority of respondents were Caucasian (79%). The majority of respondents (84%) had completed some college or training past high school. Only 18% had a high school diploma or less. Income was a characteristic for determining vulnerability; 27% of the respondents fell into the \$35,000 or less household income category. Finally, 11% of the respondents were disabled or had a disabled person in the home.

A frequency analysis and review of all respondents' demographic data and socioeconomic data used to measure vulnerability shows that 100 (65%) of the respondents fall into the non-vulnerable category and 53 (35%) fall into the vulnerable category. In a few cases, I changed the respondent's category based on a review of all of his/her responses. For example, one respondent fell into the vulnerable income level and notes on the survey that indicated they were part of an active duty military household. I changed this respondent's category to "not vulnerable."

Hurricane Experience

Additional questions were asked in regards to hurricane experience specifically if respondents had been in a hurricane in the last ten years and, if so, whether they

suffered any damage or loss. I also asked if they think a hurricane will affect them this year, next year, within the next three years or the next five years.

The majority (96%) of respondents have experienced at least one hurricane and approximately 74% of those experienced some sort of damage or loss that required repairs or insurance claims. Respondents were also asked when they thought a hurricane might affect them in the future. The majority (79%) indicated that it would happen in the next three to five years.³

Table 4-3. Frequencies of hurricane experience factors in study assessing hurricane preparedness and factors influencing preparedness in 153 households in Escambia County, Florida, 2009

Hurricane Experience (n=153)	Frequency	Relative Frequency	Cumulative Frequency
PAST EXPERIENCE			
No	6	4.0%	4.0%
Yes	145	96.0%	100.0%
DAMAGE			
No	37	25.6%	25.6%
Yes	107	74.4%	100.0%
WILL AFFECT			
This Year	27	18.1%	18.1%
Next Year	4	2.6%	20.7%
Within Next 3 Years	73	49.0%	69.7%
Within Next 5 Years	45	30.3%	100.0%

Additionally, questions were also asked in regards to the difference between a hurricane watch and warning and how hurricanes are classified. A majority (75%) of the respondents knew that a hurricane watch meant a hurricane could strike within 48 hours, but only 43% of respondents knew that a hurricane warning meant a hurricane could strike within 36 hours. Almost all (99%) of respondents knew that hurricane categories, e.g., Category 1, 2, 3, 4, and 5, are based on wind speed.

³ Questionnaire was administered during the months of September and October. This was mid-hurricane season.

These data indicate that the sample is heavily weighted to the non-vulnerable population (100 non-vulnerable vs 53 vulnerable). Independent samples t-tests were ran on the outcome and all mediator/moderator variables. Levene's statistic for all variables including the outcome variable had a p-value for $F > .05$. This would indicate that there are not two separate populations (non-vulnerable and vulnerable), but rather one population. Discussion of the sample size and how it impacts structural equation modeling will be discussed later.

This research is based on comparing non-vulnerable and vulnerable populations. As such, I analyzed the cases that did not meet the useable sample criteria. It was found that the majority (76%) of the non-useable cases met the vulnerability criteria. Forty-two (42) percent were over the age of 68 and 55 percent met the income criteria of \$35,000 or less. Additionally 31 percent were disabled. This would indicate that the elderly population may have had difficulty completing the survey. A cursory review of the completed surveys show that some respondents missed entire pages and some just did not complete different sections. This may have been due to the booklet type survey instrument and the length (six pages) of the instrument.

Although analysis supports treating the sample as one population, my research is based on comparing two populations. Therefore, I conducted additional analyses to examine differences between the two groups for predictor and outcome variables. These findings do permit me to draw conclusions between the two samples, but may not be generalized beyond this study.

Analyses and Hypotheses Testing Results

My first hypothesis states that the same causal pathways found in Paton et al.'s (2003) social cognitive model for earthquake preparation decisions will be the same for

the hurricane preparation decision process. Additionally, I hypothesized that the variables of strong and weak social networks added as a link between intentions and hurricane preparations in the model would increase the explanatory power of the model. Finally, I hypothesized that vulnerable and non-vulnerable populations would differ in their hurricane preparation decision process. The hypotheses are similar in that they examine variations on the same model and compare two sub-populations using the model.

H1: The causal pathways found in Paton's social-cognitive model for earthquake preparation decisions will be the same for the hurricane preparation decision process.

I conducted a multivariate correlation analysis to examine relationships between the nine mediator variables and the outcome variable. Additionally, two moderator variables were analyzed to determine their relationship to the outcome variable of hurricane preparation and another mediator variable, individual intentions. I first examined the correlation coefficients between all nine predictor variables and the outcome variable for the total sample of 153 households (Table 4-4). Then I treated the vulnerable and non-vulnerable samples separately (Table 4-5 and 4-6).

My model (Fig 4-1) posits a relationship between risk perception, hazard awareness, motivational relevance and perceived control over outcomes. For the combined samples (Table 4-4), risk perception is significantly correlated to perceived control (corr. = 0.29, $p < 0.01$) and motivational relevance is significantly correlated to perceived control (corr. = 0.19, $p < 0.05$), but, hazard awareness is not significantly correlated to perceived control. A similar pattern appears for the non-vulnerable sample (Table 4-5), although the correlation between motivational relevance and perceived

control is higher (corr. = 0.30, $p < 0.01$). None of these relationships are significant for the vulnerable sample (Table 4-6). Mean scores were similar for perceived control for both the vulnerable and non-vulnerable samples.

The model indicates that perceived control affects both self-efficacy and action coping (Fig 4-1). These results show that perceived control is positively and significantly correlated to action coping for the combined samples (corr. = 0.30, $p < 0.01$), the non-vulnerable sample (corr. = .29, $p < 0.01$), and the vulnerable sample (corr. = 0.33, $p < 0.05$). Perceived control is significantly correlated with self-efficacy for the non-vulnerable sample (corr. = 0.25, $p < 0.05$), but not for the combined or vulnerable samples. Mean scores were similar for action coping and self-efficacy for all samples.

Table 4-4. Combined sample correlation coefficients between 12 variables used to assess hurricane preparedness and factors influencing preparedness in 153 households in Escambia County, Florida, 2009⁴

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Hurricane Prep	22.00	6.07	--										
2. Risk Perception	4.42	.72	.06	--									
3. Hazard Awareness	3.03	.88	.27** <.001	.22** <.001	--								
4. Motiv Relevance	3.62	1.25	.29** <.001	.32** <.001	.05	--							
5. Perceived Control	3.87	.76	.17* .04	.29** <.001	.09	.19* .02	--						
6. Self-Efficacy	4.13	.65	.17* .04	-.11	-.00	.05	.16	--					
7. Action Coping	3.54	.57	.09	.16	.19* .01	.18* .02	.30** <.001	.15	--				
8. Individual Intent	1.82	.56	.25** <.001	.25** <.001	.28** <.001	.29** <.001	.18* .03	-.01	.21** <.001	--			
9. Strong Soc Net	2.84	.84	.15	.20* .01	.15	.18* .03	.16* .05	-.07	.08	.14	--		
10. Weak Soc Net	2.52	.69	.10	.22** <.001	-.01	.28** <.001	.08	-.01	.22** <.001	.36** <.001	.42** <.001	--	
11. Respons Eff♦	2.06	.87	.35** <.001	.07	.01	.10	.16	.27** <.001	.07	.16	.14	.04	--
12. Personal Resp♦	4.5	.48	.19* .02	.32** <.001	.25** <.001	.19* .02	.36** <.001	.16	.36** <.001	.15	.02	-.17	-.10

♦ Moderator variables

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

⁴ This correlation analysis was also used in the structural equation model analysis

Table 4-5. Non-vulnerable sample correlation coefficients between 12 variables used to assess hurricane preparedness and factors influencing preparedness in 100 households in Escambia County, Florida, 2009

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Hurricane Prep	22.57	5.44	--										
2. Risk Perception	4.39	.73	.23* .02	--									
3. Hazard Awareness	3.01	.94	.27** .01	.29** <.001	--								
4. Motiv Relevance	3.49	1.25	.45** <.001	.35** <.001	.04	--							
5. Perceived Control	3.83	.67	.32** <.001	.31** <.001	.17	.30** <.001	--						
6. Self-Efficacy	4.20	.56	.16	-.01	.06	.17	.25* .02	--					
7. Action Coping	3.57	.53	.18	.16	.31**	.15	.29** <.001	.21* .04	--				
8. Individual Intent	1.8	.58	.31** <.001	.31** <.001	.30** <.001	.27** .01	.27** .01	.03	.16	--			
9. Strong Soc Net	2.95	.83	.19	.27** .01	.22*.03	.25* .02	.15	-.08	.02	.27** .01	--		
10. Weak Soc Net	2.47	.72	.16	.17	.15	.26** .01	.11	-.05	.21* .04	.37** <.001	.53** <.001	--	
11. Respons Eff♦	1.98	.84	.23* .02	.03	.05	.10	.12	.14	.05	.15	.16	.03	--
12. Personal Resp♦	4.46	.66	-.02	.13	.02	.06	.26	.25	.37** .007	-.04	-.05	.10	-.20

♦ Moderator variables

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4-6. Vulnerable sample correlation coefficients between 12 variables used to assess hurricane preparedness and factors influencing preparedness in 53 households in Escambia County, Florida, 2009

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Hurricane Prep	20.91	7.05	--										
2. Risk Perception	4.48	.71	-.20	--									
3. Hazard Awareness	3.07	.75	.30* .03	.04	--								
4. Motiv Relevance	3.85	1.23	.16	.25	.07	--							
5. Perceived Control	3.93	.91	.02	.27	-.03	.03	--						
6. Self-Efficacy	3.98	.77	.15	-.27	-.08	-.05	.09	--					
7. Action Coping	3.46	.63	-.04	.18	-.02	.27	.33* .02	.06	--				
8. Individual Intent	1.92	.51	.21	.10	.21	.31* .03	.02	.00	.36** .01	--			
9. Strong Soc Net	2.63	.83	.03	.09	.02	.14	.23	-.15	.15	-.05	--		
10. Weak Soc Net	2.60	.63	.01	.00	.18	.29* .04	.03	.09	.28	.31* .03	.24	--	
11. Respons Eff♦	2.23	.92	.48** <.001	.14	.17	.17	.09	.45** <.001	.21	.25	.21	.23	--
12. Personal Resp♦	4.58	.69	.37** <.001	.39** <.001	.36** <.001	.25* .02	.43** <.001	.13	.37** <.001	.23* .02	.09	-.08	-.05

♦ Moderator variables

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed.)

The model (Fig. 4-1) further supposes a relationship between self-efficacy, action coping and individual intentions. The results show no significant relationship between self-efficacy and individual intentions or self-efficacy and action coping in the combined, non-vulnerable and vulnerable samples. Means scores for self-efficacy and action coping were slightly lower for the vulnerable samples as compared to the combined and the non-vulnerable samples. The results indicated additional relationships with individual intentions not diagrammed in the model. Hazard awareness was significantly correlated with individual intentions in the combined sample (corr. = 0.28, $p < 0.01$) and the non-vulnerable sample (corr. = 0.31, $p < 0.01$), but not the vulnerable sample. Motivational relevance correlated significantly with individual intentions in the combined sample (corr. = 0.25, $p < 0.01$), non-vulnerable sample (corr. = 0.31, $p < 0.01$), and the vulnerable sample (corr. = 0.31, $p < 0.05$). Finally, the results showed a relationship between individual intentions and perceived control only in the combined sample (corr. = 0.18, $p < 0.05$). The non-vulnerable and vulnerable samples showed no relationship.

My model indicates a direct relationship between individual intentions and the outcome variable, hurricane preparation, or an indirect relationship with the outcome variable through strong or weak social networks. The results reflect a positive and significant correlation between individual intentions and hurricane preparation in the combined sample (corr. = 0.25, $p < 0.01$) and the non-vulnerable sample (corr. = 0.31, $p < 0.01$). This relationship was not significant in the vulnerable sample. Mean scores were similar for all samples. The non-vulnerable sample showed a relationship between individual intentions and strong social networks (corr. = 0.27, $p < 0.01$). Individual intentions were strongly correlated with weak social networks in the combined

sample (corr. = 0.36, $p < 0.01$), non-vulnerable sample (corr. = 0.37, $p < 0.01$), and the vulnerable sample (corr. = 0.31, $p < 0.01$). Means scores were similar for all samples.

Finally, my model reflects a relationship between the moderator variables of response efficacy, past experience, and personal responsibility with individual intentions and the outcome variable, hurricane preparation. As previously noted, past experience was eliminated from the analyses due to low reliability scores. The results reflect a positive and significant correlation between response efficacy and hurricane preparation in the combined sample (corr. = 0.35, $p < 0.01$), non-vulnerable sample (corr. = 0.23, $p < 0.05$), and the vulnerable sample (corr. = 0.48, $p < 0.01$). The results also reflect a significant negative correlation between response efficacy and self-efficacy in the combined sample (corr. = -0.27, $p < 0.01$) and the vulnerable sample (corr. = -0.45, $p < 0.01$). Mean scores for response efficacy were higher for the vulnerable sample as compared to the combined and non-vulnerable samples.

The results also showed a significant correlation between personal responsibility and hurricane preparation in the combined sample (corr. = 0.19, $p < .05$) and the vulnerable sample (corr. = .37, $p < .001$). Only the vulnerable sample reflected a significant correlation between personal responsibility and individual intentions (corr. = 0.23, $p < .05$). Mean scores for personal responsibility were higher for the vulnerable sample as compared to the combined and non-vulnerable samples.

Analysis for this research also included structural equation modeling. The hypothesized model is presented in Figure 4-1. Multiple fit indices in addition to the chi-square statistic were used to evaluate model fit. This approach is recommended because the chi-square statistic is influenced by sample size (Hu & Bentler, 1999).

Additional fit indices that were examined were the root mean square error of approximation (RMSEA), the comparative fit index (CFI), Tucker Lewis index (TLI, also known as the non-normed fit index), and the standardized root mean square residual (SRMR). Values greater than .90 and .95 for the CFI and TLI indicate acceptable and good fit, respectively (Hu & Bentler, 1999). Values less than 0.08 for the RMSEA indicate a reasonable fit, and RMSEA values less than 0.05 indicate good fit (Hu & Bentler, 1999). Values less than 0.05 SRMR also indicate a good fit.

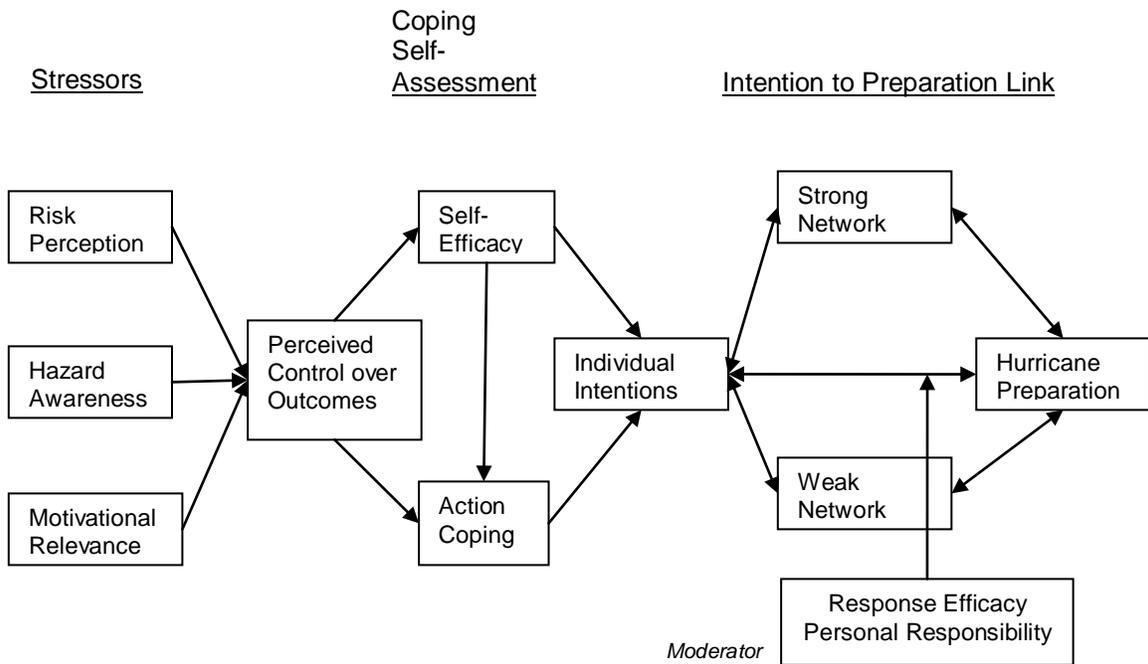


Figure 4-1. Hypothesized Hurricane Preparation Decision Model

Table 4-7. Results of path analysis in SEM of the hypothesized hurricane preparation decision model used to assess hurricane preparedness and factors influencing preparedness in 153 households in Escambia County, Florida, 2009

Model	χ^2	df	CFI	TLI	SRMR	RMSEA
<i>Hypothesized Model</i>	55.77*	16	.50	.22	.11	.13 (.09 - .17)
<i>Model w/Vulnerability</i>	12.96	7	.88	.76	.06	.08 (.00 - .14)
<i>Model w/Pers Res</i>	8.62	7	.96	.93	.05	.04 (.00 - .11)

* $p < .001$

Note. All values are rounded to two decimal places. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation. A 90% Confidence Interval is presented for the RMSEA (Kline, 2005).

In order to test for moderation in structural equation modeling, samples must be split according to the hypothesized moderator. The model is then tested across both samples. In the present study, splitting the sample across any of the hypothesized moderators would result in a sample that is too small for this form of analysis.

Therefore, moderation analyses were conducted for hypothesized pathways in a multiple regression framework (Baron & Kenny, 1986). Specifically, three regression analyses were conducted to examine the hypothesized moderators (response efficacy, past experience, and perceived responsibility).

Results of the hierarchical regression analyses revealed that hurricane preparedness was predicted by individual intention ($\beta = .25, p < .01$), $F(1, 151) = 9.74, p < .01$), accounting for 6.1 percent of the variance of hazard preparedness. However, the addition of interaction terms with response efficacy or perceived responsibility did not add significantly to the model. Therefore, there was no evidence that these variables moderate the relationship between individual intentions and hurricane preparedness.

Vulnerability (0 = non-vulnerable; 1 = vulnerable) and personal responsibility were examined as predictors to the final model. In both cases, the model fit decreases and the pathways were not significant (vulnerability, $p = 0.35$; personal responsibility, $p = 0.30$) (Table 4-7).

The hypothesized hurricane preparation decision model did not fit the data well (Table 4-7). Based on the correlation and structural equation model analyses, the data do not support the hypothesis that causal pathways found in Paton's social-cognitive model for earthquake preparation decisions will be the same for the hurricane preparation decision process.

H2: Strong and weak social networks added as a link between intentions and hurricane preparations increase the explanatory power of the model.

My model posits a strong and weak social network link between individual intentions and hurricane preparation (Fig 4-1). As noted previously, items under the strong and weak social network variables were recoded due to a large amount of missing data. The results reflected a significant correlation between weak social networks and individual intentions in the combined, non-vulnerable and vulnerable sample (Table 4-4, 4-5 and 4-6).

Only the non-vulnerable sample reflected a significant correlation between strong social network and individual intentions ($\text{corr.} = .27, p < .01$). Finally, there was no correlation in any of the samples between strong and weak social networks and hurricane preparation. The results show that strong and weak social networks do not add to the explanatory power of the model. This will be discussed further in Chapter 5.

H3: Vulnerable and non-vulnerable populations differ in their hurricane preparation decision process.

The correlation analysis supports a more complex model in the combined and non-vulnerable samples (Table 4-4 and 4-5). Many of the linkages in the model are reflected in the correlations. Risk perception was significantly correlated with perceived control and individual intentions. Motivational relevance was also significantly correlated with perceived control. Although not reflected in the model, perceived control was directly correlated with individual intentions and, as reflected in the model, with action coping. Only the non-vulnerable sample showed a correlation between self-efficacy and perceived control as modeled. Individual intentions were significantly correlated with hurricane preparations in the combined and non-vulnerable samples. Strong and weak social networks were not significantly correlated with individual intentions or disaster preparations in the combined and non-vulnerable samples. The moderator variable, response efficacy, was significantly correlated with the outcome variable, hurricane preparations in the combined and non-vulnerable sample.

The results of the correlation analyses support a much less complex model for the vulnerable population. There were fewer significant correlations and some of the correlations were different than my model. For example, there was a correlation between motivation relevance and weak network ties, not perceived control. Similar to the model, there were correlations between perceived control, action coping, individual intentions, and weak ties. The only correlation linked to hurricane preparation was response efficacy. The results reflect that vulnerable and non-vulnerable populations differ in their hurricane preparation decision process.

Post-hoc Modification to the Hypothesized Model

Using structural equation modeling, the hypothesized hurricane preparation decision model was modified using *post-hoc* modification indices. Two sensible modifications were indicated. Specifically, it was suggested that a path be added from risk perception to individual intention and from perceived control to hurricane preparation. These paths are consistent with the overall model in that the assumed directionality is consistent. The only difference is that some of the hypothesized mediational pathways are not supported fully. The revised model still did not adequately fit the data. While no additional modification indices were plausible, as further revisions were made by removing three variables that did not have significant relations with any other variables in the previous models (self-efficacy, hazard awareness, and motivational relevance). With these variables removed, the model fit the data well, and better than the hypothesized model, $\chi^2_{\text{diff}}(12) = 66.61, p < .001$. This revised model is presented in Figure 4-2. Standardized and unstandardized parameter estimates⁵ with standard errors are presented in Table 4-8.

⁵ Standardized estimates are computed with standardized variables. Standardized variables are variables that have been transformed so that its mean is 0 and its standard deviation is 1.0. The most common method to standardize a variable is by converting the raw score to a z score. Unstandardized estimates are derived with unstandardized variables, that is, variables in their original units (scale) rather than expressed as z scores (Kline, 2005)

Table 4-7. Results of path analysis in SEM of the hypothesized hurricane preparation decision model used to assess hurricane preparedness and factors influencing preparedness in 153 households in Escambia County, Florida, 2009

Model	χ^2	df	CFI	TLI	SRMR	RMSEA
<i>Hypothesized Model</i>	55.77*	16	.50	.22	.11	.13 (.09 - .17)
<i>Revision 1</i>	41.25*	14	.66	.37	.07	.11 (.07 - .15)
<i>Revision 2</i>	2.93	4	1.00	1.00	.03	.00 (.00 - .11)

* $p < .001$

Note. All values are rounded to two decimal places. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation. A 90% Confidence Interval is presented for the RMSEA (Kline, 2005).

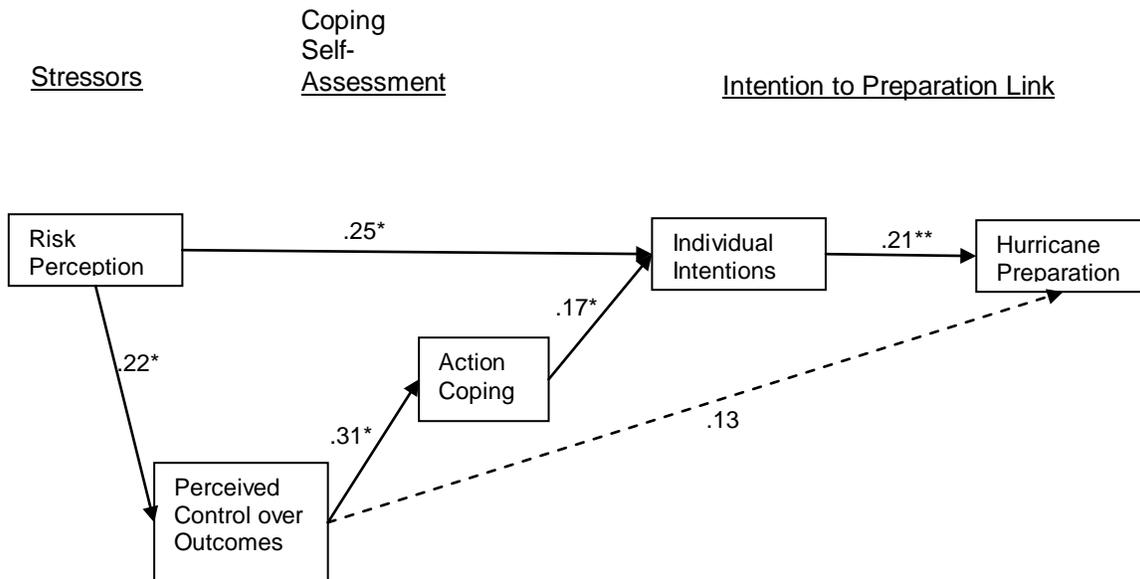


Figure 4-2. Revised Hurricane Preparation Decision Model

Table 4-8. Significance Levels and Unstandardized and Standardized Estimates and Correlations for the Exercise Model

<i>Parameter Estimate</i>	<i>Unstandardized</i>	<i>Standardized Correlations⁶</i>	
Structural Model			
Indiv Intent à Hurr. Prep	.46 (.17)**	.21	.25**
Perceived Cont à Hurr. Prep	.26 (.16)	.13	.17*
Action Coping à Indiv Intent	.21 (.31)*	.17	.21**
Risk Percept à Indiv Intent	.31 (.10)**	.22	.25**
Perceived Cont à Action Coping	.23 (.06)**	.31	.30*
Risk Percept à Perceived Cont	.31 (.11)**	.22	.29**

Note. Full Sample: $\chi^2(4) = 2.93$, $p = ns$, CFI = 1.00, TLI = 1.00, SRMR = .03, RMSEA = .00 (CI_{90%} = .00 - .11).

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

Binary Logistic Regression

A binary logistic regression analysis was conducted to determine if the model could adequately predict membership in the ‘vulnerability’ category. This served as an alternative way to compare the two populations given the limitation imposed by sample size. Logistic binary regression carries fewer assumptions and multivariate normality or homogeneity of variance-covariance are not required. Additionally, logistic regression can incorporate a large number of variables, even when the sample is relatively small (Kinnear & Gray, 2010).

The analysis showed a -2 Log likelihood of 129.04. This statistic is similar to the chi-square statistic in that a large value indicates that the regression model fits the data poorly. The omnibus test of model coefficients shows the regression model improves significantly in predicting category membership as all the p -values are 0.001. The success rate of correct category assignments when the regression model has been applied to the data improved from 69% (Block 0-absence of info about regression) to

⁶ The SEM unstandardized estimates reflect indirect effects. The correlation estimates reflect direct effects.

77.7%. All variables were used in the regression model. Using the 'enter' method, it was found that only self efficacy (.04), action coping (.03) and strong social networks (0.00) were significant at $p < 0.05$. At $p < 0.10$, perceived control (.07) and weak social network (0.09) are significant.

Additional Analyses of Full Sample

To incorporate some cases with missing data, I conducted some analyses with the complete sample of 245 cases. I focused my analysis on the variables used in the revised model. Starting with the complete sample of 245 cases, I explored the data using the following variables: risk perception, perceived control, action coping, individual intent and hurricane preparation. The result was elimination of 18 cases that were found to be outliers for one or more of the variables.

A t- test for independent samples was conducted to evaluate differences between the vulnerable and non-vulnerable samples with regard to these variables. The only variables that differed significantly were risk perception and individual intentions ($p < 0.01$). Means scores for the other variables were not significant.

Table 4-9. Groups statistics and independent samples test for correlation coefficients between 5 variables used to assess hurricane preparedness and factors influencing preparedness in 220 households in Escambia County, Florida, 2009

Variables	N	Mean	Std Dev	t-Test for Equality of Means	
NV = Nonvulnerable; V = Vulnerable				t	Sig. (2-tailed)
Outcome					
NV	118	2.89	.89	-1.15	.25
V	106	3.04	1.02		
Risk Per					
NV	110	3.76	.67	-3.43	.00
V	93	4.03	.46		
Perc Con					
NV	107	3.85	.52	-1.52	.13
V	88	3.96	.60		
Action Cope					
NV	114	3.61	.51	.62	.53
V	100	3.57	.54		

Ind Int					
NV	115	1.72	.54	-3.52	.00
V	101	1.98	.56		

Summary

This chapter presented the analysis and results of the study. First, reliability tests were conducted post-hoc on all instruments. Indicators were eliminated from risk perception, motivational relevance and perceived control. Additionally, the moderator variable of personal responsibility was deleted from the model because the reliability scores were too low.

Initially, it was found that the primary statistical analysis would be limited due to size of the useable sample (n = 154). Based on the independent samples t-test conducted on all variables, equal variances were assumed as significance levels were close to or greater than 0.05. Therefore, the sample could be treated as one population. The research for this study is based on comparing a vulnerable population to a non-vulnerable population. Comparing two groups would be difficult as the sample sizes were even smaller (non-vulnerable = 53 and vulnerable = 100). However, in an effort to delineate any differences, if possible, a descriptive and correlation analysis was conducted to analyze the 11 different variables for each population. Structural equation model analyses were also conducted to test hypotheses one and two.

The correlation and structural equation model results reflected a similarity between the hypothesized model and Paton's social-cognitive model. However, the results only reflected similarities. Overall, the results do not support the hypothesis that causal pathways found in Paton's social-cognitive model for earthquake preparation

decisions will be the same for the hurricane preparation decision process. Additionally, the results did not support the hypothesis that strong and social networks add explanatory power to the model.

Finally, the correlation analysis showed little difference between the combined sample of 153 and the non-vulnerable sample of 100. The correlation analysis reflected a more complex model in the combined and non-vulnerable samples. Many of the linkages in the model are reflected in the correlations. The results of the correlation analyses support a much less complex model for the vulnerable population. There were fewer significant correlations and some of the correlations were different than my model. Therefore, the hypothesis that vulnerable and non-vulnerable populations differ in their hurricane preparation decision process is supported by the data.

The binary logistic regression analysis indicated that the model did not fit the data well. This was also the case with the structural equation model. On the other hand, the binary logistic regression model indicated that by examining the variables of self-efficacy, action coping, and strong and weak social networks, one could successfully categorize individuals (vulnerable vs non-vulnerable) at a 77% rate.

Finally, a few additional analyses were conducted with the complete sample. Recognizing that one cannot draw too many conclusions from the *t*-test and correlation analysis, there are still similarities between the full sample (n=245) and the smaller sample (n = 153). Discussion of the results of the different analyses and their policy implications will be presented in the next chapter.

CHAPTER 5 DISCUSSION AND CONCLUSION

The purpose of this research was to explore hurricane preparation decisions by vulnerable and non-vulnerable populations. This last chapter contains five sections. The first section discusses conclusions in regards to the specific hypotheses as stipulated in Chapter 2. The second section reviews the theoretical perspectives and how the research supports or corroborates the theories used in the research. The third section discusses the overarching conclusion of the research and policy implications. The fourth section briefly discusses limitations of the study. Finally, the last section suggests future work and areas of focus for research.

Discussion of Hypotheses

H1: The causal pathways found in Paton's social-cognitive model for earthquake preparation decisions will be the same for the hurricane preparation decision process.

The hypothesized model indicates that individuals decide to prepare based on a sequence of social cognitive activities (see Figure 4-1). Paton (2003) argues that motivators or precursors lead to intention formation that eventually results in preparation actions. The hypothesis was not supported by the data. The same causal pathways in Paton's (2003) model were not evident in my hypothesized model. However, further analysis of the model reflected similarities in variables and directionality.

Numerous variables were eliminated during the analysis, but the foundational concept that social cognitive factors lead to individual intentions that result in hurricane preparations was proven to be correct. The low number of cases analyzed for the complex hypothesized model may have been a factor in eliminating many variables. The revised model shows that two stressor variables, hazard awareness and

motivational relevance, were eliminated. These are two variables that Paton's (2005) earthquake research indicated are important. Similar to my revised model, Paton's (2005) model also shows that control and coping are factors that lead to individual intentions. Finally, intention to prepare shows a link to hurricane preparations. Analysis failed to confirm moderating roles for response efficacy and personal responsibility.

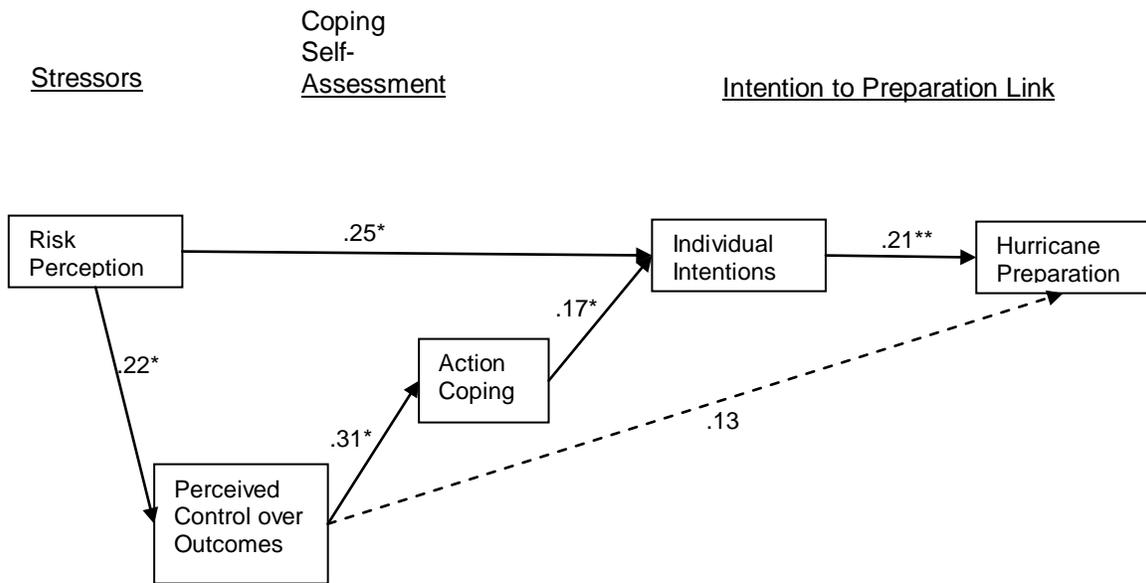


Figure 5-1. Revised Model.

Findings from this study indicate that there are three directional paths to disaster preparation (Fig. 5-1). In the first path, individuals go from risk perception directly to individual intentions with the result being hurricane preparations. A second path indicates risk perception leads to perceived control resulting in hurricane preparations. In the final path, individuals go from risk perception to perceived control to individual intentions through action coping.

This model is much less complex than my hypothesized model. The simpler model excludes a number of cognitive variables normally found in decision-making

theories, such as the theory of planned behavior or the theory of reasoned action. Many decision-making theories posit that individuals weigh their knowledge, abilities and resources against the strength of the event (Basolo et al., 2009; Lindell & Whitney, 2000). As Basolo et al. state "...individuals perform a cognitive calculus assessing qualities about themselves and attributes of the hazard adjustments or actions to be taken." Attitudes about the actions to take are more influential than the perception of the hazard (Basolo et al., 2009). Although this "cognitive calculus" is not evident in the revised model, it is evident in the correlation analyses.

H2: Strong and weak social networks added as a link between intentions and hurricane preparations increase the explanatory power of the model.

It was my assumption that vulnerable populations would utilize social networks (strong or weak) in hurricane preparation actions. Unfortunately, due to the amount of missing data, I was unable to analyze these variables as fully as I would have liked. They were not used in the structural equation model analysis for this reason.

However, I made an attempt to glean some information from the data I had in regards to social networks. As noted in Chapter 4, I recoded missing data on surveys where some but not all items had been checked in the weak and strong social network questions. If some had been checked and others were blank, I recoded the blanks as 'never.' I assumed that many respondents chose to select only items that applied to them. If all items were left blank, the questionnaire was not used in the analysis.

None of the samples showed a correlation between strong and weak social networks and disaster preparation. However, there were strong correlations between

weak social networks and individual intentions in the combined, non-vulnerable and vulnerable sample.

Strong social networks were classified as family, friends, neighbors and co-workers. The non-vulnerable group showed a significantly higher mean score in the use of strong social networks for hurricane preparation. The vulnerable population showed mean scores of 3.1 for family and 2.9 for friends and the non-vulnerable had mean scores of 3.8 for family and 3.3 for friends.

Weak social networks were classified as churches, local law enforcement, local emergency offices, social clubs, TV, radio and county extension. A review of the responses indicates that between 70 and 80 percent of the vulnerable and non-vulnerable populations use TV or radio almost always or always to obtain hurricane information. The mean score (scale of 1-5) for the vulnerable population for use of TV was 4.58 and 4.35 for radio. The non-vulnerable population had scores of 4.32 for TV and 4.06 for radio. The local emergency management office had scores of 3.54 for the vulnerable population and 3.41 for the non-vulnerable population.

The hypothesis that adding strong and weak social networks as a link between intentions and hurricane preparations would increase the explanatory power of the model was not supported by the data. The overwhelming majority (93%) of the respondents in the useable sample believe they are personally responsible for preparing for a hurricane. They also agree that the government is not responsible for making sure they are prepared. A factor that may have influenced this result in Escambia County is the increased amount of information that the county may be disseminating as part of their emergency planning. A cursory review of various

websites for Escambia County indicates that the county is taking aggressive action to inform residents about hurricane preparations. For example, the creation of BRACE was a county decision. The BRACE's statement of purpose is primarily to "engage the community in disaster preparedness, response and recovery" (BRACE, 2009). In fact, the County's emergency management plan states, "BRACE will coordinate social and support services utilizing local, donated and purchased resources from its membership and the community abroad to meet individual unmet needs and manage and maintain social service casework where appropriate" (BRACE, 2009).

The results of the correlation analysis may indicate that the strong and weak social networks should fall under coping self-assessment and not intention to prepare. Eisenman, et al.'s (2007) research on disaster planning and risk communication in the wake of Hurricane Katrina showed that social networks (family, friends and neighbors) influenced decision making in regards to evacuation. The correlations between social networks and the coping self-assessment mediator variables in my model would support the idea that social networks play a more important role in deciding to prepare rather than actual preparation actions.

The vulnerable sample only showed correlations with the weak social network variable. As stated previously, weak social networks included indicators such as media outlets. Media outlets (TV and radio) are generally used extensively in the dissemination of hurricane preparation information. Therefore, the weak social network appears to have played a predominant role for the vulnerable sample.

Eisenman et al. (2007) found that individuals tend to integrate media messages with information from family and friends. I conducted a correlation analysis combining

the indicators from both my strong and weak social networks as that would combine family and friends with media to determine if social networks would be correlated with hurricane preparations. Once again, there was no correlation between social network and hurricane preparation. The same correlations appeared when using separate variables (strong and weak) and in the analysis combining the two. This would support the conclusion that strong and weak social networks are more useful in the coping self-assessment phase.

H3: Vulnerable and non-vulnerable populations differ in their hurricane preparation decision process.

Hurricane preparedness was determined by calculating a score based on responses to a yes/no hurricane checklist from the Ready.gov website. Based on a total possible score of 31 for the outcome variable, the mean scores were 22.31 for the non-vulnerable sample and 21.0 for the vulnerable sample. After normalizing responses by using the square root adjustment, there is no significance between the vulnerable and non-vulnerable populations in regards to hurricane preparations. Several factors support this assumption. First, 96 percent of all respondents have experienced at least one hurricane. In fact, 80 percent have experienced more than one hurricane. Additionally, 74 percent of respondents experienced loss or damage from a hurricane.

Lindell and Whitney (2000) found in their study about seismic hazard adjustment that increasing people's knowledge about a hazard will positively affect their adjustment to the hazard. The findings in my research support this idea. If one has experienced a hurricane, one knows what to expect and thus might be encouraged to seek information about how to prepare. Respondents in my study were asked questions regarding the

definition of hurricane watch versus warning and how hurricanes were classified. Over 94 percent knew that hurricanes were classified based on wind speed and 67 percent knew that a hurricane watch meant that a hurricane could hit within 36 hours.

Interestingly, only 38 percent knew that a hurricane warning meant a hurricane could hit within 24 hours.

Another supporting factor that may have influenced preparation levels is that Escambia County has an aggressive hurricane preparation program. Since Hurricane Ivan struck Escambia County in 2004, county leadership has stressed the importance of identifying vulnerable populations so appropriate hurricane preparations and response can be planned. As a result, they have created BRACE. This is an umbrella organization that has 280 partners that work together in disaster preparation planning. They have a database of over 57,000 individual vulnerable households/members that they can track in times of emergencies.

Another factor that may have influenced this particular outcome is the timing that the questionnaire was administered. The questionnaire was administered in September and October. This was mid-hurricane season. Therefore, it could be assumed that a large amount of preparation information was most likely being publicized. Additionally, shortly before this questionnaire was mailed, Tropical Storm Claudette struck Escambia County and the surrounding areas. Thus, any preparation actions taken for Tropical Storm Claudette may have still been in place when the questionnaire was mailed.

The literature on disaster preparation and vulnerable communities generally indicates that vulnerable populations are less inclined to prepare or have the resources to prepare for hurricanes. My research shows this is not the case. My model indicates

that response efficacy will serve as a moderator variable between individual intentions and hurricane preparation. All samples (combined, non-vulnerable and vulnerable) showed a significant correlation between response efficacy and hurricane preparation. However, there was no correlation between individual intention and response efficacy. An interesting observation is that the combined and vulnerable sample indicated a significant correlation between self-efficacy and response efficacy. This would be consistent with the person-relative-to-event (PrE) theory that postulates that self-efficacy refers to self-assessments of one's "knowledge, skill, ability, energy, and financial resources" in relation to a hazard event (Lindell and Whitney, 2000, p. 14). Indicators for self-efficacy were based on generalized notions of how one might deal with problems faced in everyday life. Response efficacy indicators queried respondents in regards to specific hurricane preparations. Respondents were asked to indicate to what degree did cost, skill or knowledge required, time, other things to think about, and need for cooperation, prevent them from preparing for a hurricane. These indicators are the same indicators used in the PrE theory.

Bandura (1989) argues that self-efficacy, a construct of social cognitive theory, is not a "global personality trait" but is specific to a given behavior (Wenzel et al., 2002). Based on the correlations reflected in the combined and vulnerable sample, one might conclude that the results reflect a high self-efficacy for hurricane preparation—not necessarily self-efficacy for other behaviors. The high self-efficacy could be related to past experience. Although the variable of past experience was eliminated from analysis due to poor reliability concerns, researchers posit that individuals who have experienced

a natural disaster are more likely to prepare, even more so if it was a negative experience (Basolo, et al., 2009; Mileti, 1999).

The correlation analyses for the combined and non-vulnerable sample support the decision making theories in regards to the number of cognitive variables used in the process. However, the vulnerable sample reflected something very different. The correlation analysis for the vulnerable sample fell more in line with the revised model in that there were, by far, the fewest amount of correlations between the variables. It appears the vulnerable population is not inclined to utilize all the cognitive processes in deciding to prepare or not prepare. Based on the correlation analysis, the vulnerable sample appears to “react” by preparing rather than contemplate what would happen if they did not prepare. I tentatively conclude that the vulnerable population was responding to media messages (weak social network) disseminated by the local government (emergency planners).

Theoretical Retrospective

Social Cognitive Theory

An analysis of the revised model indicates that the theories used in the hypothesized model formulation were appropriate. Social cognitive theory addresses the psychosocial constructs that explain why people make certain choices. Individuals decide to prepare or not prepare for hurricanes. In discussing social cognitive theory, Bandura (2001) refers to core features of human agency as intentionality, forethought, self-reactiveness and self-reflectiveness. The hypothesized and revised models show a consistent directionality that supports human agency features of intentionality and forethought. Intentionality refers to human actions that may involve certain inducements. As the model indicates, the inducements of risk perception, hazard

awareness and motivational relevance (referred to as stressors) would lead an individual to intentions. Analysis of the model indicates that the stressor of risk perception is, in fact, an inducement to intention to act.

Bandura (2001) argues that intentions also center on plans of action. The construct of action coping as shown in the model supports Bandura's argument in that action coping is linked to individual intentions. Action coping is also referred to as problem-solving coping. Respondents were asked questions such as to the extent to which they make plans of action, develop strategies, decide what steps to take and decide how best to handle a problem in dealing with everyday life problems. These questions get at the heart of intentionality as described by Bandura (2001).

Forethought provides direction, coherence and meaning (Bandura, 2001). Individuals anticipate consequences of future events and decide on courses of action accordingly. Bandura (2001) argues that future events cannot be a motivator because they do not actually exist. However, if represented cognitively in the present, future events can motivate and direct behavior. This would be the case with hurricanes. Hurricanes are presented in the present in many ways. For example, hurricane season runs from June through November. People know that this is the most likely time for a hurricane to occur. Emergency planners publicize hurricane preparation information in the spring to encourage households to start preparation action. In fact, hurricane projections issued in December for the following year are an attempt to cognitively represent the threat of a hurricane. This cognitive representation would be an impetus for individual disaster preparation behavior.

Stress and Coping

The transactional model of stress and coping identifies cognitive appraisal and coping as factors that influence future outcomes for individuals (Wenzel et al, 2002; Folkman et al, 1986). The theory links coping processes with stressful events. The transactional model of stress and coping starts with a mediating process that identifies stressors. These stressors are viewed through primary appraisal and secondary appraisal. The primary appraisal is the initial evaluation of the event. In my research, the event would be the hurricane. As stated previously, these future occurring events are represented cognitively through various forms of media and information dissemination.

My hypothesized model used variables such as risk perception, hazard awareness and motivational relevance as stressors. These are factors found in the primary appraisal of the stress and coping model. Secondary appraisal determines what actions can be taken to improve the outcome of the event or encounter (Folkman et al, 1986). I incorporated secondary appraisal factors like perceived control over outcomes and self-efficacy in my model. My revised model shows that primary and secondary appraisal factors (stressors) are linked to intentions and consistent with the theory of stress and coping. However, self-efficacy was not a significant factor in my revised model. Perceived control over outcomes was linked directly with action coping and hurricane preparations.

My research attempted to compare a vulnerable population to a non-vulnerable population with regard to the hypothesized model. Stress literature indicates that vulnerable populations may be more susceptible or reactive to stressors (Thoits, 1995). However, other research indicates that stressors differ and that the particular event

determines whether a vulnerable population reacts differently (Thoits, 1995 and 1987). My research does not support the proposition that vulnerable populations respond differently to stressors as they relate to hurricanes. The stressor of a future hurricane event differs greatly from the types of events in the stress research. Much of the research about stress deals with health and well-being issues. Therefore, it is difficult to generalize that vulnerable populations respond differently without further research about different types of stressors.

Social Network Theory

Social interactions have always been at the heart of sociological inquiry and social networks provide the mechanism for social interactions (Pescosolido, 2006 and 1992). Pescosolido (1992) argues that interaction is a primary element in the decision-making process. Granovetter (1985, p. 486) states that the approach to social relations “has the paradoxical effect of preserving atomized decision making even when decisions are seen to involve more than one individual.” The exploration of social interactions can be traced to Georg Simmel’s (1955) work *Conflict and the Web of Group Affiliations*. Simmel (1955, p. 163) starts by stating, “Society arises from the individual and the individual arises out of association.” The strong and weak networks that Granovetter (1982) refers to can be traced to Simmel’s ideas of organic and rational motivations for joining groups (Allen, 2007). Organic motivations are based on natural connections such as family. Rational motivations are based on choice. Allen (2007) uses the terms of primary and secondary group and Granovetter (1982) uses the term of strong and weak networks.

My research examined the variables of strong and weak networks and how they impact hurricane preparations. My research showed minimal to no correlation between

social networks (weak or strong) and hurricane preparation. There are factors that have produced this result. First, the number of useable surveys may not have been large enough to present a statistically strong analysis. Second, my choices of what constituted a strong or weak network may have been flawed. While family and friends can easily be considered a strong network, it is not as clear how TV and radio should be classified. Should TV and radio be considered part of an individual's network or are they simply resources used for information dissemination? I believe further research in this regard is warranted.

Finally, my hypothesized model had social networks situated as a possible link between individual intentions and hurricane preparations. Research in stress and coping literature discusses social support instead of social networks. Thoits (1986) argues that coping and social support have similar functions—they are both directed at changing or managing stressful situations. Reconceptualizing social support as coping assistance would warrant relocating the social network or social support construct in the model to precede individual intentions. Again, I believe future research in this area would be beneficial to understanding how vulnerable communities use social support systems in disaster preparation.

Policy Implications

This study has shown that vulnerable communities choose to prepare for disaster at the same level as non-vulnerable communities. The only difference between the two communities is that non-vulnerable communities use a more complex cognitive analysis before deciding to prepare. The vulnerable community, on the other hand, does not employ a complex cognitive analysis and appears to react based on hazard awareness. The extent to which vulnerable communities receive information in about natural

hazards or hurricanes influences their decisions to prepare. Therefore, a program that includes extensive information dissemination to all residents would be useful to ensure vulnerable and non-vulnerable populations prepare.

The State of Florida Comprehensive Emergency Management Plan 2004 (FL CEMP 2004) directs counties to implement a broad-based public awareness, education and information program designed to reach all citizens of the county. Hayek (1945) discusses how certain individuals in society may have an advantage over others as they may have more information that would be beneficial in making decisions. This theory is applicable to the study of vulnerable communities and hurricane preparations. Factors that define a vulnerable community such as age, income, and disability are often the same factors that limit the amount of information provided or, if provided, understood by the vulnerable populations. Therefore, the goal for any hurricane preparedness policy should be that every citizen of the state of Florida has equal access to information that could improve their preparation actions for hazard events.

The current statutes and plans make no distinction for vulnerable populations. Current policies only address special needs populations such as disabled, visual or hearing impaired (FL CEMP 2004). The lack of addressing other vulnerable populations in emergency management plans may result in a large group of citizens not being prepared for hazard events. Yet, my study and other studies have shown that vulnerable populations will take preparations prior to the onset of a disaster event if the population is aware of what needs to be done (Tobin et al., 2006).

Escambia County has a proactive emergency preparation program and has identified over 50,000 local residents that are classified as vulnerable. Personal and

contact information for each of these residents is maintained in a database. Working through service and support agencies and organizations, the county is able to ensure residents receive the information and support they need to prepare for hurricanes. I believe the efforts the county has taken to ensure increased preparedness has increased the level of awareness by its vulnerable populations with the result of a higher preparedness level by its vulnerable residents.

This study shows that vulnerable populations are able, willing and do prepare for hurricanes if they are aware of the hazard. The State of Florida should consider any model or program that improves dissemination of hurricane preparation information to vulnerable populations. Escambia County may serve as a model as they have found a way to identify vulnerable residents and are using supporting service agencies and organizations to channel the information to the residents they serve.

Limitations of the Study

The primary limitation for this study was the number of useable cases for analysis. Although 245 questionnaires were returned from a mail-out of 1500, only 153 cases were useable due to missing data. Funding constraints limited the mail out to 1500 residents. For the complex model I was using and the fact that I was attempting to obtain a large enough sample from the vulnerable population, I believe it would have taken another 3000 questionnaires in order to obtain a statistically powerful sample. Another possibility, had funding been available, would have been to conduct the questionnaire via phone or in person to ensure all data was obtained.

Future Research

I believe that my research and other research have shown there is a directional link between risk perception and individual intentions resulting in disaster preparations.

Unfortunately, my research provided little evidence as to the impact of social networks on hurricane preparation decisions. This is an area that I believe should be examined further, especially in regards to vulnerable populations. There has been an abundant amount of research conducted examining how social support impacts coping with stressful situations. However, most of this research has been done in the health behavior areas. It would be beneficial and constructive to examine social support in regards to coping with disaster. Some questions for consideration in future research:

1. What does vulnerability really mean?
2. What degree does vulnerability and social isolation correlate?
3. Self-help...would it work with vulnerable populations?
4. How does one create conditions for empowering vulnerable populations to take disaster preparation actions?

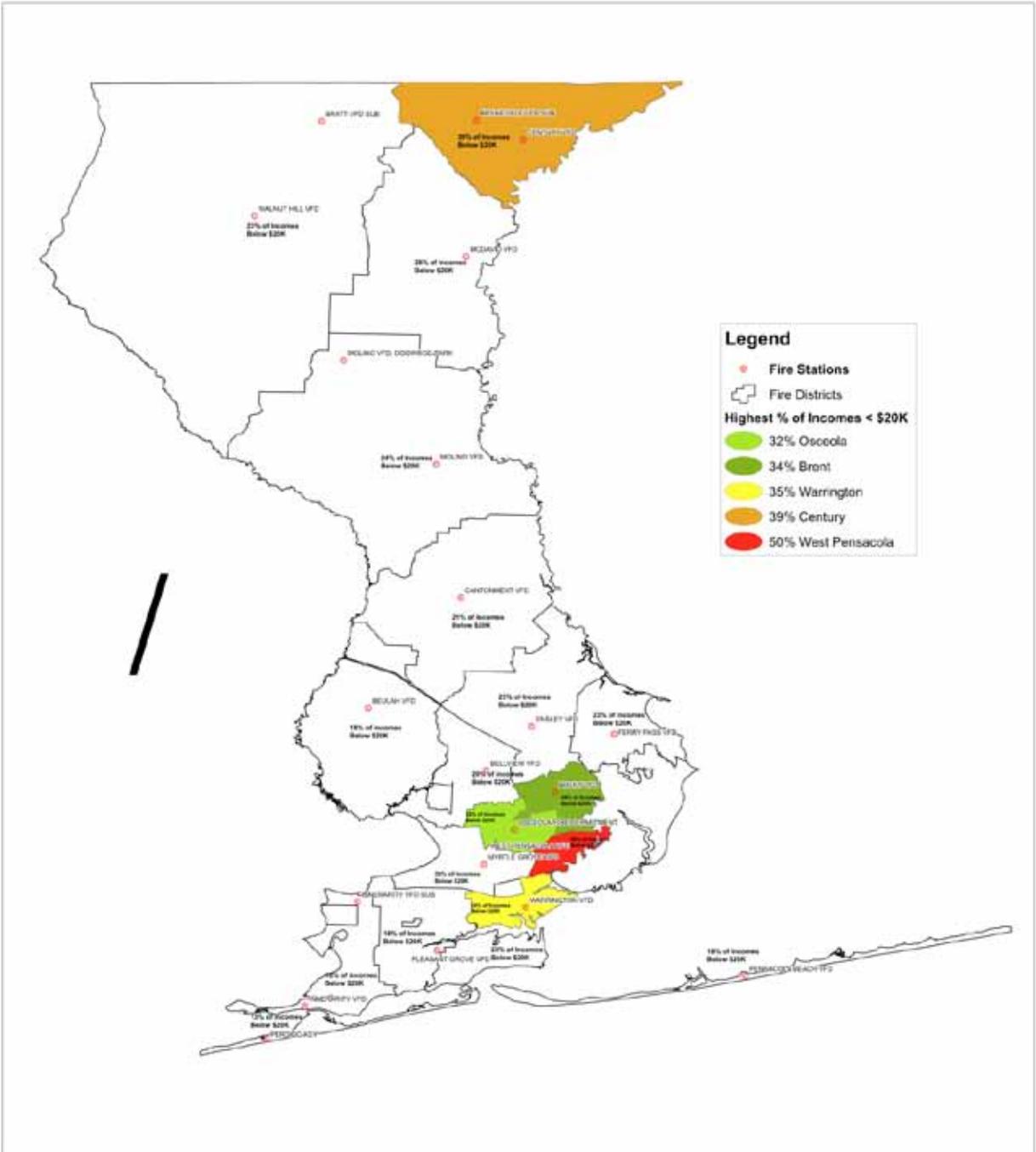
APPENDIX A
LIST OF VARIABLES AND SCALAR RESPONSE RANGE

Variables	Items	Scalar Response Range	
Risk Perception	A hurricane could pose a threat to your personal safety A hurricane could pose a threat to your daily life A hurricane could pose a threat to your property The most likely time within which a damaging hurricane could affect me is: this year; next year; within 3 years; within 5 years	1-5	Strongly disagree to strongly agree
Hazard Awareness	Please describe how much you: think about hurricanes talk about hurricanes	1-5	Not at all to a great deal
Motivational Relevance	I get nervous when there is discussion about approaching hurricanes When hurricane ads come on TV, I change the channel or don't pay attention I avoid things that remind me of hurricanes If I believe a hurricane is approaching, I make sure I know the evacuation route If I believe a hurricane is approaching, I make sure I know where my shelter is I avoid thinking about hurricanes	1-5	Not at all to a great deal
Perceived Control	Hurricanes are too destructive to bother preparing for A serious hurricane is unlikely to occur during your lifetime Preparing for hurricanes will reduce damage to my home should a hurricane occur Preparing for a hurricane will improve my everyday living conditions Preparing for a hurricane will improve the values of my house/property Preparing for hurricanes will reduce the disruption to family/community life following a hurricane Preparing for hurricanes is a hassle for me	1-5	Strongly disagree to strongly agree
Self Efficacy	I have considerable control over what happens in my life I can solve most of the problems I have by myself What happens to me in the future mostly depends on me I can do a lot to change many of the important things in my life I can do just about anything if I really set my mind on it I rarely feel helpless in dealing with the problems of my life	1-5	Strongly disagree to strongly agree
Action Coping	I try to come up with a strategy about what to do I make a plan of action I think hard about what steps to take I think about how I might best handle the problem	1-4	I usually don't do this at all to I usually do this a lot
Individual Intention	Respond to the following with regards to hurricane preparation actions: --- Check your level of preparedness for hurricanes --- Increase your level of	1-3	No, possibly, definitely

	<p>preparedness for hurricanes</p> <ul style="list-style-type: none"> --- Become involved with a local group to discuss how to reduce hurricane damage --- Seek information on hurricane risk --- Seek information on things to do to prepare 		
Strong Social Network	<p>Where do you look to get information about how to prepare for hurricanes?</p> <ul style="list-style-type: none"> --- Family --- Friends --- Neighbors --- Co-workers <p>Who do you turn to when you need to prepare for a hurricane?</p> <ul style="list-style-type: none"> --- Family --- Friends --- Neighbors --- Co-workers 	1-5	Never to always
Weak Social Network	<p>Where do you look to get information about how to prepare for hurricanes?</p> <ul style="list-style-type: none"> --- Churches --- Local emergency management ofc --- Local law enforcement --- Social clubs --- County Cooperative Extension --- TV --- Radio <p>Who do you turn to when you need to prepare for a hurricane?</p> <ul style="list-style-type: none"> --- Churches --- Local emergency management ofc --- Local law enforcement --- Social clubs --- County Cooperative Extension --- TV --- Radio 	1-5	Never to always
Response Efficacy	<p>To what extent might each of the following prevent you preparing for hurricanes?</p> <ul style="list-style-type: none"> --- The cost --- The skill or knowledge required --- Time to do them --- Other things to think about --- Need for cooperation with others 	1-5	Not at all to a great deal
Personal Responsibility	<p>I feel responsible for preparing for a hurricane</p> <p>The local government is responsible for making sure that I am prepared for a hurricane</p>	1-5	Strongly disagree to strongly agree
Past Experience	<p>Have you been in a hurricane in the last 10 years</p> <p>If yes, what year(s) did this occur?</p> <p>If yes, did you experience damage or loss (i.e., requiring repairs/insurance claims)?</p>	--	Nominal responses
Hurricane Prep	A 31 item checklist obtained from ready.gov website	0,1	No or Yes

APPENDIX B PERCENT POVERTY BY FIRE DISTRICT – ESCAMBIA COUNTY

Percentage of Incomes Below \$20,000 Per Fire District

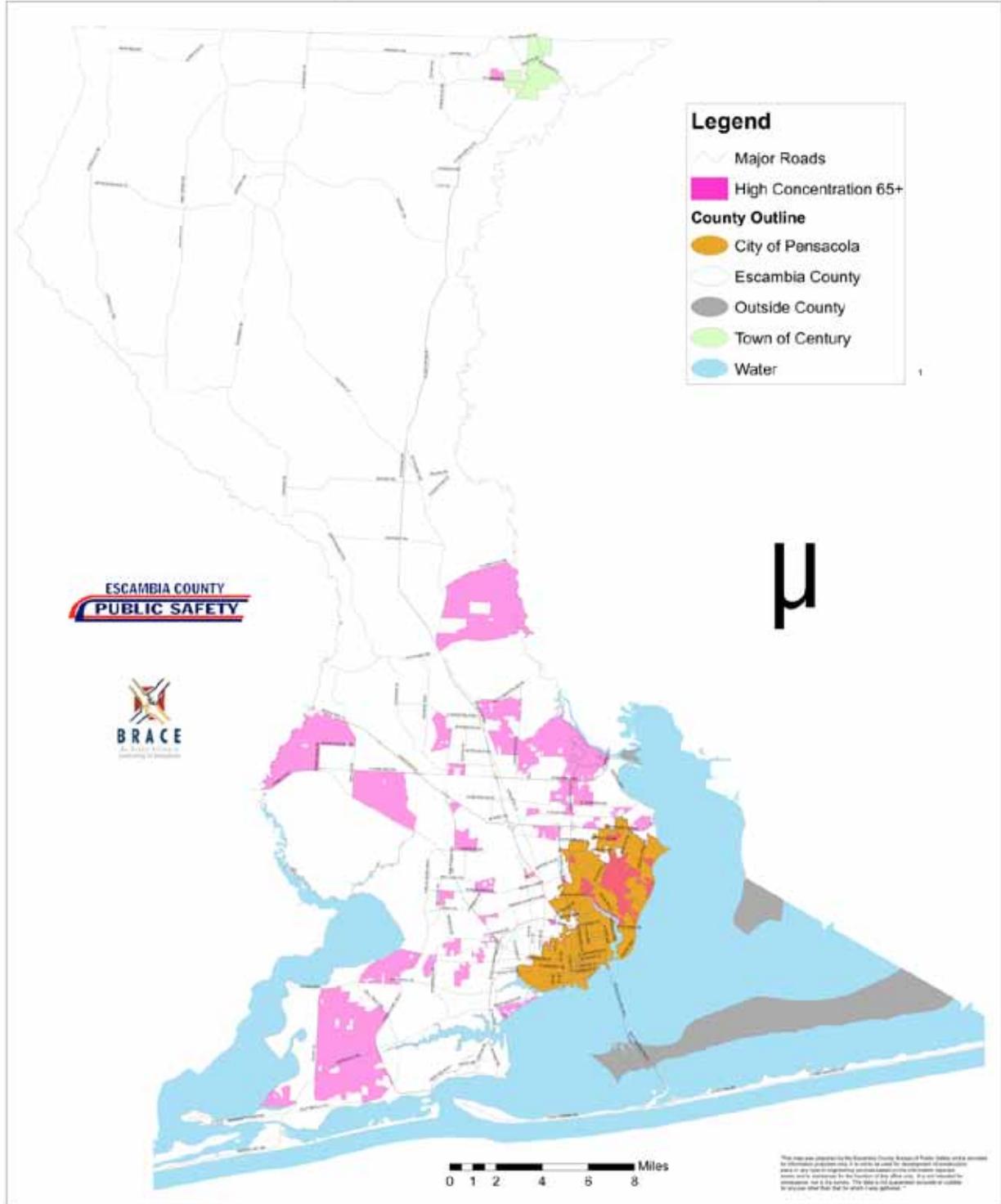


The data was obtained from the Escambia County Public Safety Department. The data was collected from the 2010 Census. The data was collected from the 2010 Census. The data was collected from the 2010 Census.



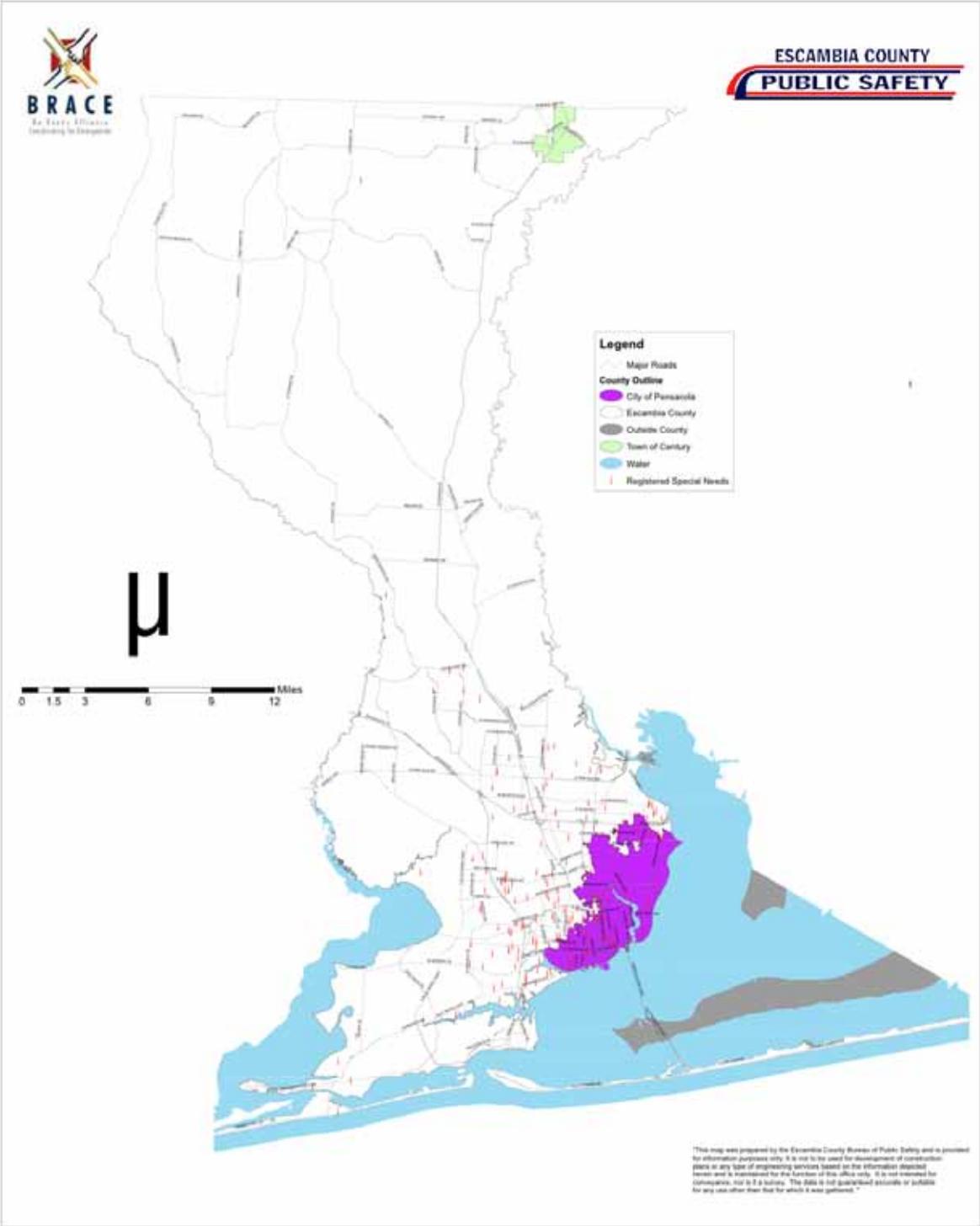
APPENDIX C
65+ POPULATIONS – ESCAMBIA COUNTY

Escambia County Census Data-Areas of 65+ Populations



APPENDIX D
SPECIAL NEEDS REGISTRANTS – ESCAMBIA COUNTY

Escambia County Special Needs Registrants



APPENDIX E ZIP CODE COMPARISON

ZIP CODE COMPARISON

ZIP CODE	32501	32503	32504	32505	32506	32507	32508	32514
POPULATION	16,372	33,023	23,220	29,267	32,782	29,423	10,389	34,688
Percent	5.3	10.8	7.7	9.6	10.8	9.5	3.4	11.4
Urban:	16,372	33,023	23,220	29,267	32,549	27,813	10,218	34,688
Rural:	0	0	0	0	233	1,610	171	0
White	6,465	21,750	19,180	13,256	24,487	22,830	7,833	28,210
% of Tot Pop	2.1	7.1	6.3	4.3	8.0	7.5	2.6	9.2
% of Zip Pop	39.5	65.9	83.0	45.3	74.7	77.6	75.3	81.3
Black	9,174	9,936	2,900	14,084	4,677	4,184	1,357	4,355
% of Tot Pop	3.0	3.3	0.9	4.6	1.5	1.4	0.4	1.4
% of Zip Pop	56.0	30.0	12.5	48.1	14.3	14.2	13.0	12.6
Other	733	1,337	1,140	1,927	3,618	2,409	1,199	2,123
% of Tot Pop	0.2	0.4	0.4	0.6	1.2	0.8	0.4	0.7
% of Zip Pop	4.5	4.0	5.0	6.6	11.0	8.2	11.5	6.1
Age 65+	2,868	5,566	3,389	3,763	4,133	4,097	0	5,384
% of 65+ Pop	6.9	13.4	8.2	9.1	10.0	9.7	0.0	13.0
% of Zip Pop	17.5	16.9	14.6	12.9	12.6	13.9	0.0	15.5
# 65+ < Pov	532	547	134	584	340	237	0	294
% of Tot	15.2	15.6	3.8	16.6	9.7	6.8	0.0	8.4
% of Zip	3.2	1.7	0.6	2.0	1.0	0.8	0.0	0.8
Med Fam Inc	26,663	41,351	48,301	27,638	40,622	41,909	33,558	48,524
Total Pop	14,388	29,162	23,145	28,651	32,393	27,413	1,481	32,812
Inc < Pov	4,141	4,592	2,005	8,408	4,394	4,590	156	3,574
% < Pov Tot	10.0	11.2	4.9	20.5	10.7	11.2	0.4	8.7
% < Pov Zip	28.8	15.7	8.7	29.3	13.6	16.7	10.5	10.9

ZIP CODE	32526	32533	32535	32561	32568	32577	COUNTY TOT
POPULATION	31,641	24,076	6,520	25,971	3,312	4,651	305,335
Percent	10.4	7.8	2.2	8.5	1.1	1.5	
Urban:	23,924	17,348	3,017	23,913	0	0	
Rural:	7,717	10,328	3,503	2,058	3,074	4,651	
White	26,553	20,417	4,108	24,990	2,810	3,984	226,873
% of Tot Pop	8.7	6.7	1.3	8.2	0.9	1.3	74.3
% of Zip Pop	83.9	84.8	63.0	96.2	84.9	85.7	
Black	2,847	2,714	2,075	210	317	500	59,330
% of Tot Pop	0.9	0.8	0.7	0.1	0.1	0.1	19.4
% of Zip Pop	9.0	11.3	31.8	0.0	9.6	10.6	
Other	2,241	945	337	771	185	167	
% of Tot Pop	0.7	0.3	0.1	0.3	0.1	0.1	
% of Zip Pop	7.0	2.6	5.1	3.0	5.6	3.6	
Age 65+	3,729	2,490	837	4,100	517	639	41,512
% of 65+ Pop	9.0	6.0	2.0	9.9	1.2	1.5	13.6
% of Zip Pop	11.8	10.3	12.8	15.8	15.6	13.7	
# 65+ < Pov	269	173	161	146	51	31	3,499
% of Tot	7.7	4.9	4.6	4.2	1.5	0.7	8.4
% of Zip	0.9	7.2	2.5	0.6	1.5	0.7	
Med Fam Inc	46,667	49,877	30,440	62,002	37,411	46,935	
Total Pop	30,693	23,881	4,968	25,773	3,285	4,635	282,680
Inc < Pov	2,873	2,658	1,366	1,384	469	437	41,047
% < Pov Tot	7.0	6.5	3.3	3.4	1.1	1.1	14.5
% < Pov Zip	9.4	11.1	27.4	0	14.3	9.4	

APPENDIX F Escambia County Zip Codes



7. Please mark the circle that closely corresponds to your opinions in the following statements?

		Strongly Disagree		Neither Disagree Nor Agree		Strongly Agree
A	A hurricane could pose a threat to your personal safety.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	A hurricane could pose a threat to your daily life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	A hurricane could pose a threat to your property.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	Hurricanes are too destructive to bother preparing for.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E	A serious hurricane is unlikely to occur during your lifetime.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F	Preparing for hurricanes will reduce damage to your home if a hurricane occurs.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G	Preparing for hurricanes will improve my everyday living conditions.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H	Preparing for hurricanes will improve the values of your house or property.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I	Preparing for hurricanes will reduce the disruption to family and community life after a hurricane.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J	Preparing for hurricanes is a hassle for me.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
K	I feel responsible for preparing for a hurricane.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
L	The local government is responsible for making sure that I am prepared for a hurricane.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

		Not at All				A great deal
M	I get nervous when there is discussion about approaching hurricanes.....	<input type="radio"/>				
N	When hurricane ads come on TV, I change the channel or don't pay attention.....	<input type="radio"/>				
O	I avoid things that remind me of hurricanes.....	<input type="radio"/>				
P	If I believe a hurricane is coming, I make sure I know the evacuation route.....	<input type="radio"/>				
Q	If I believe a hurricane is coming, I make sure I know where my designated shelter is.....	<input type="radio"/>				
R	I avoid thinking about hurricanes.....	<input type="radio"/>				
S	How much do you think about hurricanes?.....	<input type="radio"/>				
T	How much do you talk about hurricanes?.....	<input type="radio"/>				

Next, we would like to ask you a few questions about issues you may deal with in your everyday life.

8. In regard to the issues and problems that you deal with in your *everyday life*, please describe the extent to which you agree or disagree with the following statements.

		Strongly Disagree		Neither Disagree Nor Agree		Strongly Agree
A	I have considerable control over what happens in my life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	I can solve most of the problems I have by myself.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	What happens to me in the future mostly depends on me.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	I can do a lot to change many of the important things in my life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E	I can do just about anything if I really set my mind on it.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F	I rarely feel helpless in dealing with the problems of my life.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. In regard to dealing with problems in your *everyday life*, please describe on a scale from 1 (I usually don't do this at all) to 4 (I usually do this a lot) how much of each of the following you do:

		I Usually Don't Do This At All				I Usually Do This A Lot
A	I try to come up with a strategy about what to do.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	I make a plan of action.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	I think hard about what steps to take.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	I think about how I might best handle the problem.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Now, we would like to ask you a few questions about hurricane preparedness.

10. A *hurricane watch* means a hurricane could hit within 24 hours? True False
11. A *hurricane warning* means a hurricane could hit within 36 hours? True False
12. Hurricane categories (for example, Category 1, 2, 3, 4 or 5) are based on wind speed? True False

13. Please indicate by marking yes or no as to what steps you have taken to prepare for a hurricane:

		YES	NO
A	Our household has an emergency kit containing:		
	Water, one gallon of water per person per day for at least 3 days...	<input type="radio"/>	<input type="radio"/>
	Food, at least a three-day supply of non-perishable food.....	<input type="radio"/>	<input type="radio"/>
	Battery-powered radio and extra batteries.....	<input type="radio"/>	<input type="radio"/>
	NOAA weather radio with tone alert and extra batteries.....	<input type="radio"/>	<input type="radio"/>
	Flashlight and extra batteries.....	<input type="radio"/>	<input type="radio"/>
	First aid kit.....	<input type="radio"/>	<input type="radio"/>
	Whistle to signal for help.....	<input type="radio"/>	<input type="radio"/>
	Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place.....	<input type="radio"/>	<input type="radio"/>
	Moist towelettes, garbage bags and plastic ties for personal sanitation.....	<input type="radio"/>	<input type="radio"/>
	Wrench or pliers to turn off utilities.....	<input type="radio"/>	<input type="radio"/>
	Can opener for food (if kit contains canned food).....	<input type="radio"/>	<input type="radio"/>
	Local maps.....	<input type="radio"/>	<input type="radio"/>
	Cell phone with charger.....	<input type="radio"/>	<input type="radio"/>
	Medication and glasses.....	<input type="radio"/>	<input type="radio"/>
	Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container.....	<input type="radio"/>	<input type="radio"/>
	Cash or traveler's checks and change.....	<input type="radio"/>	<input type="radio"/>
	Emergency reference material such as a first aid book or information from www.ready.gov.....	<input type="radio"/>	<input type="radio"/>
	Sleeping bag or warm blanket for each person.....	<input type="radio"/>	<input type="radio"/>
	Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes.....	<input type="radio"/>	<input type="radio"/>
	Household chlorine bleach and medicine dropper.....	<input type="radio"/>	<input type="radio"/>
	Fire extinguisher.....	<input type="radio"/>	<input type="radio"/>
	Matches in a waterproof container.....	<input type="radio"/>	<input type="radio"/>
	Personal hygiene items.....	<input type="radio"/>	<input type="radio"/>
	Mess kits, paper cups, plates and plastic utensils, paper towels.....	<input type="radio"/>	<input type="radio"/>
	Paper and pencil.....	<input type="radio"/>	<input type="radio"/>
B	Do you have a family emergency plan?.....	<input type="radio"/>	<input type="radio"/>
C	Do you know where your family will meet, both within and outside of your immediate neighborhood?.....	<input type="radio"/>	<input type="radio"/>
D	Do you have an out-of-town contact to communicate with?.....	<input type="radio"/>	<input type="radio"/>
E	Do you have a plan for evacuation?.....	<input type="radio"/>	<input type="radio"/>
F	Do you know the evacuation route?.....	<input type="radio"/>	<input type="radio"/>
G	Do you know your designated shelter?.....	<input type="radio"/>	<input type="radio"/>

**14. Where do you look to get information about how to prepare for hurricanes?
(Fill in one circle for each item A - K.)**

	Never		Sometimes		Always
A. Family.....	<input type="radio"/>				
B. Friends.....	<input type="radio"/>				
C. Neighbors.....	<input type="radio"/>				
D. Churches.....	<input type="radio"/>				
E. Local emergency management office.....	<input type="radio"/>				
F. Local law enforcement.....	<input type="radio"/>				
G. Local fire department.....	<input type="radio"/>				
H. Co-workers.....	<input type="radio"/>				
I. Social clubs.....	<input type="radio"/>				
J. County Cooperative Extension.....	<input type="radio"/>				
K. TV.....	<input type="radio"/>				
L. Radio.....	<input type="radio"/>				
M. Other.....	<input type="radio"/>				

**15. Who do you turn to when you need to prepare for a hurricane?
(Fill in one circle for each item A - I.)**

	Never		Sometimes		Always
A. Family.....	<input type="radio"/>				
B. Friends.....	<input type="radio"/>				
C. Neighbors.....	<input type="radio"/>				
D. Churches.....	<input type="radio"/>				
E. Local emergency management office.....	<input type="radio"/>				
F. Local law enforcement.....	<input type="radio"/>				
G. Local fire department.....	<input type="radio"/>				
H. Co-workers.....	<input type="radio"/>				
I. Social clubs.....	<input type="radio"/>				
J. County Cooperative Extension.....	<input type="radio"/>				
K. Other.....	<input type="radio"/>				

**16. In the next month or so, do you intend to:
(Fill in one circle for each item A - E.)**

	No		Possibly		Definitely
A. Check your level of preparedness for hurricanes.....	<input type="radio"/>				
B. Increase your level of preparedness for hurricanes.....	<input type="radio"/>				
C. Become involved with a local group to discuss how to reduce hurricane damage or loss.....	<input type="radio"/>				
D. Seek information on hurricane risk.....	<input type="radio"/>				
E. Seek information on things to do to prepare.....	<input type="radio"/>				

Finally, we want to ask you a few questions about yourself. You may be assured of complete confidentiality.

Your responses will be included only together with all other responses. Your name will never be placed on the questionnaire or associated with your answers.

17. Are you? Male Female

18. What year were you born? 19____

19. How long have you lived in Florida? _____ Years

20. Which best describes your racial or ethnic background?

- African American Native American Other _____
 Asian Caucasian

21. Are you of Spanish/Hispanic background? Yes No

22. What is the highest level of education you completed?

- Did not complete high school
 Completed high school
 Some college or post high school training
 Completed an associates/2 year degree
 Completed a college/4 year degree
 Completed graduate or professional training beyond a bachelor's degree

23. Which of the following categories best describes total household income in 2008?

- Under \$9,999 \$35,000 - \$49,999
 \$10,000 - \$14,999 \$50,000 - \$74,999
 \$15,000 - \$19,999 \$75,000 - \$99,999
 \$20,000 - \$24,999 \$100,000 - \$149,999
 \$25,000 - \$34,999 \$150,000 or more

24. What are the sources of income for your household? (check all that apply)

- Job Retirement income
 Self-employed Alimony or child support
 Government assistance Other _____

25. What kind of home do you have?

- Single family house Mobile home
 Apartment Other _____
 Condominium

26. How many individuals live in your household? _____

27. Does someone in your home own a car? Yes No

28. Are there any disabled people in your home? Yes No

6

Thank you very much for your time and opinions!

Your responses will help us better understand individual attitudes and perceptions toward hurricane preparation.

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BIOGRAPHICAL SKETCH

Molly Moon enlisted in the United States Air Force directly out of high school in 1975. After earning her Bachelor of Science degree in business management while on active duty from Troy State University in Montgomery, Alabama, Molly was commissioned an officer in 1984. During her 29-year Air Force career, she earned a Masters of Business Administration degree from Barry University. She also completed Squadron Officer School, Air Command and Staff College and Air War College.

Upon retiring from the Air Force in 2004, Molly moved to Gainesville, Florida where she volunteered her time to serve as the Project Coordinator for a Habitat for Humanity Woman Build house. Upon completion of the Woman Build project, Molly returned to school at the University of Florida to pursue her doctorate degree. Molly is currently a full-time lecturer in the Department of Family, Youth and Community Sciences where she teaches Principles of Family, Youth and Community Science and Introduction to Social and Economic Aspects of Community.