

MODELING TOURIST'S EVACUATION DECISION WHILE AT THE DESTINATION:
EFFECTS OF INDIVIDUAL CHARACTERISTICS, TRAVEL RELATED VARIABLES,
INFORMATION SEARCH AND RISK APPRAISAL

By

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To everyone who never stopped believing in me
and has been my footprints in the sand

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Abstract of Dissertation Presented to the Graduate School
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The purpose of this study was to examine the role of tourists' individual characteristics, travel related variables, information search and risk appraisal in influencing their voluntary evacuation in the event of a hurricane. Three interrelated research questions framed this study (1) What are the relationships between tourists' individual characteristics, travel related variables, demographics and their hurricane evacuation decisions? (2) What are the relationships between tourists' past experience with hurricane impacts, their involvement with hurricanes, their hurricane knowledge, their personality, their risk belief associated with hurricanes and their information search behavior regarding hurricane evacuation? (3) What are the relationships between tourists' past experience with hurricane impacts, their involvement with hurricanes, their hurricane knowledge, their personality, their risk belief associated with hurricanes, their information search behavior regarding hurricane evacuation, with risk appraisal and evacuation decision?

A stated preference survey was conducted between August – September 2011, during the hurricane season by asking tourists who were visiting Orlando and Fort

Lauderdale (n=533) to respond to a 2-page questionnaire. To elicit respondent's evacuation decisions, hypothetical hurricane forecasts were used. An Ordered Probit Model and Structural Equation Modeling were used to analyze the data.

For the first research question, the study found that individual characteristics (i.e. past experience with hurricane impacts, risk belief, involvement with hurricanes, knowledge about hurricanes), demographics (i.e. gender, place of residence) and travel related variables (i.e. transportations, travel party composition) significantly influenced evacuation decisions. For research question two, the study found that individual characteristics also influenced information search regarding hurricane evacuation. Lastly for research question three, in addition to individual characteristics, information search and risk appraisal also indirectly influenced tourists' evacuation decisions.

The study concluded that hurricane information messages to tourists could be improved in several ways based on the findings. Finally further research related to this area was also recommended.

CHAPTER 1 INTRODUCTION

Defining the Problem

Increase in Crises

Crises have attracted human attention by their extraordinary, unforeseen or severe nature (Scott & Laws, 2005). News of major floods, tornadoes, earthquakes, tsunamis, hurricanes or terrorist attacks frequently becomes front-page headlines in newspapers and major stories on television networks around the globe. Over the last decade, there has been an increase in catastrophic crises worldwide including terrorist attacks, political instability, economic recessions, biosecurity threats and natural disasters that lead to the loss of lives and billions of dollars in damages. In 2011, Japan struggled with multiple crises: an earthquake, tsunamis, and a nuclear plant failure that caused more than 13,800 deaths and more than 14000 missing persons, resulting in billions of dollars in damages (AP, March 22, 2011).

In the United States, hurricanes are frequently considered to be the most costly natural disaster particularly in coastal areas (NSB, 2007; Ewing et al., 2007). Hurricane Katrina resulted in more than 1200 deaths and estimated damages in excess of 2000 billion dollars, making Katrina one of the worst natural disasters in the United States (Dolffam, Wasser & Bergman, 2007). In addition, the 2005 Atlantic hurricane season was considered to be the most harmful in recorded history and caused over 2,300 deaths and over \$130 billion dollars in damages were incurred (NHC, 2006). The economic losses associated with that particular hurricane season to industries such as fishing, agricultural and tourism were substantial, and forecasts suggest it will take decades to recover (Myles & Allen, 2007).

In 2010, the United States was hit by several severe crises. On April 20th the British Petroleum's Deep Water Horizon oilrig exploded in flames leading to a massive oil spill that threatened to become the worst ecological disaster in U.S history. The seeping oil created fears of damage to fisheries, wildlife refuges and tourism in Louisiana, Mississippi, Alabama and Florida. The cost of cleanup and mitigation was estimated at over 4 billion dollars (Walsh, 2010).

Several scholars, such as Drabek (2000), have warned of an increase in crises in the future, both human and nature induced. While human induced crises such as political unrest and terrorist attacks are often attributed to a competition for resources, nature induced crises such as natural disasters are often attributed to global warming and environmental degradation (Carlsen & Liburd, 2007). Consequently, over the past decade, there has been a growing interest in many disciplines to contribute to knowledge surrounding the mitigation of impacts from major crises (Glaesser, 2003).

Crisis Impacts on Tourism

Faulkner (2001) asserts that an increasing number of global crises, affect the tourism industry. In fact, many scholars believe that the tourism industry is often the first sector to be impacted by a crisis. In recent years, the global tourism industry has experienced numerous crises ranging from natural to human influenced crises. Tourism research has consistently focused on a destinations vulnerability to crisis occurrences. As illustrated by Pearce (1992), Woodside and Lyonski (1989), Goodrich (1978), and Santana (2003), destination image is a key factor in travel decisions. Thus, mitigating the impact of crises in order to minimize the impact to the destination image is critical. Furthermore, tourism research has consistently found that in the event of a crisis, tourists often modify their travel patterns, ranging from cancelling or postponing their

travel plans, to shortening the length of their travel stay, to traveling to a safer destination (Beirman, 2004; Reisinger & Mavondo, 2005; Sonmez & Graefe, 1998a). The aforesaid behavioral modifications have caused a significant loss to the tourism industry and have required significant efforts to rebuilt tourist confidence levels to visit and revisit a destination following a major crisis (Ritchie, 2009).

For instance Hurricane Katrina and Rita (2005) caused 81,000 businesses in 13 Louisiana parishes to suffer business interruptions as well as incurring direct damages. Specifically, 1,409 tourism and hospitality businesses were closed in Louisiana, affecting 33,000 hospitality-based employees. The city of New Orleans lost an average of \$15.2 million per day following hurricane Katrina (Louisiana Recovery Authority, 2006). The same report also indicated that the negative image portrayed by the media caused potential travelers to choose other destinations.

While there is growing recognition regarding the impacts of crises to the tourism industry, Faulkner (2001) and Ritchie (2004) have argued that there is a lack of research on crisis or disasters in the tourism industry. Nonetheless, there is a myriad of tourism crisis related research, which has been published, in the last decade (Frisby, 2002; Hooper, 2002; Stafford et al., 2002; Pine & McKercher, 2004; Fall & Massey, 2005; Evans & Elphick, 2005; Blackman & Ritchie, 2007). Most of the studies to date, however, focus primarily on the impacts and the response of the tourism industry, especially the efforts taken by the Destination Management Organizations (Blackman & Ritchie, 2008).

Ritchie (2009) further argued that little attention has been given to the actual behavior of visitors in the event of a crisis and has encouraged examining visitors'

behaviors in the event of a crisis. In addition, most studies with regard to visitors' behaviors in the event of a crisis have focused heavily on past travelers or future travelers (Beirman, 2006; Pearlman & Melnik, 2008). One plausible reason may be attributed to the difficulty of accessing on-site tourists (*in situ*) in the event of a crisis due to the chaotic nature, which ensues during a crisis.

Interestingly, Drabek (2000) found a significant discrepancy between the guests and business managers' expectations with regard to hurricane evacuations. Specifically, his study found that in an emergency situation, guests' expectations are often not fulfilled by their hosts, while the hotel managers deem that they have maximized efforts to assist their guests. Since Drabek's work in 2000, there remains a scarcity of studies on how on-site visitors behave in the event of a crisis, which leads to the need to better examine this area to fully understand expectations in order to assist them in the event of a crisis.

Crisis and Tourism in Florida

Located in the lower south peninsula of the United States, Florida is one of the top three states in the United States for inbound tourism preceded by New York and followed by California (OTTI, 2011). According to VISIT FLORIDA® (2009), the state receives approximately 83 million visitors annually, generating approximately \$62 billion in tourism/recreation taxable sales. The tourism industry in Florida is considered the largest industry in the state, which directly employs over 1 million people in travel related jobs (VISIT FLORIDA®, 2009). Major tourism destinations in Florida include Orlando with its theme parks (e.g. Disney World, Universal Studios, and SeaWorld) and greater Miami with its white sandy beaches and its Latin flavor. One notable impact due to tourism revenues in the state is the absence of a state income tax in Florida.

The state of Florida has also been a major receiver of Atlantic hurricanes. Nearly 50% of U.S. land-falling tropical cyclones in the past 50 years have made landfall in Florida, more than twice that of any other state. In addition, every county in Florida has experienced the effects of hurricane-force winds (NOAA, 2008), ranging from floods, damaging winds, heavy rainfall, and other storm impacts. It is also relevant to note that the Atlantic hurricane season, which typically begins on June 1 and ends on November 30 coincides with the high season for the tourism industry in the state of Florida.

Florida's tourism industry faces tougher competition for vacation dollars in the aftermath of the hurricanes. Lee County in Florida for example, lost an average of \$10 million in tourism revenue because of Hurricane Charley in 2004 within the first two months following the landfall (Neal, 2005). Destinations outside Florida obviously benefit from a tourist's apprehension with visiting Florida. Economic damage to the cruise industry is yet another factor. Royal Caribbean Cruises cancelled three cruises and altered routes on seven others amid the concern regarding hurricane Frances (2004), which was the most disruptive storm in the line's 33-year history. The Miami-based company announced that costs from the storm reduced their profits. Other cruise lines have faced similar challenges (Chriszt, 2005).

Nonetheless, whether hurricanes will have a long-term effect on tourists' plans to visit Florida remains uncertain. A survey issued by the Orlando-based travel marketing, advertising, and public relations firm of Yesawich, Pepperdine, Brown & Russell concluded that there are negative consequences. The study, conducted in the wake of Hurricane Jeanne in 2004, revealed that 5 percent of travelers who had planned to visit the state prior to the arrival of the hurricanes cancelled trips as a result of the hurricane.

An additional 4 percent postponed a previously planned trip. More importantly, 20 percent reported that they were less likely to visit Florida in the remainder of 2004, and a comparable percentage indicated they were less likely to visit the state between July and September of 2005. Furthermore, tourism practitioners were concerned that meeting and convention bookers may choose other locations for their events. To minimize such concerns, VISIT FLORIDA®, the state's official marketing organization developed an insurance product to cover potential losses to organizations should their conventions be postponed because of hurricanes (Appendix F) (VISIT FLORIDA®, 2009). A VISIT FLORIDA® survey found that 20 percent of potential visitors were concerned with returning to the state during 2005's hurricane season, indicating that if all those people stayed away, it would result in a \$6.7 billion loss in expenditures (Pain, 2006).

Consequently, the state of Florida provides a unique setting to examine the interplay between hurricanes and tourist behaviors due to the significance of tourism to the state and the frequency of hurricane threats, specifically examining tourists who are already in the state when the hurricane is projected to make landfall. Unfortunately, research on tourists, while on vacation in the state of Florida, has not been conducted during a hurricane crisis.

Tourist as a Vulnerable Population

One of the main reasons tourists, who are in the destination, are a vulnerable group in the context of hurricanes is that tourists, especially international tourists, may not speak and/or read the host language. Even when tourists are able to communicate in the host language, they may lack the requisite knowledge to understand hurricane terminologies that are used in hurricane forecasts such as the cone of uncertainty,

hurricane warnings, and hurricane watches. While local residents tend to know the difference between hurricane warnings and hurricane watches, the cone of uncertainty is often misinterpreted by residents (Broad, Leiserowitz, Weinkle & Steketee, 2007). Henceforth tourists may be unable to receive, interpret, and respond appropriately to hurricane forecasts, causing miscalculations in terms of perceptions of risks posed by a hurricane.

Furthermore, tourists are often unfamiliar with their surroundings and lack support systems that would be available if they were at home (Faulkner, 2001; Burby & Wagner, 1996; World Tourism Organization, 1998). Thus, the impact of hurricane risks to the tourist may be greater than to those in the general resident population in the event of a hurricane. Various characteristics of tourists, such as individual characteristics, information search behaviors and their understanding on hurricane forecasting maps may affect their reactionary behaviors in the event of a hurricane.

Resident Evacuation

In an effort to mitigate the social and private costs related to extreme weather incidents, the U.S. federal agencies have supported weather research programs that are intended to improve the precision and accuracy of weather forecasting and to augment the dissemination of timely and user-friendly weather information (NOAA, 2005). While the aforesaid programs will not stop the potential grandeur devastation of high-intensity hurricanes, precise and timely forecasting could provide individuals and other decision makers manageable information to better prepare for and reduce the likelihood of economic and social impacts of hurricanes (Letson et al., 2007). In this respect, the economic value of hurricane forecasting can be linked directly to its ability

to influence human behavior in the event of a hurricane, especially evacuation decisions (Williamson et al., 2002; USACE, 2005).

The most notable phase of the hurricane evacuation process is when people flee an approaching storm by utilizing roadways. Nonetheless, this action is the last phase in a process that often begins more than a week ahead. This progression of activities that precedes an evacuation order is typically commanded and synchronized by state level emergency management officials, integrating an advancement of weather observations, readiness activities, and response activities. The level of urgency at which the aforesaid activities are undertaken depends on the development and the path projection of the storm (Wolshon, Urbina, Wilmot & Levitan, 2005). Therefore, while emergency management agencies follow widely established procedures, the sequence and timing of response activities can be distinctive based on the particular hurricane characteristics.

The first phase of the hurricane evacuation process typically begins with tedious monitoring of tropical weather patterns that have the potential to impact the areas. When it appears that a storm may pose a threat, initial preparatory steps are taken to safeguard readiness in the event of an evacuation. This includes the issuance of a hurricane watch. When it appears that a storm strike is likely, a more heightened phase of the process is initiated, which includes a hurricane warning issuance and a recommendation to evacuate.

A critical issue in hurricane evacuation is timing. The earlier the evacuation order is issued, the more time residents and tourists have to evacuate. Alas, the earlier the order is issued, the greater the likelihood the hurricane could change course before

landfall, causing the evacuation to no longer be needed (Wolshon et al., 2005). The primary criteria used to make decisions on how soon and how large an area to evacuate are the storm forecasts and Hurricane Watches Hurricane Warning issued by the National Hurricane Center (NHC). NHC frequently issues advisories regarding the current and projected path of the storm, current and projected speed, and intensity every six hours, followed by intermediate advisories when the storm is close to landfall or when the storm conditions change significantly. Therefore, the time required to evacuate is calculated utilizing a combination of clearance times and the pre-landfall hazard time. Clearance time is the time required to configure all traffic control elements on the evacuation routes, initiate the evacuation, and clear the routes of vehicles once deteriorating conditions warrant its end. The pre-landfall hazard time is the period during which hazardous conditions exist prior to actual hurricane landfall (Florida Division of Emergency Management, 2000). Typically, depending on the projected hurricane category, the evacuation order ranges from 12-24 hours for a category 1 to 72 hours for a category 5 (Wolshon et al., 2005). This estimation can be lengthened based on several factors such as the size of the population in the projected path, en route congestion and so forth.

Once an evacuation is deemed necessary, the extent and type of evacuation is determined. The type and urgency relies on the characteristics of the storm and the clearance time. Typically, evacuations are classified as one of three types: “voluntary”, “recommended”, and “mandatory.” “Voluntary” evacuation is intended for groups that are vulnerable to hurricane storm surges and extreme winds including coastal areas and visitors. There is no special traffic control or transportation when this type of

evacuation is issued, and people may remain in their location if they choose. This study focuses on voluntary evacuation. The second level of evacuation is recommended evacuation, which is issued when a storm has a high probability of causing threats to vulnerable or at-risk groups. Special arrangement of traffic controls and transportation can be issued. As with voluntary evacuations, people may still remain in their location if they choose. In many states, such as Florida and Georgia these two levels are often used interchangeably (Wolshon et al., 2005). The highest level of evacuation order is a mandatory evacuation. During a mandatory evacuation, authorities put maximum emphasis on encouraging evacuation and limiting ingress to coastal areas. The order also leads to the implementation of evacuation transportation plans.

The most notable problem with a mandatory evacuation is that it is very difficult to enforce. Many people resist being ordered to leave their homes and property by government officials for various reasons (Dow & Cutter, 1998; Dash & Gladwin, 2007). Additionally, past studies have also found that people who heard mandatory evacuation notices were the most likely to leave, while voluntary or recommended evacuation orders were viewed with less urgency (Post, Buckley, Schuh & Jernigan (PBS&J), 2000). The method by which the evacuation order is communicated to the general public is also pivotal to avoid spontaneous evacuation or shadow evacuation. Shadow evacuation occurs when people believe they are at risk and evacuate even though they have not been officially advised or recommended to do so (Gunter, 2000). This is often cited as one of the reasons for the extremely high number of evacuees during hurricane season in Florida (Wolshon et al., 2005).

When mandatory evacuation for visitors is necessary, typically officials will issue it in early morning to provide sufficient time for travel arrangements. One of the reasons issuing a mandatory evacuation for visitors is not only to safeguard their life but also to provide ample time for the destination to prepare for the hurricanes land falling for their business and residents, for instance by closing down the property, securing boats and so forth. Accommodations and tourist's facilities including State and County Park will normally be closed. In this situation, tourists would need to go to other destinations that typically set up a special hot line to provide hotel availability and rates.

Over the last decade there have been significant advances in the science of climate and weather forecasting. Nonetheless, hurricane prediction is not an exact science. Inaccuracies in predicting the storm's path, intensity and time of landfall may affect peoples' trust and reliance on hurricane warning and tracking information (Dow & Cutter, 1998; Solis, Thomas & Letson, 2010). This lack of credibility could hamper evacuations with potentially overwhelming consequences if a hurricane does strike the area (Smith, 1999). Several studies have also consistently found that residents' decision-making process under hurricane risk is a very intricate issue that is influenced by various factors (Gladwin et al., 2001). Previous studies have demonstrated that household evacuation behaviors rely not only the intrinsic characteristics of a hurricane (e.g. projected path, intensity, timing and so forth) but also on household socioeconomic and demographic characteristics (Letson et al., 2007; Fu & Wilmot, 2004; Whitehead 2003 to name a few). Nonetheless, current studies on household evacuation tend to be conducted using data from a single event within specific geographical boundaries, and

therefore may ignore the possibility that households may learn from their own experiences (Kelly et al., 2009; Solis et al., 2010)

Tourist Evacuation

While numerous studies on residents' evacuation in the event of a hurricane have been conducted, empirical studies on tourists' evacuation behavior is still understudied. Hurricane evacuations are disruptive, expensive, and often politically sensitive issues (Phillips & Morrow, 2007). The costs of a hurricane evacuation can exceed one million dollars per mile of coastline from direct costs and losses in commerce, tourism, and general productivity. Key West, Florida lost approximately \$1.5 million a day from commerce and tourism when an evacuation order was issued during the 2008 hurricane season (Miami Herald, 2008).

From officials' perceptions, managing tourist evacuees is challenging and involves judgment calls. For instance, in Monroe County (the Keys) Florida, a tourist evacuation order is typically issued 48 hours before tropical force winds are expected to approach the area, or 12 hours for mobile home residents. Almost every year in Florida, evacuation orders for tourists have been issued regarding hurricanes. In 2008 alone, tourists in the Florida Keys were asked to evacuate twice, even though the storms were not considered to be Category 1 hurricanes yet, which resulted in false alarms. For example, Tropical storm Fay in August 2008 was projected to hit the Keys as a tropical storm, with a slight chance of growing into a Category 1 hurricane. Tourists were asked to leave two days before its projected strike and the storm later shifted south, leaving the Keys without any serious damage.

Intriguingly, most recent reports, based on the 2009 surveys of hotels, motels, resorts, bed and breakfasts, seasonal housing rentals, and recreational vehicle parks in

the Keys, suggest that 30 percent of tourists evacuate impulsively before an evacuation order is issued, and another 40 percent of tourists evacuate in the first 12 hours after the order is issued, while the remaining 30 percent of tourists evacuate at the same time as the mobile home park residents (Baker, 2009).

The aforementioned data offer intriguing questions, including: “what makes tourists leave the destination before an evacuation order is issued?” and “where are they going?” Most importantly, when they are requested to leave a destination an important question is, why do some of the tourists prefer to stay and wait until mandatory evacuation is issued? Given the aforesaid issues, understanding how tourists process an evacuation order and act accordingly, are paramount to assist in the event of hurricane evacuation. Thus, the focus on tourists in Florida is germane based on both the significance of tourism to the state, as well as the frequency with which hurricanes strike the state.

Preliminary Study

The preliminary study in which this study is based was conducted in 2009 as part of the interdisciplinary project that was undertaken by the Eric Friedheim Tourism Institute at University of Florida with the funding from the Eric Friedheim Foundation. The 2009 study was intended to explore a set of determinants of the tourist evacuation decision. The study employed two ways of data collection; a focus group with tourists in Florida and the Stated Preference Surveys that were administered to tourists. Participants of the focus group revealed that the intention to evacuate was influenced by several factors that included distance and time from the hurricane land fall, likelihood of getting hit by the hurricane, mode of transportation, possibilities to get out, infrastructures, shelter availability and the source of information.

The stated preference survey was conducted in Orlando and Tampa/St.Petersburg areas. A total of 465 samples were used in the analysis. By employing an ordered-response model, the stated preference survey found that the characteristics of hurricanes that influenced tourists' evacuation decision were the projected path of the hurricanes, the category of the hurricanes, and the duration of the hurricanes. Tourists were more likely to evacuate if the hurricane is approaching from the Gulf, is projected to be a category four hurricane, with a longer hurricane activity, and the center-line projected path would pass their current location. Aside from the characteristics of hurricanes, several tourists' background variables were also found to influence the tourists' evacuation decision. These variables included hurricane knowledge, past hurricane experience, travel mode and the types of person (gender, attitude, and emotion). In addition the result also indicated that the tourists who perceived a higher risk were more likely to evacuate than their counterpart. Based on the 2009 study, two research articles were published (Matyas et al., 2011; Villegas et al., 2012).

A few variables were found not significant for example the role of children in the evacuation likelihood. Matyas et al. (2011) found that while the presence of children increased perception of risk, it did not significantly affect evacuation likelihood. Nonetheless, literatures in resident evacuation research have found that the presence of children affected evacuation likelihood (Solis et al., 2010). Likewise, the size of travel party was found not significant, which contradicted with general literature in tourism, which consistently found that the composition of travel party affect travel related decisions (Decrop & Snelders, 2005). Therefore in this study these variables were included to be reexamined. Furthermore, the source of hurricane information that was

examined in the preliminary study was limited to a few sources. In this study, the source of hurricane information was added to include social networks and other sources.

Likewise, the credibility of sources was also examined. Other variables such as risk belief and involvement were added based on the literature in mass communication and resident evacuation.

This study took the preliminary study to the next level, not only by the inclusion of several new variables based on the literature, but also to model the process of the decision-making with Structural Equation Modeling procedures. To do so, the hypothetical scenarios used to elicit respondents' evacuation decision were simplified in terms of content and the number of the scenarios, to allow a greater rigor of the study. In the first study, due to the large number of scenario combinations (32 scenarios, 4 scenarios per person) and the order of the scenarios, several scenarios only received low numbers of responses, resulting in difficulty in comparing the responses. This study only used 8 scenarios, 4 scenarios per person with a random order to allow higher number of responses in each scenario. Likewise, the locations of data collection for this study were Orlando and Fort Lauderdale Beach to capture different types of tourists.

Problem Statement

Faulkner (2001) and Ritchie (2004) argue that there is paucity of research on the impacts of crises on both the industry and specific organizations as well as the responses of the tourism industry to such incidents. However, increased crises over the past decade has resulted in increased recognition of crisis management, recovery and organizational continuity (Blackman & Ritchie, 2007) because various crisis events have led to more recent tourism crisis management research (e.g. Stanford et al., 2002; Fall & Massey, 2005; Evans & Elphick, 2005).

Despite the growing interest in crisis management for the tourist industry, most studies to date focus heavily on the organizations (Blackman & Ritchie, 2007), with little attention given to how tourists behave in the event of a crisis. Additionally, most studies about tourists' behavior in the event of a crisis have heavily focused on tourists' perception of risks and how this perception affects their likelihood to visit and re-visit the destination (e.g. Sonmez & Graefe, 1998a, 1998b; Reisinger & Mavondo, 2005).

In the context of hurricanes, the few significant contributions to tourists' behavior during hurricanes have been published in the early and mid-1990s and largely by one author (Drabek, 1991, 1993, 1994, 1995, 1996, 1999) with a focus on evacuation strategies and policies from a supply viewpoint. In his research, Drabek clearly indicated there is a gap between what the tourism industry has done and the tourists' expectation of what the industry should do to protect their lives. Since then, there has been no known empirical study available that specifically examines how tourists perceive hurricane risks and respond to hurricane warnings. To date, the only study that examined evacuation behaviors from the demand side was done by Matyas et al. (2011) that specifically looked at the interplay between risk perception and evacuation behavior, as well as the factors that influence the evacuation decision. Likewise, most available studies in the context of hurricane evacuation have focused heavily on residents (e.g. Whitehead, 2003; Dow & Cutter, 2002), which may lead to a false assumption that residents and tourists are similar in their behaviors and should be treated as such. This study uses a demand perspective to understand tourists' behavior in the event of hurricane warning and their decision making process regarding evacuation.

Theories Guiding the Research

This study was guided by three theories; utility maximization under threat, heuristic & systemic model of information processing and theory of planned behavior. The utility maximization under environmental risk was introduced by Burton, Kates and White (1993) and Viscusi (1995), who argued that individuals make choices under the uncertainty of the threat by maximizing their expected utilities. To do so these individuals might be willing to forgo their wealth including their income, capital, and property in order to minimize those threats. Burton, Kates and White (1993) elaborate further by contending that under the threat of environmental hazards, an individual hazard response is influenced by four major elements: 1) prior experience with the specific hazard, 2) an individual's wealth, 3) their intrinsic characteristics and 4) their interaction with society.

Letson, Sutter and Lazo (2007) applied the economic theory concerning an individual's utility maximization behavior in the event of hurricane forecasts and evacuation choices. Further he argues that in examining human behavior under a hurricane threat it is essential to consider hurricane forecasts as this information may function as a decision aid to reduce uncertainty under the utility maximization theory. Other researchers such as Dow and Cutter (1998) argued that inaccurate forecasts might reduce individual reliance on forecast information and reduce their perception of a hurricane threat and consequently reduce evacuation rates.

Even though individuals are only offered two dichotomous options in the event of a hurricane evacuation concerning whether to stay at the location or to flee to a safer location, previous studies have shown that these choices are influenced by a variety of factors including social characteristics, economic constraints, storm characteristics and

planned evacuations and costs (Fu & Wilmot, 2004; Whitehead, 2003; Whitehead et al., 2000; Dow & Cutter, 1998).

Dash and Gladwin (2007) contend that risk perception, vulnerability and previous experience with hurricanes are vital factors in explaining evacuation decisions.

Whitehead (2003) explains that the ultimate goal of an evacuation is to reduce risk of injury or death. In this context, people who are in a coastal area are more likely to face a higher risk of flooding and thus are more likely to evacuate than their counterpart in the inland area (Whitehead, 2003; Smith, 1999). Similarly, Baker (1991) and Riad, Norris and Ruback (1999) found that people who are from the areas that have been affected by hurricanes in the past and those involved in an evacuation in the past show a greater propensity to evacuate. Interestingly, however, another study that was conducted by Lindell, Lu and Prater (2005) found that there was no significant relationship between previous experiences and evacuation behaviors.

Another factor, which influences the evacuation choice, is risk perception, which is determined by the particular characteristics of a hurricane. Generally, previous studies have based preferences data on hypothetical scenarios to measure the significant key storm forecast factors that significantly influence evacuation decisions (e.g. projected path, wind speed, landfall time, etc.). Bhattacharjee, Petrolia and Hanson (2009) for instance found that wind speed and landfall time are the most important characteristics affecting evacuation choices, while another study found that the intensity of the storm is the most significant predictor of an evacuation (Whitehead et al., 2000).

Wealth is another factor, which has been found to influence evacuation decisions. While it might be tempting to assume that people with higher incomes are more likely to

evacuate as they tend to acquire necessities needed to give them the perception that they do not need to evacuate, previous studies consistently found that these individuals have demonstrated a lower probability to evacuate (Whitehead, 2003; Smith, 1999). There are several possible explanations regarding this contradiction. First, they may want to protect their belongings from potential looting. Secondly, the wealthy tend to live in larger and sturdier houses, giving them a sense of security.

The power of society on inducing evacuation behavior has been focused on the examination of the effects of hurricane warnings and other sources of information (Sorensen, 2000). These studies have focused on reviewing various characteristics of hurricane warnings such as type of message, language used, timeliness and so forth. Baker (1995) for instance found that the strategy and action employed by authorities significantly influence evacuation decisions. However, another study conducted by Dow and Cutter (1998) found that the authority's action has few influences on tourists' evacuation decisions. Likewise, Dash and Gladwin (2007) also argue that a warning by itself has no value since it is considered based on its perceived credibility, interpretation and an individual's aversion to risk. Smith (1999) and Lindell, Lu and Prater (2005) add that mass media would disseminate hurricane warnings and other information related to hurricanes continuously during hurricane season, making warnings and hurricane information available for the general public. As a result, social interaction helps individuals to better digest the available information. That makes social interaction more critical than only the warning by itself.

Also relevant to the discussion on the determinants of evacuation decision is individual information seeking and processing. Griffin, Dunwoody and Neuwirth (1999)

argued that people seek and process risk information in different ways leading to different preventive behaviors, in this case evacuation choices. Griffin, Dunwoody and Neuwirth's (1999) model applied two prominent models: Eagly and Chaiken's (1993) Heuristic-Systemic model of information processing (HSM) and Ajzen's theory of Planned Behavior (TPB) (Ajzen, 1988; Ajzen & Fishbein, 1980). The first model helps to understand how people come to seek and attend to information about a given risk, in this context hurricane risks, and the second helps to understand how those communication behaviors might affect individuals' risk-related behaviors such as evacuation choices.

HSM similar to Petty and Cacioppo's (1981) Elaboration Likelihood Model (ELM) describes dual forms of information process, one more superficial (Heuristic) and the other being deeper and more effort-extensive (Systemic). In HSM terms, people tend to adopt one form of processing based on their capacity to process the information in each manner and their motivation to go beyond the more superficial processing to engage in systemic processing which can occur concurrently with heuristic processing (Eagly & Chaiken, 1993). In the HSM model, personal relevance to the topic has been found to motivate people to systematically process messages (Eagly & Chaiken, 1993). The Eagly and Chaiken (1993)'s sufficiently principle explained that perceived gap between what the person knows and what he or she needs to know (i.e one needs to know more about evacuation orders) motivates that person to devote more cognitive effort to scrutinize the message. Such efforts however will depend upon individual's capacity to think critically, existing knowledge structures and the perceived credibility of available information. Based on the HSM model, individuals who analyze risk information critically

will ultimately develop attitudes and behaviors that are more resistant to change. Griffin, Neuwirth and Dunwoody (1995) in their study found that individuals that are given information that described a hazard as high risk and its effects as severe were less likely than other individuals to base their individual risk judgment from stylistic factors of the information. They further explained that relevance might have motivated individuals in the risky and severe condition to process the risk information more systematically and to rely less on superficial cues in the structure and the style of the message. Another explanation is that in the context of risky situations, individuals tend to process information systematically in order to maximize the utility of the decision (Letson et al., 2007).

Griffin, Dunwoody and Neuwirth (1999) extended the information search and process behavior to preventive behavior using the theory of Planned Behavior (Fishbein et al., 2001). The model suggests that the style of information seeking and processing in HSM that individuals employ to seek and process information about preventive behaviors and perceived risk regarding the hazard can affect the stability of cognitive structure. In addition, various individual characteristics may also influence another antecedent of behavioral intention, subjective norms that represent social pressure to perform preventive behaviors. This subjective norm is parallel with the fourth factor that influences an individual's hazard response in Burton, Kates and White's (1993) utility maximization theory that is an individual's interaction with the society.

Griffin, Dunwoody and Neuwirth (1999) also proposed that beliefs are formed and modified through personal experience, from processing information from multiple sources. Lutz (1977) also noted that information seeking and processing might alter the

structure of beliefs by creating a new salient belief, by altering the strength or salience of a belief or by modifying its evaluation. Likewise, those who seek more information about risk related behaviors and process the information intensely will more behavioral belief to their judgments about performing the behaviors and develop more stable cognitive structure about the behaviors.

Consequently, in order to understand tourists' evacuation decisions in the event of a hurricane, an appropriate conceptual model should embody theory of Utility Maximization (Burton et al., 1993; Viscusi 1995; Letson et al., 2007), Heuristic-Systemic Model (Eagly & Chaiken, 1993), and Theory of Planned Behavior (Ajzen, 1988; Ajzen & Fisbein, 1980). The first would help to understand how tourists come to a decision regarding whether or not to evacuate, the second would help to understand how tourists engage in seeking and processing hurricane information and the last would help to understand the saliency of the preventive behavior, in this case evacuation decisions.

Theoretical Based Model

As indicated in the earlier section, the guided model used in this study is based on the aforesaid theories: the Utility Maximization, Heuristic-Systemic Model, and the theory of Planned Behavior. Individual characteristics, demography and travel related variables are elements that influence evacuation decisions as suggested in the theory of utility maximization. Individual characteristics comprise of past experience with hurricanes, involvement with hurricanes, current hurricane knowledge, risk belief, and channel belief. The information search is based on the Heuristic-Systemic model, while risk management relates to the behavioral intention and actual behavior stages in the theory of planned behavior. There are two stages in the risk management stage: risk appraisal and evacuation decision.

The model presented in Figure 1-1 proposes that tourists' individual characteristics and influence the way they seek and process hurricane information, which then influences their evacuation decision, weighted by their perception of risk. It is also predicted that the aforesaid variables, travel related variables and demographic variables directly influence tourists' evacuation decision without being mediated by information search behavior.

Research Questions

The purpose of the study is to examine the role of tourists' individual characteristics, their information search behaviors, travel related variables and risk management in hurricane evacuation decision. There are three major research questions that will be addressed in this study:

1. What is the relationship between tourists' individual characteristics, travel related variables and their hurricane evacuation decision? What factors of tourists' characteristics and travel related variables significantly influence their evacuation decision?
2. What are the relationship between tourists' past experience with hurricane impacts, their involvement with hurricanes, their hurricane knowledge, their personality, their risk belief associated with hurricanes and their information search behavior regarding hurricane evacuation?
3. What are the relationship between tourists' past experience with hurricane impacts, their involvement with hurricanes, their hurricane knowledge, their personality, their risk belief associated with hurricanes, their information search behavior regarding hurricane evacuation, with risk appraisal and evacuation decision?

Context and Delimitation

This study focuses on factors that influence tourists' evacuation decision in the event of a hurricane and is delimited to several aspects. First, the study is delimited to hurricane evacuations and may not be applicable to evacuation behaviors in other crisis events such as earthquakes or tsunamis, due to the unique nature of hurricanes. Unlike

earthquakes or tsunamis, hurricane conditions are often relatively predicted and the path can be estimated to a certain degree, leading to having sufficient time to issue an evacuation order prior to the landfall.

Second, the study is delimited to the state of Florida in the United States. Thus, the explanatory power of any result developed by this research is limited to the State of Florida and may not necessarily be extrapolated to other destinations that also experience hurricane threats as Florida is generally considered to have better hurricane preparedness mechanisms compared to other states. However, any findings derived from the research will provide a basis for improving the understanding of evacuation behaviors of tourists in the event of a hurricane in other tourism destinations that are threatened by hurricanes.

Significance of the Study

The study examined the roles of individual characteristics, information search, travel related variables and hurricane forecasts in influencing tourists' evacuation choices in the event of a hurricane. The results of this research have both significant theoretical contributions and practical contributions to the tourism industry specifically and to society in general.

Tourists are an underrepresented and understudied group in the context of natural disaster research and tourism studies. To date there is a scarcity of empirical studies conducted in the area of tourism crisis, especially tourists' behaviors in the event of a crisis. Most studies in the area of tourism crisis rely heavily on potential tourists and their likelihood to visit risky destinations and the likelihood to visit the destinations following a major crisis. This study sheds light on tourists' behavior when they are

exposed to a risk situation while they are at destination, specifically when they are exposed to hurricane risks during hurricane season.

Furthermore, this study utilized a stated preference survey and hypothetical scenarios to measure evacuation decisions. While similar methods have been used frequently in other fields, this method is not frequently used in the tourism industry. Thus, this study contributes to tourism studies by introducing a research method that can be used in different settings in different contexts within tourism realm.

In addition to contributing to the body of knowledge, the results of this study also provide valuable data for policy formulation by local and state policy makers, Emergency Response Service and Destination Management Organization (DMOs) so that tourists can be better served when a hurricane landfall is imminent. The data yielded from this study provide DMOs such as Visitors and Convention Bureaus with the information they need to ensure that messages they distribute to tourists regarding hurricanes are able to be understood and are transmitted in away likely to reach tourists. By doing so, DMOs will be able to craft more effective hurricane-related messages that save lives. Furthermore, while this study focuses on tourists visiting Florida, the findings of this study can also be generalized to other locations that are frequently threatened by hurricanes such as in the southeastern states of the U.S.

Dissertation Format

This dissertation is segmented into five chapters through three thematic areas based on the research questions. The three major research questions are built upon each other with assessment of the roles of tourists' individual characteristics, information search, travel related variables and risk appraisal in predicting tourists' evacuation choices. Each research question represents one standalone article.

Chapter 2 is the first article, which addresses the first research question; the influence of several individual characteristics, travel related variables and socio-demographic of tourists on evacuation decision. Ordered Probit Model procedures were employed to relate all independent variables and evacuation decision.

Chapter 3 is the second article that addresses the influence of individual characteristics on tourist information search behavior regarding hurricane evacuation. In this study a Structural Equation Modeling was used to relate all exogenous variables and endogenous variables.

Chapter 4 is the third article that specifically tests the relationship among individual characteristic, information search, risk appraisal and evacuation decision. Structural Equation Modeling procedures were performed to relate all exogenous variables and endogenous variables.

Chapter 5 outlines overall summaries on how the research questions were tested in Chapter 2, 3, and 4. Chapter 5 provides an explanation of how all-latent variables tested in the model were interrelated in predicting tourists' evacuation decision. In addition, Chapter 5 also provides recommendations and applications of the overall findings.

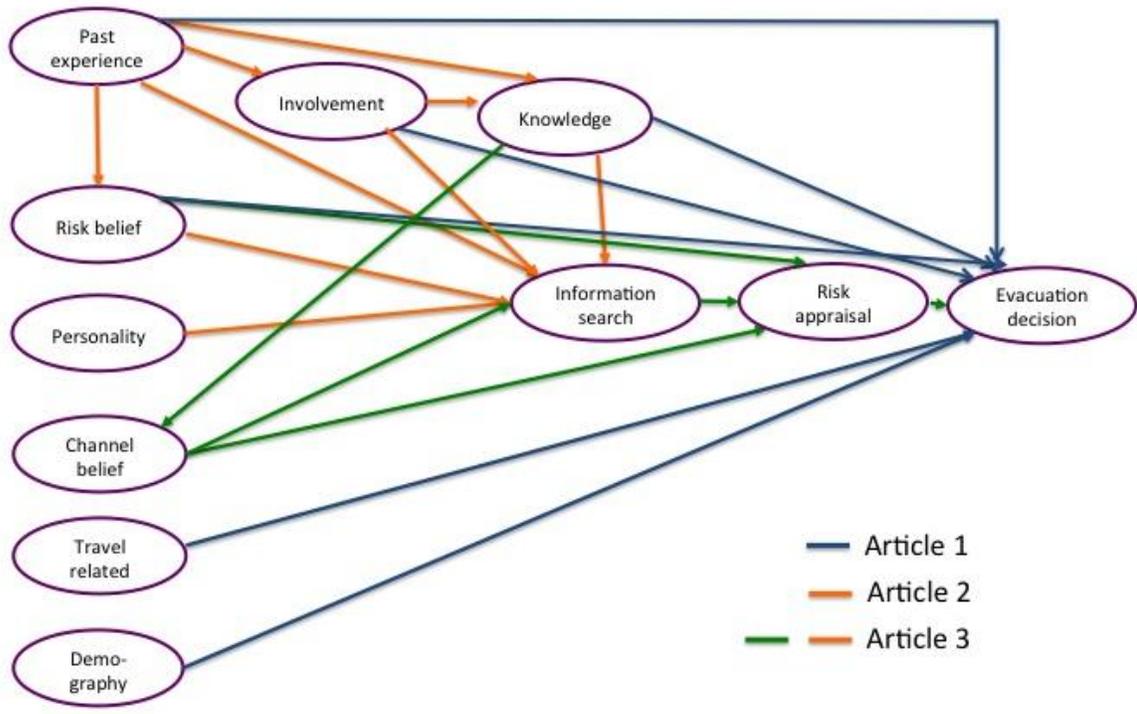


Figure 1-1. Theoretical based model on tourist's evacuation decision

CHAPTER 2 AN EMPIRICAL EVALUATION OF THE DETERMINANTS OF TOURIST'S HURRICANE EVACUATION DECISION MAKING

Background of the Study

Over the last decade, the tourism industry worldwide has experienced voluminous crises ranging from naturally induced crises such as wild fires, tornadoes, earthquakes, tsunamis and human induced crises such as political unrest and terrorist attacks. The aforesaid crises have contributed to a decline in tourists' visitation and have had a negative impact on the economy of the tourism industry worldwide (UNWTO, 2011).

Faulkner (2001) and Ritchie (2004) argued that there is a scarcity of research on the crisis phenomenon in the tourism industry, albeit within the last five years there have been a substantial number of research articles published on crises affecting the tourism industry. However, these recent publications focus primarily on the supply side of the tourism system, and can be further categorized into two major themes: studies that focus on the impacts of a crisis on the tourism industry and studies on how the tourism industry responds to crises (e.g. Carlsen, 2006; Chacko & Marcell, 2007; Chandler, 2004; Cheung & Law, 2006; Cooper, 2005). The second area examines the prescriptive models to respond to crises. Specifically, research in this area concentrates on crisis management models and attempts to offer the best model with which to manage crises (e.g. Faulkner, 2001; Ritchie, 2004; Evans & Elphick, 2005; Hystad & Keller, 2006).

Ritchie (2009) argues that research from the demand side is still lacking and suggested that future researchers examine tourists' behavior during crises. This focus on behavior is pivotal to understanding tourists' behavior in the event of a crisis in order to design effective ways to develop assistance to ensure the safety of tourists in the event of a crisis. Furthermore, Phillips and Morrow (2007) contend that tourists are

vulnerable in the event of a crisis, with one of the main reasons being that tourists may not speak and/or read the host language and may lack knowledge of the risks that hurricanes present. Hence, tourists may experience difficulty in receiving, interpreting, and responding properly to risk messages. Furthermore, tourists are often unfamiliar with their surroundings and lack support systems from their home community (Faulkner, 2001; Burby & Wagner, 1996; World Tourism Organization, 1998). While in unfamiliar environments, tourists may not know who their “protectors” are as they do not know who to turn to for help. Thus the impacts to tourists in risky situations may be greater than to those in the general resident population. Due to the need to better understand tourists’ behaviors in the event of a crisis, this study, unlike previous studies in the area of tourism crisis, will focus on tourists’ behaviors in the event of crisis, specifically on their behaviors in the event of a hurricane.

Hurricanes are one of the most disruptive natural disasters in the U.S, not only because of the direct social costs associated with the impacts, but also due to the time full recovery takes following a hurricane strike, which is often several years. According to the National Hurricane Center (2006), the 2005 Atlantic hurricane season was considered the most active and harmful season in recorded history in the United States, causing approximately 2,300 deaths and over \$130 billion in damages. Furthermore, the economic losses associated with hurricanes from fishing, agriculture, commerce, and tourism are long lasting, usually taking several years to recover (Lindell & Perry, 2004).

An extensive body of research has identified many factors that influence households’ responses to hurricanes (e.g. Drabek, 1986, Lindell & Perry, 2004) that include gender (Gladwin & Peacock, 1997; Bateman & Edward, 2002; Dash & Gladwin,

2007), wealth (Burton et al., 1993; Viscusi, 1995; Whitehead, 2003), past experiences related to hurricanes (Burton & Kates, 1964; Vitek & Berta, 1982; Peacock et al., 2005), hurricane knowledge (Dow & Cutter, 1998; Daniels & Loggins, 2007) and race and ethnicity (Gabe, Falk, & McCarty, 2005; Niga, Barnshaw & Torres, 2006).

Unfortunately, little attention has been focused on transient populations such as tourists (Phillips & Morrow, 2007). Consequently, while general findings in hurricane studies have facilitated emergency managers and policy makers to develop plans that make realistic assumptions about the general nature of human behaviors related to hurricane strikes, such studies may not be sufficient to provide the information that emergency management, policy makers, and the Destination Management Organizations' need for specific predictions about the behavior of tourists in their communities.

The few noteworthy contributions which examine tourist behaviors during hurricanes were published in the early and mid-1990s and largely by one author (Drabek, 1991; 1993; 1994; 1996; 2000) with a focus on evacuation strategies and policies from a supply viewpoint. Matyas et al. (2011) was the only study, which focused on the tourist population. They found the interplay between tourists' perceived risks and their likelihood to evacuate, with those who perceived higher risk being more likely to evacuate in the event of hurricane warning. This article expands the earlier study (Matyas et al., 2011) by employing decision theory to examine determinants that influence tourists' evacuation decision making in the event of a hurricane.

Given the paucity of academic research on tourists' evacuation behaviors and the urgency to conduct such studies, this chapter is focused on examining aspects of

tourists that potentially influences whether or not tourists voluntarily evacuate in the event of a hurricane. Specifically this chapter is guided by three interrelated questions:

1. What are the effects of a tourist's individual characteristics on their decision regarding whether or not to voluntarily evacuate?
2. What are the effects of travel related variables on their decision regarding whether or not to voluntarily evacuate?
3. What are the effects of demography of tourists on their decision regarding whether or not to voluntarily evacuate?

It is predicted that these three factors influence decision making by tourists regarding evacuation.

Decision Theory

As this article intends to examine the decision making of tourists with regard to their evacuation choices, the article will employ decision-making theory as a theoretical lens. The decision theory typically can be divided into two major parts: a description of the agent to which the theory applies and normative claims about how the agent should behave.

Under the standard decision theory, the agent in which the theory applies satisfies the following conditions: 1) The agent's belief state at the time can be represented by a probability function over a space of possibilities that indicates the agent's confidence that the possibility is true, with greater values indicating greater confidence. 2) The agent's evaluative state at the time that can be represented by a function which assigns positive numbers to elements in the space of possibilities, which is referred to as a utility. Utilities indicate the extent to which the agent values that possibility of obtaining the act. The higher numbers indicate higher utilities. 3) The agent's potential acts in a decision situation that can be represented by a unique set of mutually exclusive

propositions $\{a_1, \dots, a_n\}$ where “a” can be considered as the proposition that the agent performs the i th available act.

The standard decision theory also posits that the agent would only perform a potential act if the utilities of this act are at least as large as the expected utilities of any alternatives. This assertion is also known as utility maximization (Meacham, 2010; Jones, Boushey & Workman, 2006).

Within Decision Theory, there are two competing schools of thought regarding individual choice. The first is the rational choice that assumes that individuals behave as if they were acting as pure utility maximizers to deduce patterns of outputs from social systems (Friedman, 1953). The second is Bonded Rationality that recognizes psychological constraints on human decision-making, premised on the idea that individuals would maximize the utility of alternatives that are available for them at that time.

Decision theory has been widely used in order to examine various fields from transportation behaviors (Kitazawa & Batty, 2004), insurance purchasers (Kunreuther & Pauly, 2004) as well as evacuation decision makers (Burton et al., 1993; Viscusi, 1995, Letson et al., 2007).

In tourism literature, decision theory has long been used mostly to examine travel decision-making, purchase behaviors, as well as factors that influence decisions (Moutinho, 1987; Woodside & MacDonald, 1994; Sirakaya & Woodside, 2005). Woodside and MacDonald (1994) applied the decision theory to understand destination choices. In their study they found that often tourist choices of destination are not always rational. The choices are attributed to the interaction of individual preferences and the

influences of travel party members. Sirakaya and Woodside (2005) provide a comprehensive development of theories of decision making by travelers. While they argue that decision theory has been frequently used to understand travel behaviors, there is still a need to advance current understanding of tourist's decision-making by applying the theory to other facets of travel experiences.

Utility maximization allows disaster researchers to comprehend evacuation decisions better by providing a framework to understand how people make a decision regarding whether or not to evacuate (Burton et al. 1993; Viscusi, 1995). Based on utility maximization, the aforesaid researchers argue that individuals make choices under the uncertainty of future environmental threats by maximizing their expected utilities. To do so, they are willing to compromise their wealth to reduce the threats. Hence, an individual who is trying to determine whether or not to evacuate the city or stay prior to hurricane's landfall employs a cost-benefit analysis. If this individual decides to flee, this individual will face a completely different payoff function than making the choice to stay. Depending on factors that are valued by the individual, these pay off functions will be pondered by the individual to determine which voluntary evacuation behaviors to choose. Several researchers have applied the decision theory with its utility maximization to examine people evacuation behaviors. Burton, Kates and White (1993) and Viscusi (1995) argued that under the threat of environmental hazards, individuals responses are influenced by four major elements: prior experience with specific environmental hazards, individual wealth, their intrinsic characteristics and their interaction with society.

In addition, several other researchers have added other factors that significantly influence evacuation choices including: social characteristics, planned destination costs (Whitehead, 2003, Whitehead et al., 2000; Dow & Cutter, 1998; Fu & Wilmot, 2004), risk perception, and vulnerability (Dash & Gladwin, 2001), relevant hazard experiences (Baker, 1991; Whitehead, 2003; Lindell, Lu & Prater, 2005), risk specific beliefs (Burby & Wagner, 1996), level of involvement with hurricanes (Burton & Kates, 1964; Vitek & Berta, 1982; Peacock, 2003), personality (Sorensen & Sorensen, 2007), current hurricane knowledge (Dow & Cutter, 1998; Daniels & Loggins, 2007; Phillips & Morrow, 2007) and socio demographic such as gender (Gladwin & Peacock, 1997; Solis et al., 2010) and ethnicity (Gabe, Falk & McCarty, 2005). While these factors have been frequently found to influence households' evacuation choices, to date, there is no empirical evidence that the aforesaid factors apply to tourists. This is due to the different nature of their ties to the destination and that they are transient populations in the destination whom lack ties to the destination compared to residents who have resided in the destination. As there is a need to examine the characteristic of transient populations that influence their evacuation choices, this article will specifically focus on the variables that are assumed to influence tourists' evacuation choices based on the findings within evacuation studies.

Literature Review

Tourist Individual Characteristics

This study focuses on four variables that are presumed to influence tourists' voluntary evacuation decision making: 1) individual risk belief with hurricane, 2) level of involvement with hurricanes, 3) hurricane knowledge and 4) past experience with hurricanes.

Risk beliefs

Risk belief signifies personal beliefs regarding controllability, optimism bias, as well as risk propensity/aversion (Rohrmann, 1995; 1999). Risk-specific belief pertains to the extent of an individual's level of confidence to overcome uncertainty (Quintal, Lee & Soutar, 2010; Major, 1993; 1998; Lee & Rodriguez, 2008; Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992). When individuals hold higher perceptions of controllability, they are less likely to perceive that they are at risk (Burby & Wagner, 1996). Similarly, individuals with lower perceptions of the controllability of the event are much more likely to perceive that they are at risk. Consequently, those who are less confident with their ability to overcome risks associated with hurricanes are more likely to perceive higher risks leading to their evacuation decision (Sorensen & Sorensen, 2007; Whitehead, 2003).

Individual risk beliefs have been found to be predictors of future travel behaviors (Sonmez & Graefe, 1998a; Sonmez & Graefe, 1998b) and also influence the evaluation of destination alternatives and information acquisition (Roehl & Fesenmaier, 1992). Research suggests that specific locations are more risky than other destinations in terms of perceptions of risk by tourists (Sonmez & Graefe, 1998a). For example, destinations which have experienced previous natural disasters (i.e., Miami or Key West) may be perceived as riskier than destinations, which have not been hit by past natural disasters (Sonmez & Graefe, 1998b). In addition, Floyd and Pennington-Gray (2003) found that tourists perceived national parks, natural areas and museums to be less risky locations than theme parks in the context of terrorism. Coastal versus non-coastal areas may have varying levels of perceived risk, particularly as they relate to

hurricanes, therefore, in this study risk belief is predicted to positively influence voluntary evacuation.

H1: Tourists with higher risk belief regarding hurricanes are more likely to evacuate than those with lower risk belief.

Involvement

According to the literature in mass communication, the level of involvement refers to how personally connected an individual feels to the issue (Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992; Petty & Cacioppo, 1986). Typically, the level of involvement can be determined through three attributes: interests, importance, and curiosity that individuals have concerning a specific issue (Zaichkowsky, 1985; Greenwald & Leavitt, 1984; Hallahan, 2000). Other researchers define involvement as a state of activation during exposure (Cohen, 1983) or the processing that results from exposure (Batra & Ray, 1985) thus often raising the question of when involvement takes place. Levy and Windahl (1984) rekindle the distinction by dividing audience involvement into three categories: pre-activity, during activity and post activity.

Past studies on individual connectedness to hurricanes and evacuation predictions have been inconclusive. Several researchers argue that personal connectedness toward hurricanes will elevate perceptions of risk, leading to higher evacuation rates (Burton & Kates, 1964; Vitek & Berta, 1982). Peacock (2005) argued that this occurs because those who are personally connected to hurricanes will be more receptive to warning messages, compared to those who are not personally connected to hurricanes. However, other researchers such as Lindell and Perry (2000) found that those with personal connectedness toward hurricanes are resistant to warning messages as they

are more likely to perceive that they are in control of the situation, leading to a lower evacuation rate. Further, Lindell and Perry (2000) argue that perceived relevance is important to predict how one perceives the threat of a future hazard, in this case hurricanes.

To date, there are no known empirical studies that specifically discuss personal connectedness of tourists toward hurricanes and how that connectedness influences their responses to hurricane warnings. Nonetheless, it is noteworthy to explore how involvement influences travel related decisions. Beatty, Kahle and Homer (1988) distinguished between two types of involvement: ego involvement and purchase involvement. Ego involvement is defined as the importance of the product to the individual and to the individual's self-concept, values and ego, while purchase involvement relates to the level of concern for or interest in a product which is triggered by the need to consider a particular purchase.

In behavioral terms, Engel and Blackwell (1982) suggest that involvement be measured by the time spent in product search, the energy spent and the extent of the decision process. Similarly other behavioral cues including frequency of participation, ability or skill, as well as ownership of equipment contribute to the level of involvement (Kim et al, 1997). Several tourism scholars have operationalized involvement in behavioral terms (Fesenmaier & Johnson, 1989; Dimanche et al., 1993). Fesenmaier and Johnson (1989) used behavioral involvement to segment the Texas domestic leisure travel market. Cai, Feng and Breiter (2004) examined the level of tourist involvement in travel information search, with more highly involved tourists demonstrating different travel information search behaviors relative to less involved

tourists. Josiam, Kinley and Kim (2005) also used involvement to segment tourists based on their shopping behaviors.

As previous studies have consistently demonstrated the importance of the influence of tourist involvement regarding travel related decision making, the level of involvement of tourists with hurricanes may also affect their travel decisions, in this case their evacuation choice in the event of a hurricane. It is predicted that tourists' involvement with hurricanes has a negative association with the decision to evacuate voluntarily.

H2: Tourists with low involvement with hurricanes are more likely to evacuate than those with higher involvement.

Current knowledge

Current knowledge has been found to influence the travel related decision making of tourists (Vogt & Fesenmaier, 1998; Ratchford, 2001; Gursoy & McCleary, 2004), who can gain prior knowledge from their experiences with the destination from the experiences of others, the mass media and the Internet. Hoogenraad, Eden and King (2004) asserts that independent tourists are more vulnerable to natural hazards as they travel separate from recognized groups and that they often take more risks, while Murphy and Bayley (1989) argue that due to the nature of pleasure travel, tourists tend to dismiss risks and display a low level of natural disaster awareness. Research conducted by Johnston et al. (2002 in Johnston et al., 2007) found that 46% of U.S visitors were unaware of tsunami warning systems compared to 28% of locals and only 19% of visitors had seen tsunami hazard maps.

Similarly, a study of backpackers in North Queensland Australia found that this group had a low awareness of cyclones, with only 30% receiving information concerning

cyclones during their trip, thus leading to an increase in their vulnerability (Hoogenraad et al., 2004). These studies suggest that current hurricane knowledge may influence tourists' decisions regarding evacuation. Those who lack knowledge of hurricanes are more likely to experience a higher risk perception preceding their evacuation choice. Conversely, those who possess a sufficient level of hurricane knowledge tend to be better able to decide in an appropriate manner (Griffin et al., 1999). Therefore, it is predicted that the level of hurricane knowledge has a negative correlation with choosing to voluntarily evacuate during a hurricane.

H3: Tourists with low hurricane knowledge are more likely to evacuate than those with higher hurricane knowledge.

Past experience

Past experiences have been considered as important factors that influence individuals' future behavior. People often use past situations as an anchor in the decision making in the new situation they face (Grunig, 1983). Grunig (1983) further argues that while individuals tend to apply a referent criterion from past experience as a decision rule for future situations, they also develop new criterion when the criteria they initially apply fails to work in a new situation. Similarly, Johnson and Tversky (1983) found that individual experiences with particular risks, including their preventive behaviors could transfer to the individual's response to other risks.

In the area of hazards, past studies have used past experiences as a predictor of several dependent variables ranging from individual perceptions of risk (Griffin et al., 1998), information seeking regarding the hazard (Lenz, 1984; Johnson & Meiske, 1993), and evacuation choices (Baker, 1991; Phillips & Morrow, 2007; Whitehead, 2003; Lindell, Lu & Prater, 2005). Whitehead (2003) contends that the main goal of

hurricane evacuations is to alleviate the risk of injury or death and that people who are in flood prone areas have demonstrated a higher likelihood of evacuation than those who are not in at risk areas. Similarly, Baker (1991) and Riad, Norris and Ruback (1999) also found that people who are in areas previously affected by a major storm and those with past hurricane evacuation experience also demonstrated a greater propensity to evacuate than those in higher grounds and those who have had no prior experience with hurricane evacuations. Phillips and Morrow (2007) found that having past experience with hurricanes affect residents' decisions as to whether or not they evacuate. Thus, residents of hurricane-prone regions who have experienced the impacts of hurricanes tend to have a greater familiarity and thus better comprehension of hurricane-related terminology than tourists who have not had prior experiences with hurricanes. Nonetheless, it is also important to note that another study by Lindell, Lu and Prater (2005) found that past experiences with hurricanes do not significantly influence evacuation decisions.

While several studies regarding residents' evacuation behavior have addressed the relationship between past experiences to current evacuation behaviors, little analysis has been done within the context of tourism. A recent study on tourists' evacuation behaviors found a significant relationship between tourists' past experience with hurricanes and their likelihood to evacuate in the event of hurricane warnings with those who experienced hurricane impacts in the past demonstrating a much lower propensity to evacuate than those who have never experienced a hurricane in the past (Matyas et al., 2011). They did not, however, specifically ask respondents about the severity of hurricanes that they had experienced in the past and whether or not they

were asked to evacuate in the past. Nonetheless, the study has helped to shed light on the need to examine the relationship between past experiences and evacuation behaviors. In this study it is predicted that tourists' with past experience with hurricanes have a negative association with the decision to voluntarily evacuate.

H4: Tourists with past experiences with hurricane impacts are less likely to evacuate than those without such experiences.

Travel Related Variables

This study focuses on the size of the travel party, the number of visits to the destination, the composition of the travel party and mode of transportation. Tourism literature has found that the travel party size influences travel related decisions such as where to eat, where to stay and what to do (Decrop & Snelders, 2005). More effort is needed to negotiate and to accommodate every member's need and interests in larger travel parties. Finding common ground may prove to be challenging for a large group that may need more time to make a decision, which becomes a significant issue during hurricane situations, which typically require decisions regarding evacuation to be made very quickly. Likewise, in the context of evacuation, familial size and having a united family are relevant factors, with a larger family size having been found to positively correlate with a higher propensity to evacuate (Sorensen, 2000) with one possible reason being the desire to protect the entire family. Therefore it is predicted that the size of the travel party is positively associated with tourists' decisions to choose to voluntarily evacuate in order to safeguard all members of the travel party.

H5: The larger travel party the more likely to evacuate than those with smaller travel parties.

In resident evacuation literature, the length of residence has also been found to influence evacuation decisions, with longer lengths of stay being correlated with a lower likelihood of evacuation in the event of a potential hurricane strike (Gladwin & Peacock, 1997). Due to lack of experience and knowledge in a specific area or with hurricanes, newcomers may misjudge the potential destruction of the approaching hurricane. Some newcomers may simply underestimate the hurricane risk out of ignorance or lack of experience, but some others may overestimate the actual risk due to the same reasons, which trigger a “false alarm” (Whitehead et al., 2000). Conversely, those who have been in the area longer are more likely to have better sense of hurricane risks.

Likewise, the tourism literature has also found that those who have never been to the destination before exhibit higher perceptions of risk than those who have been in the destination before (Sonmez & Graefe, 1998b). One possible reason is that those who have previously been in the destination have gained higher familiarity and knowledge with regard to the destination and may also have developed support systems there. Thus, first time tourists are more vulnerable in the event of a crisis as they lack the requisite hurricane related knowledge and are unlikely to have a support system in the destination. This lack of familiarity may cause higher perceptions of risks associated with hurricanes and lead to an effort to alleviate the uncertainty by evacuating. Therefore, in this study it is predicted that those who have never been in the destination are more likely to evacuate than those who have been in the destination before.

H6: First time tourists are more likely to evacuate than those who are not.

Tourism research has well documented the roles of travel party composition in travel related decision making (Decrop & Snelders, 2005; Egelhoff & Sen, 1992;

Fesenmaier & Jeng, 2000; Hyde, 2004). Additionally, the role of children in households may significantly affect decision-making with regard to travel related decisions when in the destination and such findings have been documented in travel literature (Nickerson & Jurowski, 2001). In addition, the presence of children and the elderly have been found to significantly influence evacuation choices. Dash and Gladwin (2007) found that households with children display a higher propensity for evacuation while large households and households with elderly persons showed a lower probability to evacuate. However, it is also important to note that the earlier study found that although the presence of children increased perceptions of risk, it did not lead to a higher likelihood of evacuation by tourists (Matyas et al., 2011). Based on prior studies, this article predicts that the presence of children in the travel party will increase the likelihood of evacuation, while the presence of elderly will decrease the likelihood of evacuation.

H7: Those who travel with children are more likely to evacuate than those without children.

H8: Those who travel with elderly are less likely to evacuate than those without.

Access to transportation has consistently been determined to be a factor that influences hurricane evacuation decision making among residents, with those who have access to transportation being more likely to evacuate than those without access (Solis et al., 2010). With regard to tourists however, the earlier study found that tourists who fly to the destination and those who rent vehicles in the destination exhibit lower evacuation rating than those who do not fly or rent a vehicle in the destination (Matyas et al., 2011). Furthermore, they argued that those who fly or rent a vehicle are less likely

to evacuate due to concerns regarding unexpected expenses that may occur in modifying their travel plans. On the other hand, those with personal vehicles may have greater freedom to leave at any time and perception regarding traffic may motivate them to depart early from the destination to avoid heavy traffic associated with hurricane evacuation. In this chapter, those who fly to the destination and those with rental vehicles are predicted to have a negative association while those with personal vehicles are predicted to have a positive association with evacuation likelihood.

H9: Tourists who fly to the destination are less likely to evacuate than those who do not fly.

H10: Tourists who rent a vehicle in the destination are less likely to evacuate than those who do not.

H11: Tourists who take personal vehicles to the destination are more likely to evacuate than those who do not.

Demographic Variables

Past studies on hurricane evacuation have consistently utilized demographics as a factor in predicting evacuation choices ranging from ethnicity, age, gender and education and wealth, with conflicting results (Baker, 1991; Dow & Cutter, 1998; Solis et al., 2010; Whitehead et al., 2000; Lindell et al., 2005). Dow and Cutter (1997) for instance found no differences in factors such as age, race and gender between evacuees and non-evacuees, while other researchers (Gladwin & Peacock, 1997; Bateman & Edward, 2002; Dash & Gladwin, 2007) found significance of the aforesaid factors in influencing evacuation decisions.

Specifically, Bateman & Edwards (2002) and Riad, Norris and Ruback (1999) found that gender is a significant factor in predicting evacuation decisions with females

being more likely to evacuate than males, while one's education level has been found to be insignificant in predicting evacuation choices (Whitehead, 2003; Smith, 1999).

Past studies have also found that race and ethnicity play a critical role in determining evacuation choices. The aftermath of hurricane Katrina illustrated that more than 100,000 residents of greater New Orleans, many of whom were poor and African American did not evacuate before Katrina's landfall (Gabe, Falk & McCarty, 2005; Niga, Barnshaw & Torres, 2006). While one can argue that the vulnerability of these groups was mainly attributed to economic status and access to resources, other studies have concluded that cultural ignorance, ethnic insensitivity, racial isolation, and racial bias also contribute to lower levels of preparedness, fewer resources for evacuation, and disparities in access to relief and recovery (Fothergill, Maestas & Darlington, 1999).

Wealth is often considered to significantly influence evacuation decision making (Burton et al., 1993; Viscusi, 1995; Whitehead, 2003). Wealth is often described as incomes and owned possessions (Smith, 1999) and plays an intriguing role in predicting evacuation choices. Contrary to the widely held assumption that people with higher incomes are more likely to leave because they are assumed to have all necessary resources to evacuate (e.g. personal transportation, funds etc.), past studies have found that households with higher incomes tend to demonstrate a lower likelihood of evacuation (Whitehead, 2003; Smith, 1999). One plausible explanation is that wealthy households tend to have more valuable goods such as artwork and electronic devices, etc. Therefore, in order to safeguard their belongings from potential looting, they are more likely to stay than those who do not possess such valuable goods. Furthermore, wealthy households tend to live in sturdier homes, which often create a greater sense of

security. This is also the reason why people who live in multi-unit buildings are more likely to evacuate than those living in single family properties (Gladwin & Peacock, 1997). Nevertheless, there is no available data to date to apply this behavior to tourists or other transient populations who do not own properties in the destination.

While the role of wealth applies to tourists, their behaviors may vary. Having more financial support is important for tourists as hurricane evacuation may lead to unexpected expenses, especially as it relates to modifying travel plans. Therefore those who have greater access to available funds have more options regarding evacuation choices than those without sufficient financial resources, which often translated into higher evacuation rates.

With regard to the influence of tourists' socio demographic variables to their evacuation choices, the earlier study found that international tourists in coastal destinations are more likely to evacuate than domestic tourists (Matyas et al., 2011). One plausible explanation was that international tourists tend to be less familiar with the destination compared to domestic tourists and coastal destinations are considered risky destination with regard to hurricanes. Furthermore, the study also found a significant relationship between a tourist's age and the likelihood of evacuation with younger tourists being more likely to evacuate than tourists aged 50 or higher, although these tourists demonstrated the highest perception of risks, which is consistent with previous studies (Baker, 1979; Drabek, 1986; Eisenman et al., 1997).

The same study also found that female tourists have a relatively higher risk propensity and are more likely to evacuate than males in the event of a hurricane warning. In addition, the earlier study also found that tourists travelling in their own

vehicle indicate higher ratings for evacuation likelihood and perception of risk than those that did not travel in their own vehicle (Matyas et al., 2011). These findings parallel those of previous studies regarding residents' evacuation decisions (Lindell et al., 2005; Dow & Cutter, 2002). Nonetheless, as Matyas et al. (2011) focused on seeking relationships between tourists' demographic characteristics and their evacuation choices, further study needs to be conducted to examine the causality of tourists' demographic variables with respect to their evacuation choices as relationship does not assume causality (Agresti & Finley, 2009). Based on the literature, the hypotheses for this study were specified as followed:

H12: Female tourists are more likely to evacuate than male tourists.

H13: Younger tourists are more likely to evacuate than older tourists.

H14: African American tourists are less likely to evacuate than White Caucasian Tourists.

H15: Tourists with higher income are more likely to evacuate than those with lower income.

H16: International tourists are more likely to evacuate than tourists from Florida.

Methodology

Sample and Sampling Frame

The population of this study was tourists who were currently visiting Florida. This study utilized an intercepting approach in data collecting to sample tourists. In this study, a tourist was defined as "any person who participates in trade or recreation activities outside the county of his or her permanent residence or who rents or leases transient living quarters or accommodations" (Florida Statue 125.0104(3)(a)). Screening questions were utilized to ensure the eligibility of the respondents. To maximize the

randomness of participants, the survey administration used every n^{th} formula. Every third eligible tourist in each site was approached and asked to complete the survey after verifying their eligibility.

Study Design

This study used a stated preference survey to elicit tourists' evacuation decisions. The use of stated preference surveys allowed elicitation of evacuation decision-making choices based on multiple hypothetical hurricane scenarios (Solis et al., 2010). Data collection for this study was conducted in August-September 2011 during the Atlantic hurricane season based on the preposition that during the hurricane season, people are more likely to cognitively ponder and seek information about hurricanes. Surveys were administrated in two sites in Orlando and Fort Lauderdale Beach, Florida.

Students were hired to administer the intercept surveys in each site. Prior to the actual survey administration, training was conducted for student surveyors. A pilot study in the form of a focus group and qualitative interviews was administered to validate the findings and the design of the survey instrument as well as the time needed to complete the survey to minimize any potential systematic errors (Dillman et al., 2009). In average, the survey took 15 minutes to complete.

Measurements

There were sixteen independent variables and one dependent variable for this study. The independent variables were: risk-specific beliefs, involvement, current knowledge, hurricane past experience, size of travel party, prior visit to destination, presence of children, presence of elderly persons, the use of an airplane, rental vehicles, personal vehicles, gender, age, ethnicity, income, education and place of

residency. The voluntary evacuation decision was the dependent variable. Table 2-1 summarizes the constructs and their measurements.

As indicated in Table 2-1, risk-specific beliefs was be measured by asking respondents about their perception of hurricane risks using a five-point Likert scale (1= *strongly disagree* to 5= *strongly agree*) on respondents' agreement of 4 statements measuring attributes of risk-specific beliefs that were adapted from Moon (2010), that was adapted from Paton, Smith, Johnston, Johnston and Ronan (2003). The statements included: "A hurricane exposes me to risks beyond my control," "I get nervous when there is discussion about approaching hurricanes," "I avoid thinking about hurricanes," "I know what I should do if a hurricane occurs during my stay in Florida."

Tourists' involvement with regard to hurricanes was measured by using the following three questions that were adapted from Major (1998): "How interested are you with hurricane topics?" , "How important is the hurricane problem to you personally?" and "How curious are you with hurricane topics?" using a 5 point Likert scale with 1= *not at all* and 5= *extremely*. Tourists' hurricane knowledge was measured by asking the respondents to answer the following four *true/false* & *don't know* questions about hurricanes that were adapted from Moon (2010) and Matyas et al. (2011): "A hurricane watch means a hurricane could hit within 24 hours", "Hurricane categories (1-5) are based on wind speed only", "Hurricane season runs from June to October" and "At 50 mph (80 km/hr) wind speed, a tropical storm becomes a hurricane." Tourists' past experience was measured by asking the respondents a yes/no question: "I have experienced the impacts of hurricanes in the past" that was adapted from Whitehead (2003).

Travel related variables were measured through a series of questions. These include size of travel party, whether or not they have visited the destination before, the composition of their travel party (the presence of children and the elderly), and whether or not the respondents travel by air, personal vehicles or rent vehicles while in the destination. Demographic variables such as age, gender, education, income, residence (domestic Florida, domestic outside Florida or International) were measured using typical census questions.

To elicit the evacuation decision, 8 hypothetical hurricane scenarios were developed, with each containing a combination of three attributes, each with two levels. The attributes and the levels were: projected hurricane path (passing through the destination and offset the destination), projected intensity at landfall (category 1 and category 4) and time to the destination (48 hours and 36 hours). Each respondent was given 4 scenarios to evaluate, then they were asked to state their choice of evacuation for a given scenario using a 5 point Likert scale with 1 = *most likely to stay* to 5 = *most likely to evacuate*. Figure 2-1 illustrates the scenario used to elicit respondents' likelihood of evacuation.

Data Analysis

Data analysis for this study involved two stages. First, descriptive statistics were performed on the variables, which allowed for a closer look at the nature of the data pattern. Next, in the second stage, multivariate analysis was performed. This study employed an ordered-response model (McKelvey & Zavoina, 1975) procedure to relate all individual characteristics and evacuation choices. As the responses to evacuation choices were measured using a Likert scale (1-5), an Ordered Probit Model was employed. The Ordered Probit Model recognizes the inherent ordering in the outcome

variables of interest and allows for calculation of the probability of each level of outcome as a function of explanatory factors. In the Ordered Probit Models, a positive parameter indicates that the corresponding factor is associated with a higher likelihood of evacuation and a negative parameter indicates the opposite effect. The parameters of the model were estimated using the maximum likelihood methodology. Prior to estimating the model, the dataset was converted, from a person-based data set to a scenario-based data set to better reflect choices based on hypothetical hurricane scenarios. A statistical analysis was performed using the PASW Statistic 18 package.

Results

Profile of the Respondents

A total of 632 eligible tourists were approached in all sites. Five hundred and forty four agreed to participate (response rate= 86%). Out of 544, 533 were deemed usable due to the completeness of the responses, and therefore were used for this study. A no response bias test (t-test) was conducted to compare those who completed and those who did not complete the questionnaire. No significant differences in variables used in the study were found, indicating there was no difference between those who completed the questionnaire and those who did not complete the questionnaire.

Out of 533, females encompassed 56%. Domestic tourists from outside of Florida encompassed 50% of the sample, followed by international tourists (38%) and domestic tourists from Florida (12%), with a median travel party were 3 people in the group. The youngest respondent's age was 20 years old and the oldest was 88 years old, with a median age of 44. More than half of the respondents (54%) indicated that they have been in the destination before. More than half of respondents did not travel with children (64%). Likewise, those who travel without elderly persons comprised 79% of the

sample. Caucasians represented the majority of the sample (69%) followed by Hispanic (12%) and African Americans (8%). Forty four percent of respondents earned \$50,000 to \$99,000 annually.

The demographic of the sample was found to be comparable with the visitors to the state of Florida. Based on VISIT FLORIDA@ study, the median age for both international and domestic tourists was also 44. The median of travel party was also 3, while the income was slightly lower than the average income on both international and domestic tourists, while 70 percent of international tourists visit Florida without children (VISIT FLORIDA@, 2011). Table 2-2 outlines the descriptive information about the respondents.

A reliability test was employed for “risk belief” and “involvement” items to ensure the consistency of the construct measurements. The overall Cronbach’s alpha for risk belief was .91, while the overall Cronbach’s alpha for “involvement” was .90, higher than a minimum value of .70 (Zinbarg, Revelle, Yovel & Li, 2005) that indicated a high consistency among items in each scale. Consequently, a single value was calculated from each scale to represent individual aggregate “risk belief” and “involvement.” The mean for aggregate risk belief was 3.2 (S.D. = 1.0), while the mean for overall involvement was 2.4 (S.D.= 1.0) in a 5 point Likert Scale to indicate that in average respondents had medium risk belief regarding hurricanes and low involvement with hurricanes. With regard to knowledge of hurricanes, an aggregate score was calculated based on respondents’ responses to four hurricane related questions. The overall mean score for hurricane knowledge was 1.5 (S.D.= 1.5) with 4 as a maximum score, which indicated overall low hurricane knowledge among participants.

Results of the Ordered Probit Model

Prior to estimating the model, the dataset was converted to a scenario-based dataset, as one person responded to 4 different scenarios, the sample for the Ordered Probit Model was 2137. The -2 Log likelihood at convergence was 4246.393 ($\chi^2 = 524.080$, $df = 27$, sig. .000) indicating a significant improvement from the baseline model. The model with all independent variables accounted for 41 percent of the variance in the evacuation likelihood. Table 2-3 outlines the results of the Ordered Probit Model.

Individual characteristics

The Ordered Probit Model indicated that there were significant effects of individual risk belief with regard to hurricanes, involvement with hurricane topics, hurricane knowledge and their past hurricane experience in predicting evacuation decisions. Those with higher risk beliefs with regard to hurricanes were more likely to evacuate than those with lower risk belief ($\beta = .07$) that uphold Hypothesis 1.

Two individual characteristics, involvement with hurricane topics and hurricane knowledge also negatively affected the likelihood of evacuation, $\beta = -.09$ and $\beta = -.09$ respectively. Thus, it upheld Hypothesis 2 and Hypothesis 3.

Past hurricane experience contributed to the decrease of evacuation likelihood ($\beta = .49$). The contribution of this variable in predicting likelihood of evacuation was found to be very significant. As past hurricane experience showed negative association, Hypothesis 4 was supported.

Travel related variables

With regard to travel related variables, the Ordered Probit Model indicated that the size of travel party, first visit, the presence of children, the presence of elderly and modes of transportation used all had significant effects on evacuation likelihood. The

size of travel party was found to have a positive effect on evacuation likelihood ($\beta = .05$) that upheld Hypothesis 5. This indicated that the more number of travel party members, the higher the likelihood to evacuate. Those who have never been in the destination before showed a higher propensity to evacuate than those who visited the destination in the past ($\beta = .24$). With this finding, Hypothesis 6 was upheld.

A composition of travel party yielded interesting results. Those with children were more likely to evacuate than those without children ($\beta = .16$), which supports Hypothesis 7. The presence of elderly individuals in the travel group affected evacuation likelihood with those with elderly were less likely to evacuate than those without the presence of elderly in their travel group ($\beta = -.20$). Therefore Hypothesis 8 was upheld.

Mode of transportation was also found to significantly affect evacuation likelihood with airplane and personal vehicle usage specified to have positive effects $\beta = .50$ and $\beta = .25$ while the use of rental vehicles was specified to have a negative effect $\beta = -.15$. Thus Hypothesis 9 was not supported, while Hypothesis 10 and 11 were supported.

Demographic variables

The results of the Ordered Probit Model indicated that females were more likely to evacuate than males ($\beta = .24$), which provided support for Hypothesis 12. However, the model indicated that the older the tourist was the more likely this tourist was to evacuate ($\beta = .01$). This finding contradicted with Hypothesis 13.

The result of the model did not find support for Hypothesis 14. In this study, race and ethnicity were not found to significantly affect the likelihood of evacuation. With regard to income, only those who earned more than \$125,000 in annual household income were found to be varying significantly. This group was more likely to evacuate

than those who earned less than \$24,000 annually. Therefore, Hypothesis 15 was upheld.

Likewise, the residence of origin of tourists was found to positively affect evacuation likelihood. International tourists were more likely to evacuate than those who resided in Florida ($\beta = .36$), while those who were from outside Florida were more likely to evacuate than those who were from Florida ($\beta = 1.28$). This finding provided support to uphold Hypothesis 16. Lastly, with regard to the education level, only those who responded to have other education level were less likely to evacuate than those who held a bachelor degree.

Discussion

The use of Decision Theory under uncertainty allowed detail examination on the determinants of tourists' voluntary evacuation. By applying the theory to the estimated model, it can be argued that the decision by the tourist regarding whether or not to voluntarily evacuate is a complex phenomenon that is worthwhile to examine. The Ordered Probit Model yields interesting results. Most hypotheses were upheld. Three hypotheses were not upheld: Hypothesis 9, 13 and 14. Those were the use of plane, effects of age, and race and ethnicity on evacuation likelihood. Variables associated with individual characteristics (that are risk belief, involvement with hurricane, hurricane knowledge and past hurricane experience) all have significant effects, with risk belief with hurricanes having a positive association with evacuation likelihood, while other variables including past experience, involvement with hurricane topics and hurricane knowledge all having negative associations with hurricane association.

The positive association of individual risk belief to evacuation is explicable as risk belief reflects personal belief on controllability and optimism bias (Rohrman, 1995; 1999). Risk belief also reflects an individual's level of confidence to overcome uncertainty (Quintal, Lee & Soutar, 2010). Therefore, it is understandable that individuals with higher risk belief will feel more vulnerable and perceives less controllability when exposed to hurricane risks. As these individuals feel more threatened with hurricane risks, they would then prefer to leave the destination when hurricane warning issued to alleviate uncertainty (Sorensen & Sorensen, 2007). Likewise, higher involvement with a certain topic has been consistently found to increase one's self confidence (Grunig, 1989; Aldoory et al. 2010), and therefore makes one less susceptible to external threats. As predicted, tourists with low hurricane involvement showed a higher likelihood to evacuate than those with greater hurricane involvement.

Additionally, the negative association of hurricane knowledge and evacuation likelihood indicated that those with higher hurricane knowledge are less likely to evacuate than those with low hurricane knowledge. One possible explanation is that level of knowledge of hurricane and its risk help the person in their decision making with regard to evacuation. Sufficient knowledge about hurricanes will allow the individual to make a better decision, instead of allowing him or herself to be susceptible to external threats (Hoogenraad et al., 2004). Individuals are often based on their own knowledge to make a decision in a risky situation (Griffin et al., 1999). The samples for this study indicated that most of them have low knowledge with regard to hurricanes that might be resulted due to the nature of the tourist population. While the effect of knowledge was

consistent with what was found in past research, with leisure travelers demonstrating a low level of natural disaster awareness (Murphy & Bayley, 1989; Johnston et al., 2007) the findings should be accepted with caution due to the quality of items that were used to elicit the level of hurricane knowledge. This study only used four questions that designed to measure the level of hurricane knowledge that may affect the quality of responses. A better set of questions may be needed to fully capture the effect of hurricane knowledge on evacuation.

The result of the Ordered Probit Model on risk belief, involvement and hurricane knowledge suggests the need to increase tourists' self-confidence. Increasing individual confidence can be done in various ways. One possible way is to increase one's knowledge level of hurricanes. As most tourists in this study indicated that they have low involvement with hurricanes and minimal knowledge of hurricanes, it is suggested that activities aimed to increase hurricane awareness among tourists is needed. This may include creating hurricane information in multiple forms that is easy to access such as in the elevators. Hotels can place such information in the check in areas or in each guest room in the event that a hurricane is on the horizon. Destination Management Organizations can team up with Emergency Management Organizations to create a dark webpage that contains all information about hurricanes and hurricane evacuation procedures that can be accessed by tourists and the general public. Then this dark site can be launched when a hurricane is in the horizon.

In this study past hurricane experience shows that those without past experience with hurricane impacts are more likely to evacuate than those that experienced hurricane impacts in the past. This finding was consistent with the earlier study (Matyas

et al., 2011). This is an interesting finding as most studies on residents and their evacuation behaviors indicate that past hurricane experience has no influence (Lindell et al., 2005) or positive association (Solis et al., 2010; Riad et al., 1999). One possible explanation is that people often used past experience as a reference to make a decision in the same situation (Johnson & Tversky, 1983). For those without past experience regarding the impacts of a natural disaster, past studies have found that these individuals would create a reference based on social cues on which to base their decisions to alleviate uncertainty (Major, 1998) and that those without past experiences have consistently indicated higher perceived vulnerability as they are uncertain about what to do in the event of natural disasters (Griffin et al., 1998). Therefore, it is understandable tourists without past experience with hurricane impacts are more likely to evacuate than those with hurricane experiences as they feel that they are more vulnerable in the event of a hurricane. Another plausible explanation is that in their encounter with hurricane impacts, they realized that it was not necessary to evacuate and therefore they may not this time because it is not necessary.

Results of an Ordered Probit Model indicate the roles of travel related variables in predicting the likelihood of evacuation. As predicted, the larger the travel party the more likely tourists are to leave the destination in the event of a hurricane. One plausible explanation is that with more people in the group, one will not only consider his or her own safety but also other individuals in the group. Therefore leaving the destination is reasonable in order to accommodate everyone's safety.

With regard to the result of the presence of children, the findings support the prespecified Hypothesis. As predicted, the presence of children was found to increase

the likelihood of evacuation. Thus, unlike the finding of Matyas et al. (2011), the presence of children not only amplifies the perception of risk but also lead to a higher likelihood of evacuation. This study is consistent with findings presented by Lindell, Lu and Prater (2005) and Solis, Thomas and Letson (2010) in resident household evacuation studies. Having children in the group seems to amplify perceived risks that lead to a higher rate of evacuation among those with children.

It is interesting to note that those who travel with elderly persons are more likely to remain in the destination, which is parallel with prior studies regarding residence evacuation (Gladwin et al., 2001). One possible explanation is that they may perceive a need for longer time to perform various activities, perception of crowding on the highways may deter them to evacuate and stay in the destination until a mandatory evacuation is issued as it is deemed easier. Another possible explanation is that they used their life experience and knowledge to make their decision. Knowledge of the fact that hurricanes might change the path of their course, thus resulting in no evacuation order; it is understandable that they decide to stay in the destination and wait until a mandatory evacuation is actually issued. This finding suggests the need to assist elderly tourists finding safer shelters or hotels in the event of hurricane evacuation. Local Destination Management Organizations need to establish a system to track tourists in their destinations, especially those with elderly and disabled persons and other at-risk groups. In addition, Destination management Organizations need to ensure that all accommodations comply with the “non-gouging law” in the event of hurricane evacuation.

The result of the Ordered Probit Model provides evidence that modes of transportation play a role in predicting evacuation likelihood. Contrary to widely held expectations, those who traveled by air and those who used their own vehicle were more likely to evacuate than those who rented a vehicle. While the findings on rental vehicles are parallel with the earlier study's findings (Matyas et al., 2011), the result of the use of airplanes is not.

One possible explanation is that those who come to Florida by plane feel more vulnerable than those who do not take an airplane. These are more likely international tourists and tourists from outside of Florida. The result of the Ordered Probit Model with regard to places of residence also indicates that those who reside in other states and other countries are more likely to evacuate than those who reside in Florida. Thus, it is understandable that those who use an airplane are more likely to evacuate. Another possible explanation is that those who depend on airplanes would think that they need to be at the airport as soon as possible to get a flight to leave the destination. Traffic can often be a problem during hurricane evacuation such that one needs to plan and allow for more time to get to airports. Concerns that flights might be cancelled in the event of hurricanes may also pose a problem and thus, to avoid traffic and ensure that they will get a flight, they have to leave the destination as soon as possible.

Those with rental vehicles were found to be less likely to stay in the destination with one possible explanation being that vehicle renters are bound by the term of the lease and have to return the vehicle within a specific time. They lack the freedom to leave the destination that is afforded to those traveling in their own vehicles. They may need to extend the lease of the vehicle should they decide to take the rental vehicle to

another safer destination, that may incur extra spending. Additionally, the rental company may not allow them to take the vehicle beyond the specified boundary. Due to these complexities, it is understandable that those who rent a vehicle are less likely to evacuate than those who do not rent a vehicle.

The finding with regard to owning a personal vehicle is parallel with the earlier study (Matyas et al., 2011), such that those with personal vehicles are more likely to evacuate than those without a personal vehicle. In addition, the findings also confirm prior studies of resident evacuation behaviors that argue that access to vehicles is an important factor in dictation evacuation likelihood, with those with access demonstrating a higher likelihood of evacuation than those without access (Eisenmann et al., 1997). One possible explanation is that concern over potential traffic associated with evacuation may motivate tourists who have access to personal vehicles to leave the destination as soon as possible in order to avoid traffic.

As perception over potential traffic may play a role to both motivate tourists to leave the destination or to stay in the destination, it is pivotal to inform tourists of potential traffic information, main evacuation routes as well as secondary evacuation routes. One notable issue with hurricane evacuation is “shadow evacuation” (Wolshon et al., 2005), where those who have not been ordered to evacuate decide to evacuate, creating major traffic in the interstate system. While the state of Florida has done a good job in posting evacuation route signs along evacuation routes, tourists who are not familiar with the routes and procedures may still need more information regarding evacuation routes. It is important to note that in the event of mandatory evacuation, Florida’s Department of transportation would put up electronic signs along the

evacuation routes. In more severe situation, a contra flow procedures would be employed by converting both sides of the highways to outbound only. Likewise, assistance in refund policy procedures for those who decide to evacuate may be needed, especially those who are required to check out early from their hotels.

With regard to demographics in this study we found interesting results. With regard to gender, the findings of this study were consistent with several past studies that found females to demonstrate a higher propensity to evacuate than males (Lindell et al., 2005; Riad et al., 1999; Smith & McCarty, 2009). This suggests that males and females view evacuation differently. The significance of the age of the tourist in predicting the likelihood of evacuation is contradicted by Baker (1991) and Dow and Cutter (1998) who found no effect of age in predicting evacuation and Matyas et al. (2011). One possible explanation of our finding is that the respondents' ages were between 20 and 88 with a median age of 44, and that those were tourists who travel with others, and that most of them travel with their family. As the sample comprised those who travel with family and that those tend to be middle age they may need to take account other individuals in their groups in their decision making process. Another possible explanation is that younger generations tend to be more risk taking than older generations in travel related decision making (Reisinger & Mavondo, 2005). Therefore, it is understandable that younger tourists are more likely to stay while older tourists are more likely to leave, as they have to take into consideration other individuals in their group, making them less risk taking.

The findings indicated that race and ethnicity were not significant factors on the likelihood of evacuation, which is consistent with the findings by Dow and Cutter (1998) and Baker (1991). More recent studies however have found that race and ethnicity does

affect evacuation rates with white Caucasian being more likely to evacuate than African Americans (Elder et al., 2007). One possible explanation is that almost 70% of the sampled tourists were Caucasian while the remaining percentage comprises other races and ethnicities. This discrepancy may affect the stability of the result of Ordered Probit Model as the model is based on probability of the number of cases in each group (McKelvey & Zavoina, 1975). Consequently, further study needs to be conducted to fully examine the role of tourists' race and ethnicity regarding their evacuation decisions during a hurricane.

With regard to income, this finding partially supports the findings of previous studies on residents' evacuation behaviors (Solis et al., 2010) with higher incomes being associated with a greater likelihood to evacuate. This study also found that only tourists with incomes of more than \$125,000 are more likely to evacuate than those who earned less than \$24,000. One possible explanation is that changing travel plans often requires a substantial amount of money for related expenses such as changing flights and accommodation plans which could exceed their allotted budget. Therefore, it is understandable that those with substantially higher incomes are more likely to leave.

With regard to residence of origin, this study found that international tourists show a higher likelihood to evacuate than those from other states and from Florida. This is consistent with the findings of the earlier study (Matyas et al., 2011). One possible explanation is that the proximity of residence has an effect on the familiarity of hurricanes. International tourists may not be familiar with hurricanes and perceive the threat differently than those who reside in Florida. Therefore, international tourists are more likely to leave the destination to alleviate uncertainty. Since most international

tourists flew to Florida, it is understandable that the findings also reflect the finding on the use of airplanes with those who flew to Florida showing a higher likelihood of evacuation than those who do not travel by air. This suggests the need to provide educational information regarding hurricanes and evacuation orders. Such information should be made available in multiple languages to accommodate international tourists. International tourists are very vulnerable in the event of a hurricane evacuation, as they may not know what to do and how to seek information regarding the evacuation due to language and cultural barriers. Therefore, local Destination Management Organizations need to work with accommodations, policy makers and local emergency management organizations to ensure their awareness and safety.

With regard to the role of education, these findings of this study were generally consistent with past studies of residents' evacuation decisions (Whitehead, 2003; Smith, 1999), which found no significant role of one's education level in predicting evacuation likelihood. In this study only those who respond "other" are more likely to evacuate than those with a bachelor degree. Those who responded "other" were only 7% of the entire sample, suggesting that the significance resulted from the discrepancy of numbers on a group between those who respond "other" and those who responded "bachelor degree" that used as a reference group in the Ordered Probit Model.

The study provides support the utility of maximization under threat, according to Burton, Kates and White (1993) and Viscusi (1995), under environmental threat, individuals might be willing to forgo their wealth in order to minimize those threat. As predicted by the theory, tourist's prior experience with hurricanes, their intrinsic

characteristics and their wealth were found to significantly affect their evacuation decision.

Concluding Remarks

The study analyses the determinants of tourist hurricane evacuation decision based on the decision theory. This article contributes to the literature by accounting for two issues normally neglected in previous evacuation studies. First, it focused on transient populations of tourists who are in the destination when a hurricane evacuation issued. Secondly, this article utilizes several variables that were not used in previous resident evacuation studies such as risk belief and involvement with hurricanes as well as other travel related variables.

In general the empirical results of this study suggest that individual characteristics, travel related variables and the demography of tourists influence their voluntary evacuation in the event of a hurricane, with tourists who are not from Florida showing higher risk beliefs regarding hurricanes, with low involvement and knowledge about hurricanes, without past experience with hurricane impacts, traveling with a larger party, travelling with children, travelling for the first time to the destination, travelling with plane and personal vehicle, who is older, female with an annual income more than \$125,000 are more likely to evacuate. In contrast, tourists who are from Florida are less concerned with risks associated with hurricanes due to greater familiarity with and knowledge of hurricanes, experience with hurricane impacts in the past. Those travelling with a smaller group, having been to the destination before, those without children, those with elderly persons, those with rental vehicles, males, younger tourists, and those with annual income less than \$24,000 were all found to be less likely to evacuate.

Importantly, the results obtained in the estimated model may be a useful tool to identify the willingness to evacuate from broad tourist' groups. This information may help Destination Management Organizations and Emergency Management Organizations to target resources more efficiently, focusing not only on groups of tourists with higher risks but also on those groups with a lower probability to evacuate. Nevertheless, given that the study was conducted in the state of Florida that is considered to have a better hurricane information system compared to other locations, further research is needed to test the validity of the model and its application across different tourism destinations.

Historically the ethnicity of tourists has not been found to significantly influence tourists' decisions regarding whether or not to voluntarily evacuate, yet a recent study on resident evacuation found that African Americans and Hispanics were less likely to evacuate than Caucasians (Gladwin & Peacock, 1997). While a possible explanation was because the sample of this study was predominantly White Caucasian, further study is needed to test whether the race/ethnicity of tourists matters in their evacuation decisions or if there are other variables that better explain the likelihood of evacuation.

As tourists can be already in the destination for several days before they hear that a hurricane is coming, further study is needed to measure the effect of the amount of time between learning that a hurricane is coming and when the evacuation order is issued on their evacuation decision. Those who have been in the destination for longer may be more likely to evacuate than those who hear that a hurricane is coming and an evacuation order is issued on the first day of their stay because they have experienced most of the destination. However, there is also a possibility that these groups are less

likely to evacuate as the longer they stay the more familiar they are with the destination and its support system. Thus, further study is needed to fully understand the effect of time when a tourist becomes aware of the hurricanes threat on their evacuation decision.

Finally this study only focuses on three areas: individual characteristic, travel related variables and demographics. Burton, Kates and White (1993), Viscusi (1995) and Lindell, Lu and Prater (2005) however, assert the importance of social interaction in evacuation decision. While this study does not address the effect of tourists' social interaction in the process of evacuation decision, the significance of information gathering in the process of deciding to evacuate while facing a hurricane threat is certainly complex and should be the subject of further study.

Table 2-1. Variables and measurements

Variable	Measurement
Risk specific beliefs	Four statements using a 5-point Likert Scale asking respondents' perception on hurricanes.
Involvement	Three statements measuring individuals' interest, importance, and curiosity with regard to hurricanes.
Current hurricane knowledge	Four T/F/Don't know questions about hurricanes.
Past hurricane experiences	One yes/no questions about past experiences with hurricanes.
Size of travel party	One question asking the number of travel party
First time	One Y/N question asking whether or not a respondent has been to the destination before.
Presence of children	One Y/N question asking the presence of children in the travel party.
Presence of elderly	One Y/N question asking the presence of elderly in the travel party.
Plane	One Y/N question asking whether or not the respondent flew to the destination.
Rental vehicle	One Y/N question asking whether or not the respondent rent a vehicle in the destination.
Personal vehicles	One Y/N question asking whether or not the respondent use personal vehicles in the destination.
Gender	One question asking the respondent's gender.
Age	One question asking the respondent's age.
Ethnicity	One question asking the respondent's ethnicity.
Income	One question asking the respondent's income.
Education	One question asking the respondent's highest education level.
Place of residence	Two questions each asking the respondent place of residence
Evacuation decision	A five point Likert scale on likelihood to evacuate



Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location.
This is expected to be a **Category 1*** hurricane within your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure 2-1. Example of hypothetical hurricane scenario

Table 2-2. Percentage of variables

Variables	Percentage
Gender	
Female	56
Male	44
Residence	
International	38
Domestic outside Florida	50
Domestic inside Florida	12
Income	
\$125,000 <	17
\$100,000 - \$124,999	20
\$ 75,000 - \$ 99,999	22
\$ 50,000 - \$ 74,999	22
\$ 35,000 - \$ 49,999	9
\$ 24,000 - \$ 34,999	5
< \$24,000	5
Ethnicity	
Caucasian	69
Hispanic	13
African American	8
Other	10
Education	
Graduate degree	25
Bachelor degree	51
High school	17
Other	7
Past hurricane experience	No (49), Yes (51)
First Visit to destination	No (54), Yes (46)
Transportation	
Airplane	No (37), Yes (63)
Rental vehicle	No (74), Yes (26)
Personal vehicle	No (65), Yes (35)
Travel party composition	
Children	No (64), Yes (36)
Elderly	No (80), Yes (20)

Table 2-3. Results of the ordered probit model

Variables	Parameter estimate	Sig.
Individual characteristic		
Risk belief	.07	.008*
Involvement with hurricane topics	-.09	.003*
Hurricane knowledge	-.09	.001*
With past hurricane experience (ref. = without)	-.49	.000*
Travel – related		
Number of travel party	.05	.001*
First visit to destination (ref. = no)	.24	.000*
With children (ref. = without)	.16	.007*
With elderly (ref. =without)	-.20	.002*
Plane (ref. = no)	.50	.000*
Rental vehicle (ref. = no)	-.15	.014*
Personal vehicle (ref. = no)	.25	.002*
Demography		
Female (ref. = male)	.24	.000*
Age	.01	.000*
Ethnicity (ref. = Caucasian)		
African American	-.02	.787
Hispanic	.12	.119
Other	.07	.426
Income (ref = <24)		
125 <	.32	.019*
100 – 124,9	.17	.204
75 – 99,9	.04	.767
50 – 74,9	-.04	.749
35 – 49,9	.13	.346
24 – 34,9	-.07	.658
Place of Residence (ref= Florida)		
International	.36	.000*
Domestic outside Florida	.24	.003*
Education (ref=Bachelor)		
Graduate degree (MS/PhD)	-.10	.110
High School	.05	.470
Other	-.22	.020*
Thresholds		
Evacuate = 1	-.54	.007
Evacuate = 2	-.02	.898
Evacuate = 3	.75	.000
Evacuate = 4	1.46	.000
-2 Log likelihood at convergence(n=2137)		4246.393 ($\chi^2 = 524.080$,df=27, sig. .000)
Pseudo R ² Negelkerke		.41
Ref= reference group, * p<.05		

CHAPTER 3
TOURIST'S HURRICANE EVACUATION INFORMATION SEARCH BEHAVIOR WHILE
IN THE DESTINATION: EFFECTS OF PAST EXPERIENCE, RISK BELIEF,
INVOLVEMENT, CURRENT KNOWLEDGE AND PERSONALITY

Background of the Study

Recent research has highlighted information management as one possible response to risks (Mishel, 1988; 1990; Brasher, Goldsmith, Hsieh, 2002; Griffin, Dunwoody, Neuwirth, 1999). For instance, people with chronic illnesses frequently seek information to understand their diagnosis, to decide on treatments and to predict their prognosis (Brashers et al., 2002). Likewise, researchers have also found that individuals tend to maintain a certainty level of risk related knowledge in their life and therefore pursue information to understand risk factors and to learn preventive measures to alleviate uncertainty associated with potential risks they might encounter. To reduce uncertainty, information sources need to be utilized including peers, social networks comprised of friends and family, media, governmental and other organizations (Brashers, Haas, Neidig & Rintamaki, 2002). Channels for information seeking and processing include face-to-face encounters e.g. personal conversations, support groups, and mediated communication (e.g. television, internet websites, emails or pamphlets).

Information is frequently defined as stimuli from an individual's environment that contributes to that individual's knowledge of beliefs (Brashers et al., 2002). Likewise, information management includes communicative and cognitive activities such as seeking, avoiding, providing, appraising and interpreting the aforesaid stimuli. For example, information can be used to decrease uncertainty that is distressing, to increase uncertainty that allows for optimism to invite reappraisal of uncertainty.

Conversely, information can also increase stress-producing certainty, while avoiding information allows people to maintain their current state of knowledge or beliefs (Brashers et al., 2000; Egelhoff & Sen, 1992).

In a hazardous situation, people often wait to act while digesting and confirming messages (Mileti, 1999). Over two decades, studies have found that different population groups employ different sources to seek confirmation information, citing several factors that influence risk information search behaviors. These include personality (Kernan & Mojena, 1973; Jacobsen, 1998; Heinstrom, 2003), risk specific beliefs (Sriramesh et al., 2007; Major, 1998; Lee & Rodriguez, 2008), past experiences (Lenz, 1984; Johnson & Meischke, 1993; Gladwin & Peacock, 1997), involvement (Havitz & Dimanche, 1999; Hallahan, 2000), knowledge (Vogt & Fesenmaier, 1998, Ratchford, 2001; Decrop & Snelders, 2005) and demography (Gursoy & McLeary, 2004).

Griffin, Dunwoody and Zabala (1998) argued that individual risk information search behavior has an effect on preventive behaviors such that differing information search strategies that individuals' employ may ultimately dictate behaviors that individuals might adopt in the face of a specific risk. Individuals will utilize the information they gathered to assess the risk they face and in the end decide to utilize preventive behaviors in order to cope with the risk (Rorhmann, 1999). Further, Griffin, Dunwoody and Neuwirth (1999) recommend that the nature of information search that individuals employ be explored. This includes focusing on searches in uncertain and risky situations due to the complicated nature of risks as well as the emerging body of theory in both psychology and communication to better facilitate the inquiry. These theories include the Elaboration Likelihood Model (ELM) and Heuristic-Systemic Model (HSM). It

has been recommended by Griffin, Dunwoody and Neuwirth (1999) that these two models be used to better understand individual information search strategies during times of uncertainty as they offer an explanation of how people decide to seek information about a given risk. Both ELM and HSM describe dual forms of human information processing, with the first form being more superficial and the later more effort intensive. According to HSM, people tend to employ the form of processing for a given message based on their capacity to process the information and their motivation to go beyond the superficial (heuristic) processing to engage in systematic processing that can occur simultaneously with heuristic processing (Eagly & Chaiken, 1993).

In the context of risk information, Griffin, Neuwirth and Dunwoody (1995) found that under more risky situations, individuals tend to employ systematic processing to a greater degree than they do during less risky situations. Nonetheless, there is a scarcity of empirical research that provides support on how specific groups come to seek and process information and adopts preventive behaviors relative to a specific hazard (Rohrmann, 2000). Consequently, the contribution of this study is as follows: first, the focus on tourists as a transient population and their information search behavior under a given hazard and second, the nature of predictive behaviors as an output of information search behaviors, namely evacuation.

While there are numerous tourism studies that examine the different forms of tourist information search behaviors (e.g. Vogt & Fesenmaier, 1998; Fodness & Murray, 1999; Baloglu, 1999; Chen, & Gursoy, 2000; Luo, Feng, & Cai, 2004; Snepenger et al., 1990), there are virtually no empirical studies to date that examine information search behaviors of tourists while in the destination under risky situations (Ritchie, 2009),

specifically how information search behavior may shape their reactionary behavior, such as evacuation decision making.

In the event of a hurricane, tourists are susceptible (Phillips & Morrow, 2007) with one primary reason being that tourists may not understand the risks posed by hurricanes. Furthermore, tourists are often in unfamiliar surroundings and are without the customary support systems of their home community (Burby & Wagner, 1996; World Tourism Organization, 1998). Thus the impact to the tourist in a risky situation may be greater than to those in the general resident population. Moreover, various characteristics of tourists, past experiences and knowledge of hurricanes may affect their information processing and reactionary behaviors to risk communication. Specifically, tourists who are not from areas exposed to hurricanes may lack knowledge about technical terms associated with hurricane messages (i.e. cone of uncertainty, hurricane watches and warnings). The situation often becomes more challenging for international tourists who often have difficulty in communicating in the local language of the tourist destination. Consequently, the focus on tourists as a transient population and their information search regarding hurricane evacuation will shed light in crafting a more effective way to disseminate hurricane risk information to tourists. As a consequence, it is essential to identify types of tourists in order to craft effective hurricane risk communication messages and to select the most effective channels to deliver these messages to tourists. Unfortunately, there remains a paucity of academic research in this area (Phillips & Morrow, 2007).

The objective of this study is to examine the relationship among tourist' past experience with hurricanes, hurricane risk belief, involvement with hurricanes, current

knowledge about hurricanes and their personality in predicting information seeking regarding hurricane evacuation in the destination. Specifically, the main research questions for this study are:

1. What is the effect of tourists' past experience with hurricanes on their information search behavior with regard to hurricane evacuation?
2. What is the effect of tourists' risk belief on their information search behavior with regard to hurricane evacuation?
3. What is the effect of tourists' involvement with hurricanes on their information search behavior with regard to hurricane evacuation?
4. What is the effect of tourists' current hurricane knowledge on their information search behavior with regard to hurricane evacuation?
5. What is the effect of tourists' personality on their information search with regard to hurricane evacuation?

This is a largely unexplored area. The findings from this work will be of considerable interest and importance to the managers of Emergency Response Service Teams, Policy Makers, and in particular Destination Management Organizations in designing appropriate messaging techniques for the different tourist segments to ensure their safety during a hurricane strike.

Theoretical Framework

This article uses Eagly and Chaiken's (1993) Heuristic-Systemic model of information processing (HSM). HSM helps to understand how people come to seek and process information about a given risk, in this context hurricane risks. Likewise, Griffin, Dunwoody, & Neuwirth (1999) argued that people seek and process risk information in different ways leading to different preventive behaviors, in this case evacuation choices.

The Heuristic-Systemic Model (HSM) explains the dual routes of information processing those individuals take in scrutinizing the message (Eagly & Chaiken, 1993).

Eagly and Chaiken (1993) define heuristic processing as “a limited mode of information processing that requires less cognitive resources” (p. 327), while systematic processing is defined as a more elaborate, comprehensive effort to analyze and understand the information. Likewise, Griffin, Dunwoody and Zabala (1998) argue that the perceived gap of what people know and what they are need to know about the risks motivates the individual to devote more cognitive effort to processing messages. Furthermore, Griffin et al. (1998) also argue that the systematic processing is dependent upon an individual’s capacity to process, their motivation, perceived credibility of the available information while by default most people engage in heuristic processing and using various superficial cues in evaluating information. Both processes however, can occur concurrently (Eagly & Chaiken, 1993).

Eagly and Chaiken (1993) further argued that heuristic processing is learned from past experience or prior knowledge stored in the memory. Consequently, even though heuristic processing is viewed without much attention by people engaging in messages, heuristics might be revealed through recognition measures of beliefs people have about risk messages. Similarly, systematic processing can be operationalized by various measures of attention to risk messages beyond mere exposures (Griffin et al., 1998; Perse, 1990) and the respondents self-reporting of elaboration of the messages (Grunig, 1983). Lastly, Griffin et al. (1999) and Grunig (1983) argued that risk information seeking and processing should be measured on a continuous scale due to the fact that heuristic and systematic processes can occur concurrently. In the HSM model personal relevance and connectedness to the subject matter has been shown to motivate people to systematically process messages (Eagly & Chaiken, 1993). Hence,

individuals who scrutinize risk information analytically will eventually cultivate attitudes and behaviors that are more resilient to change.

Griffin, Neuwirth and Dunwoody (1995) discovered that respondents who are given information that portrayed a hazard as high risk and its effects as austere were less likely than other respondents to base their personal risk judgment on stylistic factors of the information. Griffin, Neuwirth and Dunwoody (1995) further explained that relevance of the topic has motivated respondents in risky and austere conditions to process risk information more systematically and to rely less on superficial cues and the stylistic nature of the information. Another elucidation is that in risky circumstances, individuals tend to process information systematically in order to maximize the utility of the decision (Letson et al., 2007). Griffin, Dunwoody and Neuwirth (1999) further argue that individual information seeking and processing behaviors are influenced by involvement, specific risk beliefs, relevant hazard experiences, and hazard characteristics (Griffin et al., 1999).

While the HSM provides informative interpretations of the risks, it is also important to include the notion of “bounded rationality” (Drabek, 2001). Bounded rationality refers to a concept that was popularized by Simon (1957) through his analysis of ‘satisfying behavior.’ This refers to when people are required to search for information and make decisions, however limited this search process may be. Rather than search and consult all possible information sources, or even try to identify all potential options, individuals are typically satisfied with only considering information that is easy to obtain and is the most obvious. This behavior becomes rote in the event of making risky decisions to ensure their survival such as evacuating a destination (Burton et al., 1993; Palm, 1990;

Alexander, 1993; Mitchell, 1999). Figure 3-1 outlines the conceptual framework for this study.

Literature Review

Past Experience

Grunig (1983) contends that people tend to apply a referent criterion from past situations as an initial guide when exposed to new situations. When the referent from past situations fails in new situations, they develop a new set of criteria to help them in deciding, behaving and communicating. Likewise, Johnson and Tversky (1983) also found that an individual's experience with one risk could be transferred to their responses to other risks. This includes employing the same information strategies as the ones the individuals employed in the past. Nonetheless, previous studies in hurricane evacuation have inconclusive results regarding the effect of past hurricane experience on information search behaviors. Some studies have found that past experiences positively influence the modes of information seeking that individuals employ in the decision making process (Lenz, 1984; Johnson & Meischke, 1993). People with past experiences with hurricanes are more likely to obtain information regarding how to get accurate hurricane data compared to those without past experience with hurricanes (Gladwin & Peacock, 1997). On the contrary, Whitehead (2003) for instance argued that residents who frequently experienced hurricane impacts tend to use their experience in their evacuation decisions and therefore exhibit lower information search behaviors regarding hurricanes. In this article, it is posited that tourists who have never experienced hurricane impacts are more likely to seek information with regard to hurricane evacuation.

H1: Tourists' past hurricane experience with hurricane impacts reduces the information search with regard to hurricanes.

Likewise, Fodness & Murray (1999) in their study also found that those who have been to a destination in the past are more likely to utilize more personalized information search strategies than those who have never been to the destination before. In concert with aforesaid researchers, Kerstetter and Cho (2004) also noted that more experienced travelers tend to be more resourceful than those who are less experienced. More experienced travelers are more adept and knowing where to seek credible information with regard to the issues they face during their travel, in this case the decision of whether or not to evacuate.

H2: Past experience with hurricane impacts increases tourist's knowledge about hurricanes.

Past studies in risk information have linked past experience with risk belief regarding hazards (Griffin et al., 1999; Griffin et al., 1998). Griffin, Dunwoody and Zabala (1998) asserted that personal experience with a hazard influences individual risk beliefs associated with the hazard, with those who experienced the impact of a hazard in the past exhibiting a lower risk belief regarding the hazard. One explanation is that having experiences increase one's sense of controllability and self-confidence with their own ability to manage the situation. Those without past experience tend to exhibit higher risk belief as a result of a lower sense of controllability.

Within the tourism literature, there is wide agreement that the influences of past experiences in travel related decision-making affect future decision-making regarding travel related crises. Lehto, O'Leary and Morrison (2004) found that when engaging in

routine travel decisions such as weekend visits to a nearby park or a recreation area, tourists are more likely to rely on their past experiences to seek habitual information to aid in their decision making. Conversely, when tourists have to make a risky decision such as engaging in a new activity at a familiar destination, they are more likely to seek more information beyond their own experience to reduce uncertainty.

H3: Past experience with hurricane impacts decreases individual risk-belief regarding hurricanes.

Additionally, past experience has also been found to influence individual involvement with a topic of interest (Grunig, 1983; Sriramesh et al., 2007) such that the more experience individuals have with regard to certain topics, the more likely involved the individual will be with such topics. Likewise, past studies regarding residents' evacuation behavior have also concluded that residents who have experienced hurricane impacts in the past exhibit a higher likelihood to engage in hurricane prevention and preparedness activities; that includes having a hurricane preparedness kit and having family evacuation plans. (Mayhorn, 2005; Mileti & O'Brian, 1992)

H4: Past experience with hurricane impacts increases individual involvement with hurricanes.

Risk Beliefs

Risk belief refers to personal beliefs regarding controllability, optimism bias and risk propensity/aversion (Rohrmann, 1995; 1999). It also reflects the extent of an individual level's of confidence to overcome the uncertainty (Quintal, Lee & Soutar, 2010; Major, 1993; 1998; Lee & Rodriguez, 2008; Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992). When individuals hold higher perceptions of controllability, they have a higher propensity to perceive that they are not at risk (Burby

& Wagner, 1996). Similarly, individuals are more likely to perceive that they are at risk when they have a lower perception of their controllability of the event. Thus, those who are less confident with their ability to overcome risks associated with hurricanes are more likely to perceive higher risks. This perception has been found to be associated with past experience with related hazards and preventive behaviors (Griffin et al., 1999; Helweg-Larsen, 1990). Lastly, past studies have consistently found that individuals who are risk averse and display uncertainty are likely to engage in strategies to reduce their risk and uncertainty, such as seeking assurance (Sweeney et al., 1999) and searching extensively for information (Vogt & Fesenmaier, 1998; Maser & Weiermair, 1998).

H5: Risk belief with regard to hurricanes increases information search with regard to evacuation.

Involvement

One's level of involvement refers to how personally connected the individual feels to the problem (Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992). Typically, the level of involvement can be determined by three attributes: interests, importance, and curiosity that individuals have concerning a specific issue (Zaichkowsky, 1985; Greenwald & Leavitt, 1984; Hallahan, 2000). With the increase of an individual's involvement level on certain issues, the more knowledge the individual seeks and obtains.

H6: Tourists' involvement with hurricane increases their level of knowledge of hurricanes.

Individual level of involvement has been found to influence what information searches individuals employ when seeking information regarding the problem (Grunig, 1974; 1989; Mileti & Fitzpatrick, 1993, Major, 1998; Havitz & Dimanche, 1999). Grunig

(1989) further argues that the more personally connected to the problem an individual feels, the more active they are in seeking information regarding the problem.

Conversely, those who have low involvement or do not feel personally connected to the problem are least likely to seek information regarding problem resolution.

Within communication fields, it also has been consistently found that highly involved individuals are likely to utilize more criteria (Mitchell, 1980), search for more information using external sources (Beatty & Smith, 1987, 1988), utilize more information sources (Jamrozny et al., 1996), accept fewer alternatives (Petty & Cacioppo, 1981), process relevant information in detail (Chaiken, 1980) and are more likely to form attitudes that are more resistant to change (Chaiken & Eagly, 1976). Likewise, in low involvement situations, travelers do not perform an extensive search and rarely evaluate alternative choices before making a decision (Bieger & Laesser, 2004).

Similarly, Major (1998) in her study on assessing responses to the new Madrid earthquake predictions found that individual level of involvement was associated strongly with problem recognition with higher involvement being associated with greater problem recognition and vice versa. People who ponder the problem are more likely to feel personally connected to the problem and thus are more likely to discuss the problem and actively seek information about problem resolution in order to reduce uncertainty.

Within the tourism literature, the concept of involvement has also received substantial attention (i.e. Havitz & Dimanche, 1999; Celsi & Olsen, 1988; Gursoy & McLeary, 2004). Tourists' involvement with a certain topic has been found to influence their information search behaviors (Broderic & Mueller, 1999; Foxall & Bhate, 1993).

Highly involved individuals are more likely to actively search for information including evaluating more alternatives before making a travel related decision (Clarke & Russell, 1978; Gursoy & McLeary, 2004). Gursoy and McLeary (2004) further argue that as tourists' involvement with a specific topic increases, they are more inclined to utilize more external sources to gather additional information about important attributes, strengths, and weaknesses of each alternative. These findings conclude that increased tourist involvement correlates with an increase in the utilization of both interpersonal and external information sources.

H7: Tourists' involvement with hurricanes increases their information search with regard to hurricane evacuation.

Current Knowledge

Tourists can gain current knowledge from their own experiences, from their interaction with others, or through visual, verbal and sensory stimuli such as advertisements, newspapers, movies, and television programming (Vogt & Fesenmaier, 1998). Tourists have also acquired knowledge through engaging in ongoing information searches (Bloch, Sherrell & Ridgway, 1986). It is argued that tourists utilize the knowledge that they store in their memory when they evaluate a destination (Ratchford, 2001) in order that current knowledge can aid in the decision making process (Brucks, 1985; Decrop & Snelders, 2005).

Findings on the relationship between current knowledge and information search behaviors have been inconclusive. Some researchers found positive relationships between current knowledge and information search, with knowledgeable individuals performing information seeking more effectively since they know what information they need to obtain and know where and how to get it (Coupey et al., 1998). Lastly, other

researchers also found that current knowledge aids in processing new information (Gursoy, 2001; Rao & Sieben, 1992). Mitchell and Dacin (1996) argued that informed individuals tend to develop new questions about product attributes and are better aware of problems that can occur when purchasing and consuming.

Likewise, Kerstetter and Cho (2004) also note that experts in travel tend to have a greater capacity for and interest in learning new information and therefore are more likely to conduct an extensive search or they may simply acquire information from their internal sources such as memory or retained knowledge. Novices in travel on the other hand, are prone to rely more on personal sources such as the opinions of reference groups, salespersons (Furse, Punj & Steward, 1984) or promotional materials that are easily understood (Gardner, 1983). Kerstetter and Cho (2004) in their study found a significant and positive relationship between prior knowledge and internal search (own knowledge) and external search, specifically on the use of the Internet as an information source.

On the contrary, some other researchers such as Coupey, Irwin and Payne (1998) and Fodness & Murray (1998) found a negative relationship between current knowledge and information search behavior. Those with very little knowledge potentially do more extensive information searching than those with a greater degree of prior knowledge because they do not have standards for evaluation (Alba & Hutchinson, 1987). One possible explanation is that individuals with higher levels of knowledge about the attributes of alternatives rely heavily on their own knowledge and are less likely to seek information from external sources (Brucks, 1985), and demonstrate a greater propensity to base their decisions on their current knowledge (Vogt & Fesenmaier, 1998).

In addition, based on the Heuristic-Systemic Model (Eagly & Chaiken, 1993), Griffin, Dunwoody and Neuwirth (1999) asserted that individuals would be motivated to engage in more effortful information searching when the sufficiency threshold is higher than the amount of knowledge the individual feels or currently has. That is, the greater the gap between the current level of knowledge and the sufficient threshold, the more efforts would be needed to reduce the gap. Thus it leads to a higher degree of information search. Therefore, in this article it is proposed that those who have low knowledge regarding hurricanes are more likely to seek more information regarding hurricane evacuation.

H8: Current level of hurricane knowledge negatively affect information search with regard to hurricane evacuation.

Personality

Personality is defined as “the pattern of characteristic thoughts, feelings and behaviors that distinguishes one person from another and that persists over time and situation” (Phares, 1991: 4). There is a common agreement in the field that there are five basic dimensions that can be used to describe differences in cognitive, affective, and social behavior (Revelle & Loftus, 1992). The five basic dimensions are often described in the following order of decreasing robustness based on personality scales: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Costa & McCrae, 1992: 14-16). These dimensions are stable across a lifespan and seem to have a physiological basis (Revelle & Loftus, 1992).

The influence of personality on information search behaviors has been documented in several studies (e.g. Kernan & Mojena, 1973; Kirton, 1989; Jacobsen, 1998; Heinstrom, 2003; Weaver, 1998). Heinstrom (2003) found that individuals with

high levels of neuroticism are more vulnerable to the strain of many conflicting messages and therefore prefer less confusing information. Similarly, Miculincer (1997) also found that the more secure an individual is, the more likely that person is to affirmatively seek and accept new information.

The influence of personality has been found to influence various aspects of tourism experiences, ranging from engaging in high-risk sports (Robinson, 1992; Rowland et al., 1986) to online information searching (Luo, Feng, & Cai, 2004). Tourists' personality traits have lead to different perceptions of the benefits and costs involved in information searching (Gursoy & McCleary, 2004). Luo et al. (2004) found that the benefit of a search is determined by the perception of uncertainty in the environment, the importance placed on the product and the perceived risks. Tourists also evaluate the costs of search efforts in terms of the time and money required to conduct the search as well as the cognitive effort required to process the information (Srinivasan & Ratchford, 1991).

H9: Tourist's personality positively affect information search with regard to hurricane evacuation.

Methodology

Research Design

The population of interest for this study was tourists who were currently visiting Florida. In this article "tourist" is defined as "any person who participates in trade or recreation activities outside the county of his or her permanent residence or who rents or leases transient living quarters or accommodations" as described in Florida Statute 125.0104(3) (a). A self-completion survey using an intercept approach was administrated in September 2011, during the 2011 Atlantic hurricane season. It was

argued that during the hurricane season, people were more likely to cognitively think about and seek information concerning hurricanes. Surveys were administrated in two Florida sites in Orlando and Fort Lauderdale Beach that were chosen based on the high volume of visitors. The survey was designed to be completed in 15 minutes or less. Prior to the administration, a pretest was conducted to ensure the legibility, validity and reliability of the measurements. Based on the pretest, the questionnaire was modified. This included but not limited to simplifying the instructions and collapsing items to reduce the respondent's burden. Several students were hired to administer the surveys. Trainings were conducted to ensure that the student surveyors understood the procedures to administer intercepting surveys.

Screening questions were employed to ensure the eligibility of respondents. The screening questions include: 1) "Are you visiting this destination for leisure?" 2) "Did you travel for more than 50 miles one way beyond your county line to come to this destination?" To minimize the potential for bias, the survey administration used every n^{th} formula. Only one person in each travel party was eligible. Every third tourist in each site was approached and asked to complete the survey after verifying their eligibility in the study. Each participant received a luggage tag from the University of Florida's Tourism Crisis Management Institute as an incentive.

Measurements

The questionnaire was designed to collect information regarding the likelihood to search for hurricane evacuation information while in the tourist destination. There were 6 constructs in this study: past experience, risk-belief, involvement, knowledge, personality and information search. Tourists' past experience was measured by asking the respondents a yes/no question on whether or not they experienced impacts from

hurricanes in the past, which was adapted from Whitehead (2003). Risk belief was measured using the following four questions asking each respondent about his or her perceptions of hurricanes that were adapted from Moon (2010): “A hurricane exposes me to risks beyond my control”, “I get nervous when there is a discussion about approaching hurricanes”, “I avoid thinking about hurricanes”, “I know what I should do if a hurricane occurs during my stay in the destination (reversed coded)” with a scale of 1 to 5 where 1 is *strongly disagree* and 5 is *strongly agree*. Tourists’ involvement with regard to hurricanes was measured by three questions that were adapted from Major (1998): “your interest of hurricane topics”, “the importance of hurricane topics for you personally”, and “your curiosity about hurricane topics” with 1 (*not at all*) to 5 (*extremely*). 4) Tourists’ hurricane knowledge was measured by asking respondents to answer 4 True-False-don’t know questions about hurricanes that were adapted from Moon (2010) and Matyas et al. (2011): ““A hurricane watch means a hurricane could hit within 24 hours, “Hurricane categories (1-5) are based on wind speed only”, “Hurricane season runs from June to October” and “At 50 mph (80 km/hr) wind speed, a tropical storm becomes a hurricane.” A composite score based on these 4 questions was used as an indicator for measuring respondents’ current knowledge.

A Ten-Item Personality Inventory (TIPI) scale that was adapted from Gosling, Rentfrow and Swann (2003) measured personality. Respondents were asked to rate their agreement or disagreement with 10 statements using 5 point Likert scale with 1=*strongly disagree* to 5 = *strongly agree*. The items measure five basic dimensions of personality: extraversion, agreeableness, conscientiousness, emotional stability and openness to experiences. Extraversion was measured by two statements (extraverted-

enthusiastic and reserved-quiet). The agreeableness dimension was measured by two statements (critical-quarrelsome and sympathetic-warm). Conscientiousness was measured by two statements (dependable-self disciplined and disorganized-careless). Emotional stability was measured by two statements (anxious-easily upset and calm-emotionally stable). Openness to experiences was measured by two statements (open to new experiences-complex and conventional-uncreative).

Information search behavior was measured using two variables: active information seeking and passive information processing. Active information seeking was measured by asking respondents 8 questions on a five-point Likert type scale about two-way communication. The question was: Who do you turn to for information in the event of hurricane evacuation while you are vacationing in the destination (1=*never* to 5=*always*)? The list included family/friends/relatives, locals, other tourists, local tourism office, local authority, social network sites, hotel staff and social clubs. Passive information processing was measured using five questions on a five-point Likert type scale about one-way communication usage. The question was: Where do you seek information in the event of hurricane evacuation while you are vacationing in the destination (1=*never* to 5= *always*)? The list of choices as answers for the question was: TV stations, Weather Channel, Radio stations, Newspaper and The National Hurricane Center.

Data Analysis

The Statistical Package for Social Sciences (PASW 18) software was used for descriptive and inferential analysis to provide respondents profiles, correlations and reliability test. Structural Equation Modeling (SEM) procedures using MPlus statistical software (Muthen & Muthen, 2008 - 2010) was applied to test the causal relationships in

the model. By using SEM, important constructs could be modeled, while taking into account the unreliability of the indicators. In addition, the SEM considered reliability of the measures and ranks the measures in terms of their importance (Byrne, 2012). Furthermore, the SEM also allows indirect effects examination among constructs (Kline, 2011, p: 289).

Results

Respondents' Profile

A total of 632 eligible tourists were contacted in all sites. Five hundred and forty four agreed to participate (response rate= 86%), of which 533 were deemed usable due to the completeness of the responses. There was no significant difference were found between those who complete the questionnaire and those who did not complete the questionnaire. Out of 533, females encompassed 56% of the sample. Domestic tourists from other states comprised 50% of the sample, followed by international tourists (38%) and domestic tourists from Florida (12%), with a median travel party of 3 people in the group. The youngest respondents' age was 20 years old and the oldest was 88 years old, with a median age was 44 years old. More than half of the respondents (54%) indicated that they have visited the destination before. White Caucasian represented the majority of the sample (69%) followed by Hispanic (12%) and African Americans (8%). Forty four percent of respondents earned between \$50,000 and \$99,000 annually. Half of the sample has a bachelor degree, while those who experienced hurricane impacts in the past comprised 51% of the sample.

Internal Consistency and Construct Validity

Unlike other scales that are designed to optimize internal consistency, the Ten Item Personality Inventory (TIPI) emphasizes content validity considerations, resulting in

lower inter-item correlation than is typical of more homogenous scales statements (Gosling et al., 2003). The relatively lower inter-item correlation is due to the fact that TIPI scales only use two items, resulting in some unusually low internal consistency estimates. Specifically the Cronbach's alphas for extraversion, agreeableness, conscientiousness, emotional stability and openness to experiences were marginally low with .69, .65, .67, .70 and .68 respectively. Table 3-1 presents the means, standard deviation and Cronbach's alphas for TIPI scales. A composite score was calculated using items to represent each personality dimension.

Factor analysis with principal component with and the Varimax rotation method was employed to test the dimension underlying risk belief, involvement and information. The principle component analysis was used to justify the number of factors to be used as indicators in the SEM analysis. This procedure was selected to avoid having a second order Confirmatory Factor Analysis as a measurement model in the Structural Equation Model (SEM) procedures (Kline, 2011). Table 3-2 presents the results of the principal component analysis. For risk belief, one factor emerged explaining 80 percent of the variance with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .83, which was higher than the recommended index of .60 (Hair et al., 2010). The Bartlett's test of sphericity was 1548.415 ($p = .00$) and the Cronbach's alpha of the total scale was .91. The results held the unidimensionality of the scale. A similar procedure was employed for the involvement construct. One factor emerged explaining 84.49 percent of the variance with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .75, which was also higher than the recommended index of .60. The Bartlett's test of sphericity was 1058.537 ($p = .00$) and the Cronbach's alpha of the total scale was also

.91, which indicated unidimensionality of the scale. With regard to information search, two factors emerged explaining a 51.48 cumulative percentage of the variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .81, which was also higher than the recommended index of .60. The Bartlett's test of sphericity was 2392.119 ($p = .00$) and the Cronbach's alphas for active information seeking and passive information processing both were .80.

With regard to the knowledge construct, a composite score was calculated based on the number of correct responses on four hurricane related questions. The mean for the aggregate knowledge was 1.25 with a range of possible score from 0 to 4. The standard deviation was 1.11, indicating that in general the sample had an overall lack of hurricane knowledge.

Measurement Model

A Confirmatory Factor Analysis (CFA) was conducted on the variables involved in the model in order to develop evidence that the indicator variables were actually measuring the underlying constructs of interest, and that the measurement model demonstrated an acceptable fit to the data. The CFA used the procedures in the MPlus program. This measurement model was estimated with the maximum likelihood estimator. As risk belief and involvement only had one factor that was comprised from multiple items, in order to take account measurement errors of factors, measurement error variance was inputted in the measurement model. Measurement error variance was calculated by $1 - \alpha$. Based on the coefficient alpha of both factors (.91), the measurement error variances were set to .09. A series of modifications based on modification indices were employed to increase the goodness-of-fit of the model. As an

example, the measurement residuals for the personality dimensions were allowed to correlate to one another due to content of the dimensions as the method of data collection.

The final measurement model adequately fit the data with $\chi^2 = 65.248$ with degree of freedom of 32 ($p < .00$). Although this statistic was significant, it is generally agreed that the chi-square value should be used as a guide rather than an absolute index of fit due to its sensitivity to sample size and model complexity (Anderson & Gerbing, 1982; Byrne, 2012). Other fit indices such as Bentler's Comparative Fit Index (CFI) was .97 and Tucker-Lewis Index (TLI) was .95 both above the cutting value of .95 indicating good fit. Likewise the Root Mean Square Error of Approximation (RMSEA) was .04, while the Standardized Root Mean Square Residual (SRMR) was .03. Both were below the cutting point of .06 indicating adequate fit. Standardized factor loadings for indicator variables were all significant ($p < .00$). Table 3-3 presents the zero ordered correlation among indicator variables while Table 3-4 outlines the result of standardized factor loadings for all observed variables.

The R-square of constructs was also assessed. The R-square value indicates the percent of variance in the indicator that is explained by the factor that it is supposed to measure (Hatcher, 1994). The R-square value for personality indicators ranged from a low of .11 to a high of .59. The R-square value for risk belief was .91. The R-square value for involvement was .92, while the values for information search were .20 to .76. R-square values for knowledge and past experience were 1 as their measurement error variances were set to zero.

Structural Equation Model

The structural equation model, which portrayed the relationship of all latent variables, was presented in Figure 3-2. There were two exogenous latent variables in the model, past experience and personality. There were four endogenous latent variables: involvement with hurricanes, knowledge and hurricane evacuation information search. The structural equation model was estimated using with the Maximum Likelihood Estimator by embedding the specified paths to the CFA model.

The goodness of fit indices of the SEM model indicated that the model had an adequate fit. The model fit χ^2 was 74.357 with degrees of freedom 34 ($p < .00$). Although the model chi-square test was significant, all other fit indices that included Bentler's Comparative Fit Index (CFI) was .96 and the Tucker-Lewis Index (TLI) was .95, with both being above the cutting value of .95 indicating a good fit. Likewise the Root Mean Square Error of Approximation (RMSEA) was .05 and the Standardized Root Mean Square Residual (SRMR) was 0.04, both below the cutting point of 0.06 indicating an adequate fit.

Findings of the Constructs Relationships

The structural equation model yielded interesting results. As predicted by Hypothesis 1, tourists past experience with hurricane impacts was found to negatively affect their information search ($\gamma = -.34$, $p = .00$) and was also found to increase hurricane knowledge as predicted by Hypothesis 2 ($\gamma = .18$, $p = .00$). Past experience was also found to decrease risk belief regarding hurricanes ($\gamma = -.58$, $p = .00$), thus providing support for Hypothesis 3. The structural equation model also found that past experience increased individual involvement with hurricane ($\gamma = -.13$, $p = .00$), thus the Hypothesis 4 was upheld.

With regard to the effect of past experience with hurricanes impacts and information search regarding hurricane evacuation, the model indicated that in addition to the direct path, past experience also affected information search through multiple indirect paths. The first significant path was from past experience to risk belief to information search ($\gamma = -.08$, $p = .02$). The second significant path was from past experience to knowledge to information search ($\gamma = -.03$, $p = .02$). The third path, which was marginally significant, was from past experience to involvement to knowledge to information search ($\gamma = -.01$, $p = .05$). This means that tourists without past experience with hurricane impacts were more likely to seek additional information with regard to hurricane evacuation while in the destination when a hurricane is deemed probable. Based on the direct path and indirect paths of past experience to information search, the total effect of past experience to information search was found to be significant ($\gamma = -.46$, $p = .00$)

Risk belief was found to have a significant total effect on information search ($\beta = .15$, $p = .00$). It positively affected information search. That means tourists with higher risk belief regarding hurricanes were more likely to seek information about hurricane evacuation when a hurricane occurred. This effect was attributed to the direct effect ($\beta = .14$, $p = .02$). Therefore Hypothesis 5 was upheld.

Involvement was found to positively affect knowledge. This effect was found to be positive ($\beta = .16$, $p = .00$). This was to suggest that the more involved tourists are with regard to hurricane topics the more knowledge they have with regard to hurricanes. Therefore, Hypothesis 6 was upheld. However, involvement did not have a significant total effect on information search ($\beta = -.02$, $p = .72$), although there was a significant

negative indirect path from involvement to information search. This indirect path was from involvement through knowledge to information search ($\beta = -.03$, $p = .01$). This was to suggest that while lower individuals in the involvement scale, the more likely they are to seek information with regard to hurricane evacuation in the destination, with the total effect of involvement to information search not being significant. Therefore Hypothesis 7 was not upheld.

Knowledge was found to negatively affect information search ($\beta = -.18$, $p = .00$), which was fully attributed to the direct effect of knowledge. Thus Hypothesis 8 was upheld. That means tourists who had less knowledge about hurricanes were more likely to employ more information search strategies regarding hurricane evacuation in the destination than those who had more knowledge about hurricanes.

Personality was found to have a significant total effect on information search. This total effect was positive. This effect was attributed to the direct effect ($\gamma = .19$, $p = .03$). That means the more positive one in the personality scale, the more likely the person seek information with regard to the hurricane evacuation. By examining the standardized path coefficients among the variables, past experience was found to be the strongest predictor of information search, followed by knowledge, risk belief and personality.

Discussion and Implications

The empirical results of this study provide tenable evidence that the proposed structural equation model designed to consider tourists past experience with hurricane, their risk belief, their involvement with hurricanes, their knowledge about hurricanes, their personality and their information search strategies with regard to hurricane evacuation is acceptable. Even though in the literature the individual constructs have

received considerable attention from tourism scholars and practitioners, the conceptual model and empirical studies pertaining to causal relationships among those constructs have not been examined, especially under a threat condition. It is believed that this study has substantial capabilities for generating more precise applications related to tourists risk information search while in the destination, especially concerning past experience, risk belief, involvement, knowledge and personality.

The major findings of this study have significant implications both theoretically as well as managerially. Theoretically, this study found positive effects of personality and risk belief and negative effects of past experience and knowledge on information search with regard to hurricane evacuation.

This finding is parallel with the utility maximization principle (Letson et al., 2007) that is under a threat, individuals would seek information intensively to alleviate the uncertainty and thus maximize the utility of alternatives. This explains why those without past experience and low knowledge are more likely to seek information about hurricane evacuation by maximizing the utility of various information sources. It therefore can be inferred that individuals will seek more information when they have greater feelings of uncertainty.

The findings indicated that past experience with hurricane impacts had a negative effect on information search regarding hurricane evacuation both directly and indirectly. One possible explanation of this finding is that when tourists are faced with having to make a potentially risky decision regarding evacuation, they are more likely to seek more information beyond their own experience to reduce uncertainty. Not having past experience with hurricane impacts increases the perception of risk and therefore, in

order to alleviate the perception of risk individuals are more likely to seek information both actively and passively. While those with past experiences with hurricane impacts are more likely to rely heavily on their past experience and therefore seek less information with regard to hurricane evacuation, those with past experience with hurricane impacts seem to rely more on their own experiences in making the evacuation decision and therefore reduce the likelihood of information search.

It is important to note that the respondents were only asked whether or not they have experienced hurricane impacts. They were not asked to elaborate on the severity of the impacts. Severity of the impacts may help to understand the negative effect of past experience to information search. Several researchers such as Mileti and O'Brian (1992), Piotroski and Amstrong (1998) and West and Orr (2007) noticed that residents who experienced severe impacts of a hurricane in the past have been found to pay more attention on the information regarding hurricanes. Therefore, it is possible that the negative effect of past experience on information search in this study is attributed to the fact that tourists in this study only experienced minimal impacts from hurricanes. Nonetheless further research needs to be conducted to fully understand the effects of past experience on information search.

Next, the structural equation model also revealed that there was a positive effect of risk belief on information search. This finding was understandable as the more people believe that hurricanes expose them to risk beyond their control, the more likely they seek information with regard to hurricane evacuation both through active information search and passive information search in order to alleviate uncertainty (Vogt & Fesenmaier, 1998; Maser & Weiermair, 1998).

While the findings of the structural equation model also indicated that involvement affected information search with regard to hurricane evacuation, this effect however is mediated by knowledge. The direct path from involvement to information search was found not to be significant. Nonetheless, while the indirect effect of involvement through knowledge to information search was significant, the total effect of involvement on information search was not significant. This is intriguing, as past studies have consistently found a positive effect of involvement on information search. One possible explanation of this finding is because the composition of the sample size was comprised of tourists (both international and domestic) who mostly have low involvement with regard to hurricane topics, and therefore other variables might serve as better predictors of information search with regard to evacuation. Another possible explanation is that the model only measured the involvement with the hurricane topics, and therefore did not control for respondents' involvement with the destination. The greater the involvement the tourists have with the destinations (Florida), the more likely they are to know about the possibility of hurricane threats and evacuation issuances when they choose to go for vacation in Florida during a hurricane season. Further study however needs to be conducted to examine the plausibility of this explanation.

Subsequently, the findings of the structural model indicated that the level of hurricane knowledge negatively affected the information search regarding hurricane evacuation. This finding is parallel with past studies (Alba & Hutchinson, 1987; Brucks, 1985; Vogt & Fesenmaier, 1998). One possible explanation is that those with very little knowledge with regard to hurricanes engage in more extensive information searching than those with a greater degree of prior knowledge because they do not have the

requisite knowledge regarding standards for evacuation. In addition, the finding also confirms that those individuals with higher levels of knowledge about the attributes of alternatives rely heavily on their own knowledge and are less likely to seek information from external sources both actively and passively. It is important to note that in this study current level of hurricane knowledge is only measured by four questions. Although the question items were carefully selected and tested, the reliability of the questions can still be improved to better measure the level of hurricane knowledge as well as to better discriminate tourists' hurricane knowledge. This can be done by adding more questions and giving attention to the level of difficulty for each question item.

Afterward, the findings revealed that personality has a positive effect on information search regarding hurricane evacuation. This finding is consistent with past studies in different contexts (Luo, Feng & Cai, 2004; Gursoy & McCleary, 2004). While this study did not specifically examine the different effects of the five dimensions of personality, the findings provide a valuable insight that the more positive score on each personality dimension will lead to higher information search strategies that include both active information search and passive information search. Nonetheless further study would need to be conducted to examine the role of each personality dimension in predicting tourists' information search strategies with regard to hurricane evacuation.

The findings therefore confirm the utility of Eagly & Chaiken's (1993) Heuristic-Systemic Model (HSM) in understanding tourists' information search with regard to hurricane evacuation in the destination. Although HSM predicts two ways of information search and processing, in the risky situation individuals would not seek information from a variety of information sources. They are more likely to utilize and scrutinize the

sources available for them at that time to alleviate uncertainty that is explained by bounded rationality and therefore these individuals are more likely to take the systemic route. As Griffin, Neuwirth and Dunwoody (1995) asserted, this process depends on the relevance of the topic and the perceived gap between what people know and what they need to know about the risks. This study highlighted this assertion and found that those who believe that hurricanes pose a risk beyond their control are more likely to seek more information about hurricane evacuation than those who believe otherwise, and that those who perceive that they have low knowledge of hurricane are more likely to seek more information about hurricane evacuation than their counterparts.

The testing of the proposed model has implications for the effectiveness of hurricane evacuation information dissemination to tourists in the destinations. In order to improve the effectiveness of dissemination, policy makers and destination management organizations need to consider the level of knowledge, involvement, past experience, risk belief and personality of tourists. The model implies the need to allocate resources to cater to different types of tourists. Hurricane evacuation information should then help different types of tourists to alleviate their perception of uncertainty. To do so, crafting specific information messages that target specific groups of tourists is needed. Those with higher risk belief of hurricane will need different types of messages than those with lower risk belief.

As one important role of warning messages is to alleviate uncertainty, it is pivotal to ensure the comprehension of the target of the message. Recent studies (Drabek 2001; Matyas et al., 2011; Villegas et al., 2012) suggest that tourists may be at a disadvantage when they encounter hurricane warnings and evacuation messages that

require them to draw inferences. Thus to affectively reach tourist populations, the key to improve comprehension lies in the content of the message. Consistent with the guidelines developed by Mileti and Peek (2000) messages that are specific, clear, and accurate should improve comprehension by reducing the need to make inferences and reducing uncertainty. Therefore hurricane evacuation that targets transient populations such as tourists should emphasize the clarity of the messages by the removal of jargons, other technical terms and euphemisms that might not be understood by tourist populations due to the fact that they are not from the destinations.

It is also important to consider the effect of the level of knowledge in predicting the likelihood of information search with regard to hurricane evacuation both actively and passively. This study found a negative result with regard to the effect of the current level of hurricane on information search with one possible explanation that those with higher levels of knowledge about hurricanes rely heavily on their own knowledge and therefore less likely to seek information both actively and passively. Therefore, those who have higher hurricane knowledge would need different types of messages than those with lower level of knowledge. Therefore findings imply that the emergency agencies and Destination Management Organizations need to provide hurricane information aids such as brochures, or other educational materials for tourists in the State of Florida with multiple levels of information to assist tourists in their evacuation information search. The use of social media such as *Facebook* or *Twitter* to inform tourists is also recommended (Pennington-Gray et al., 2011).

Lastly, it is also recommended that a one-stop web-based geo-spatial hurricane information website be developed. Ideally, the website should be designed to aid

communication and sharing of hurricane information and resources to enhance efficiency by making it easier, faster and less expensive. Through this website, tourists can learn about hurricane-related terminology through the inclusion of a glossary and safety quiz, which would allow them to access hurricane-related information when they are traveling.

Concluding Remarks

It can be concluded that tourists' information search with regard to hurricane evacuation in the destination has a causal relationships with past experience with hurricanes, individual risk belief with regard to hurricanes, their level of knowledge as well as their personality. In the tourism literature, although it has been acknowledged that information search is a crucial factor in decision-making, little has been done to investigate its measurement, or its structural relationship with the aforesaid constructs. This study revealed and confirmed the existence of the critical relationship among the aforementioned constructs. The findings suggest that it would be worthwhile for destination managers, to make greater investments to craft a multiple types of messages to target different types of tourists. The effectiveness of the hurricane evacuation information would be largely determined by the suitability of the messages to the target groups.

Finally, there are two issues associated with this study's limitations that should be discussed to provide a guide for future research. First, data collection for this study was conducted during a hurricane season with an assumption that during hurricane season people are cognitively thinking about hurricanes. Nonetheless, the choice of collecting data during hurricane season might self-select the sample with those who exhibit higher risk-belief regarding hurricanes have decided not to travel to Florida during a hurricane

season, and thus was not part of the sample for this study. Therefore, it is recommended to replicate a similar study during off-hurricane season to test the robustness and consistency of the model.

Secondly, the study's model was tested in Florida, a location that has been considered to be advanced in disseminating hurricane information to their tourists compared to other states. The generalization of the model is suggested, with the replication of this study in other settings that have different types of tourists. This can provide opportunities to evaluate the extent and direction of current hurricane knowledge as it relates to information search as well as involvement. An application of the model to other settings will help produce reliable indicators and further validate the construct, thus producing a more robust and stable model.

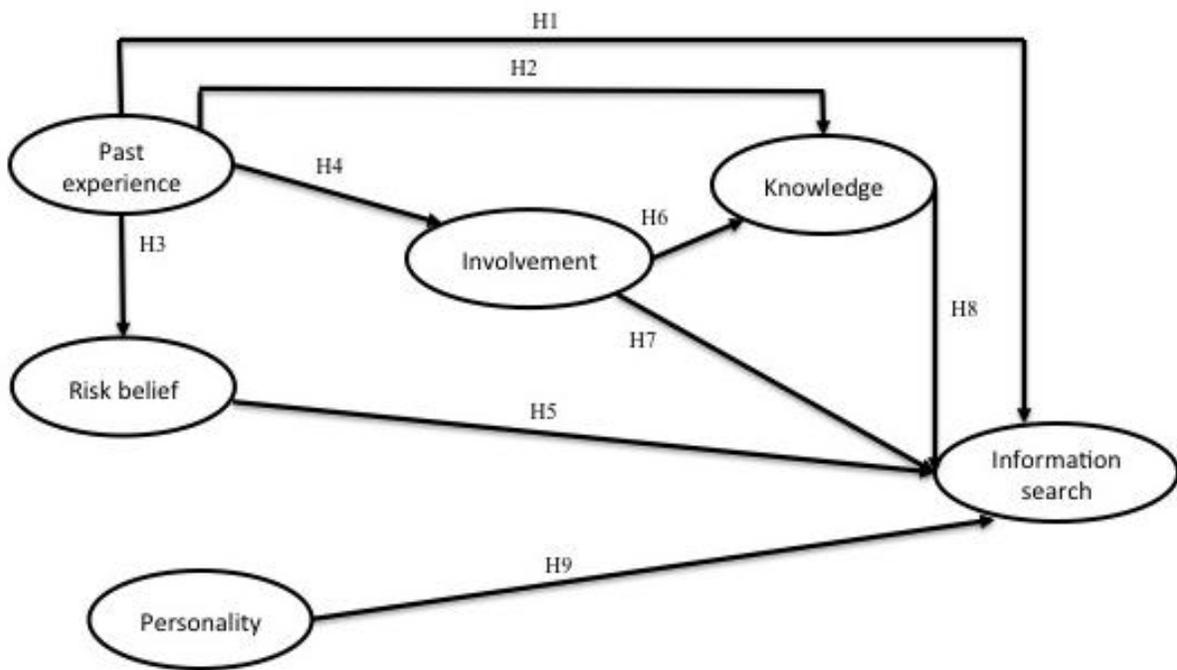


Figure 3-1. Theoretical Model

Table 3-1. Means, standard deviations and Cronbach's alphas for personality construct

TIPI Items	Means	Standard Deviation	Cronbach Alpha
Extraversion			.69
Extraverted, enthusiastic	3.78	1.06	
Reserved, quiet (R)	3.49	1.17	
Agreeableness			.65
Critical, quarrelsome (R)	3.55	1.20	
Sympathetic, warm	3.93	.97	
Conscientiousness			.67
Dependable, self-disciplined	4.06	1.11	
Disorganized, careless (R)	4.00	1.19	
Emotional Stability			.70
Anxious, easily upset (R)	3.72	1.14	
Calm, emotionally stable	3.79	1.07	
Openness to Experiences			.68
Open to new experiences, complex	4.01	1.10	
Conventional, uncreative (R)	3.69	1.17	

R= Reversed code

Table 3-2. Principal component analysis of risk belief, involvement and information search

Scale item	Factor Loading	Eigenvalue	Variance explained	Cronbach's Alpha
Risk Belief		3.20	80.07	.91
a) A hurricane exposes me to risk beyond my control.	.92			
b) I get nervous when there is discussion about approaching hurricanes.	.93			
c) I avoid thinking about hurricanes.	.87			
d) I know what I should do if a hurricane occurs during my stay in the destination. (R)	.82			
Involvement		2.53	84.49	.91
a) Interest of hurricane topics	.93			
b) Importance of hurricane topics personally	.90			
c) Curiosity about hurricane topics	.89			
Information search				
<i>Active Information Seeking</i>		4.29	33	.80
a) Family, friends, relatives	.55			
b) Locals	.63			
c) Other tourists	.47			
d) Local tourism office	.69			
e) Local authority	.55			
f) Social network	.56			
g) Hotel staff	.70			
h) Social clubs	.55			
<i>Passive Information processing</i>		2.14	18.48	.80
a) TV stations	.71			
b) Weather channel	.81			
c) Radio stations	.86			
d) Newspaper	.73			
e) National Hurricane Center	.71			

Table 3-3. Means, standard deviations and zero- ordered correlations of variables (N=533)

Variables	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Past Experience	.31	.46	-										
2. Active search	2.98	.79	-.43**	-									
3. Passive process	3.99	.87	-.15**	.39**	-								
4. Extraversion	3.63	.89	-.06	.04	.02	-							
5. Agreeableness	3.74	.86	-.14**	.15**	.17**	.23**	-						
6. Conscientiousness	4.03	.97	-.09*	.05	.15**	.22**	.44**	-					
7. Emotional stability	3.75	.90	-.11*	.09*	.09*	.26**	.53**	.49**	-				
8. Openness	3.85	.89	-.13**	.07	.05	.47**	.43**	.44**	.50**	-			
9. Involvement	2.70	1.13	.13**	-.05	.02	-.03	-.10*	-.05	-.10*	-.12**	-		
10. Risk Belief	3.22	1.05	-.55**	.31**	.16**	-.10*	.08	.03	-.02	-.05	-.02	-	
11. Current knowledge	1.25	1.11	.20**	-.21**	-.18**	.01	.05	.08	.04	-.04	.17**	-.13**	-

** significant at .001, * significant at .05

Table 3-4. Confirmatory factor analysis results

Construct and factor	Standardized Factor Loadings	R-Square
Personality		
Extraversion	.34	.11
Agreeableness	.68	.47
Consciousness	.65	.42
Emotional stability	.76	.58
Openness	.65	.42
Risk Belief		
Risk belief	.95	.91
Involvement		
Hurricane involvement	.96	.92
Knowledge		
Hurricane knowledge	1.0	1.0
Past experience		
Past hurricane experience	1.0	1.0
Information search		
Active	.87	.76
Passive	.45	.20

χ^2 test of model fit = 65.248, df = 32 (p=.000)
 RMSEA= .044, CFI/TLI= 0.972, 0.952, SRMR= .031

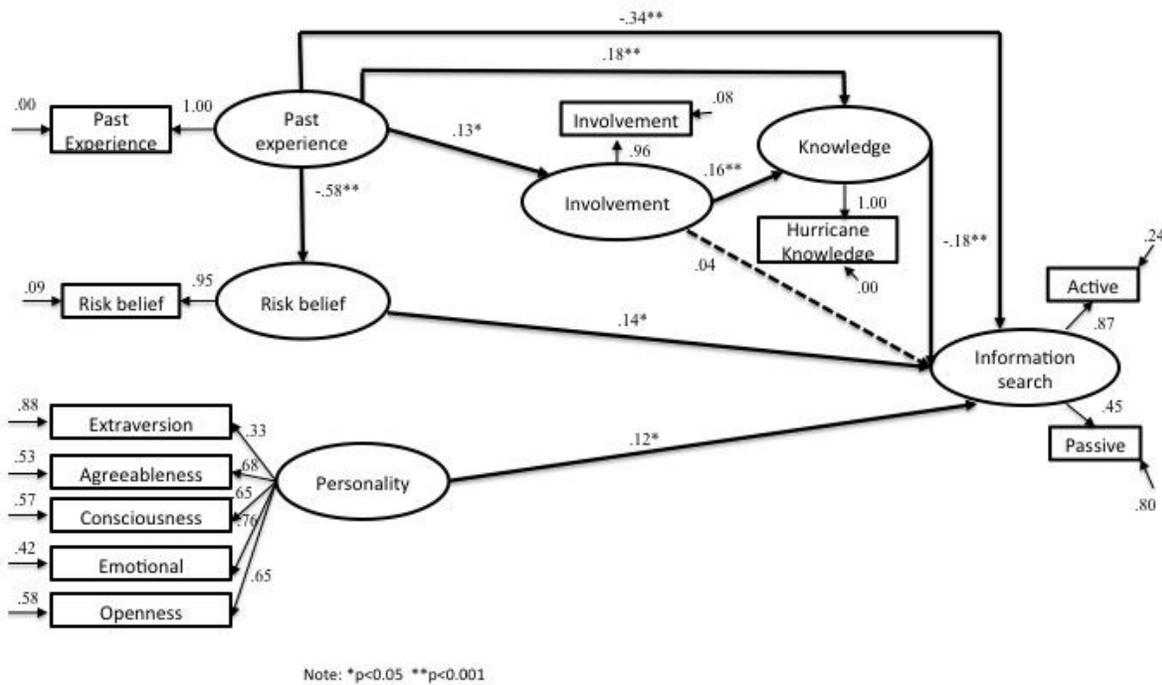


Figure 3-2. Final model of information search regarding hurricane evacuation

CHAPTER 4
TOWARD A GREATER UNDERSTANDING OF TOURIST'S HURRICANE
EVACUATION DECISION PROCESS: INDIVIDUAL CHARACTERISTICS, CHANNEL
BELIEFS, INFORMATION SEARCH AND RISK APPRAISAL

Background of the Study

Natural disasters associated with severe weather such as hurricanes and tropical storms present at least two kinds of challenges for emergency management agencies and authorities. The first challenge is related to the damage to structures, environments and the cost of the recovery following the impact. The second challenge is dealing with how individuals respond to the weather event, specifically related to their evacuation behaviors. An increasing challenge associated with mass evacuation following severe storms is the potential for a significant portion of evacuees to be stranded on congested highways when the hurricane makes landfall (Stein, Duenas-Osorio & Subramanian, 2010; Higgins, 2005). An additional challenge with evacuation is shadow evacuation in which individuals who are from areas not under an evacuation advisory drive to the evacuation zone, thus increasing the congested traffic (Dash & Gladwin, 2007; Henk et al., 2007). Likewise, hurricane evacuations often result in an inconvenience and extra financial costs to evacuees. Consequently, response to hurricanes can themselves become a source of personal and financial detriment (Dow & Cutter, 1998, 2002).

Over the past decade, there has been a growing body of literature which has attempted to profile determinants of evacuations with inconclusive results regarding several factors (Gladwin et al., 2001; Solis et al., 2010; Letson et al., 2007). For instance, with regard to past experience with hurricane impacts, Phillips and Morrow (2007) found that having past experience with hurricanes affects residents' decisions as to whether or not they evacuate, while another study by Lindell et al. (2005) found that

past experiences with hurricanes do not significantly influence evacuation decisions. One possible explanation of such inconclusive and contradictory results is that specific groups of people respond to a different set of information cues, incentives and risk factors than other groups (Peacock, Brody & Highfield, 2005; Stein, Duenas-Osorio & Subramanian, 2010). These discrepancies can therefore offer policymakers a wide range of alternatives to better manage mass evacuation (Dow & Cutter, 2000).

Despite several inconsistencies in research findings regarding factors that influence individual responses to hurricane threats, it is widely believed that the individual decision making process during the threat of hurricanes is a very complicated issue that is a result of many factors (Gladwin et al., 2001), ranging from sociological, psychological and demographic characteristics, credibility of the information source, as well as past experience with hurricanes (Burton et al., 1993; Viscusi, 1995; Letson et al., 2007; Dow & Cutter, 1998). Nonetheless, several researchers have argued that hurricane evacuation is also a social process whereby the decision to evacuate is influenced by individual interpretations of hurricane warning messages and their social networks (Whitehead, 2003; Drabek, 2001).

Most hurricane evacuation related studies to date have overwhelmingly been concentrated on households and residents (Phillips & Morrow, 2007; Broad, Leiserowitz, Weinkle & Steketee, 2007). There is a paucity of research regarding other vulnerable groups, such as transient populations (Whitehead et al., 2000; Phillips & Morrow, 2007). The vulnerability of transient populations stems from the fact that they are not from the area. Therefore they are especially at risk of not having the requisite communication skills needed to decipher hurricane-advisory messages and may lack

knowledge and familiarity about the potential risks associated with hurricanes.

Consequently, they may be unable to respond appropriately to hurricane advisories.

One notable transient population is tourists because they are in a vacation mode away from their support system and they are typically in unfamiliar surroundings, which may escalate their vulnerability to hurricane threats (Burby & Wagner, 1996; World Tourism Organization, 1998). Consequently, in destinations with a large concentration of tourists as in Florida, mass evacuation strategies also need to consider this group. Unfortunately, research regarding tourist evacuation has been understudied. Drabek did notable works in this area in late 1990s and early 2000 regarding informing tourists about hurricane risks and to increase the likelihood of voluntary evacuation. Matyas et al. (2011) was the most recent one.

One contribution of the Matyas et al. (2011) study was to provide empirical evidence to demonstrate that tourists respond to hurricane advisories differently than residents, and that the evacuation behaviors of all evacuees is not determined by a common set of determinants. It also encourages further elaboration in determinants that shape tourist evacuation decision. This study is built around the earlier study (Matyas et al., 2011). However, this study intends to model the evacuation decision, rather than simply uncovering determinants of tourists' evacuation decisions.

To model tourists' evacuation decision, Chapter 4 used the findings on Chapter 2 and Chapter 3 as a starting point. The model was built around a basic tenet: tourist evacuation decision making is a linear process, in which the individual moves from one point to another point leading to an evacuation decision. Therefore, unlike other studies, the predicted determinants affect evacuation decisions through several intermediaries.

Specifically, in Chapter 4, several predicted determinants from Chapter 1 and 2 were used to develop the model. These predicted determinants were: past experience with hurricane impacts, hurricane involvement, current knowledge about hurricanes, risk-belief, personality, information search. In addition to these determinants, two variables were added: channel belief and risk appraisal to fit the umbrella model that is introduced in Chapter 1.

Theoretical Framework

Chapter 4 was built around a tenet that tourists progress through several stages in their evacuation decision process. A model based on Griffin, Dunwoody and Neuwirth's (1999) model was used to model tourist's hurricane evacuation decision. The model explained that people seek and process risk information in different ways leading to different preventive behaviors, in Chapter 4, evacuation decision. Griffin, Dunwoody and Neuwirth (1999) model applied two prominent models: Eagly and Chaiken's (1993) Heuristic-Systemic model of information processing (HSM) and Ajzen's theory of Planned Behavior (TPB) (Ajzen, 1988; Ajzen & Fishbein, 1980; Ajzen, 1991).

HSM, similar to Petty and Cacioppo's (1981) Elaboration Likelihood Model (ELM), pronounces dual mechanism of information processing, with one being more superficial (Heuristic) and the other being deeper and more effort-extensive (Systemic). According to HSM, people have a tendency to adopt one procedure of processing based on their capacity to process the information in each manner and their motivation to go beyond the more superficial processing to engage in systemic processing which can occur concurrently with heuristic processing (Eagly & Chaiken, 1993). In the HSM model, personal relevance to the topic has been found to motivate people to systematically process messages (Eagly & Chaiken, 1993). Based on the HSM model, individuals who

analyze risk information disparagingly will eventually develop more resilient attitudes and behaviors. Griffin, Neuwirth and Dunwoody (1995) in their study found that individuals that are presented with higher risk hazard information and its severe effects were less likely than other individuals to base their individual risk judgment on the stylistic factors of the information. Griffin, Neuwirth and Dunwoody (1995) further elucidated that relevance might have motivated individuals in risky conditions to process risk information more systematically and therefore being less reliant on superficial cues in the message. Another plausible explanation is that in the context of risky situations, individuals tend to process information systematically in order to maximize the utility of the decision (Letson et al., 2007).

HSM embodies utility maximization under environmental threats (Burton et al., 1993) and (Viscusi, 1995). The utility maximization argued that individuals make choices under the uncertainty of the threat by maximizing their expected utilities. To do so these individuals might be willing to relinquish their wealth including their income, capital, and property in order to minimize those threats. Burton et al. (1993) elaborates further by contending that under the threat of environmental hazards, an individual hazard response is influenced by several elements that include prior experience with the specific hazard, an individual's wealth, their intrinsic characteristics and their interaction with society.

The power of society on inducing evacuation behavior has been focused on the examination of information search behaviors (Sorensen, 2000). When a warning is received, people engage in what evacuation researchers have generally termed the warning confirmation process. Individuals contact others to increase their knowledge

and understanding of the event (Mileti, 1991; Drabek, 1996) and discern each other's behaviors (Cutter & Barnes, 1982). Other researchers like Christensen and Ruch (1980) are divided over the influence of social networks in prompting evacuation. Results from two experiments using recorded simulated hurricane bulletins indicated that neither the actions of an observed friend nor those of a spouse had any effect on the individual's responses. Smith (1999) and Lindell, Lu and Prater (2005) add that mass media would disseminate hurricane warnings and other information related to hurricanes continuously during hurricane season, making warnings and hurricane information available for the general public. As a result, social interaction helps individuals to better digest the available information, making social interaction more critical than only the warning by itself.

Another factor, which influences the evacuation decision, is risk perception, which is determined by the particular characteristics of a hurricane. Previous studies have primarily based preferences data on hypothetical scenarios to measure the significant key storm forecast factors that significantly influence evacuation decisions (e.g. projected path, wind speed, landfall time, etc.). Bhattacharjee, Petrolia and Hanson (2009) for instance found that wind speed and landfall time are the most important characteristics affecting evacuation choices, while Whitehead et al. (2000) found that the intensity of the storm is the most significant predictor of an evacuation.

Griffin, Dunwoody and Neuwirth's (1999) model expands the information search and process behavior to preventive behavior using the theory of Planned Behavior (Fishbein et al., 2001). The model suggests that the fashion of information seeking and processing those individuals engage in to gather and process information about

preemptive behaviors can affect the stability of cognitive structure. Therefore, in order to understand tourists' evacuation decisions in the event of a hurricane, an appropriate conceptual model should embody theory of utility maximization (Burton et al., 1993; Viscusi, 1995; Letson et al., 2007), Heuristic-Systemic Model (Eagly & Chaiken, 1993), and Theory of Planned Behavior (Ajzen, 1988; Ajzen & Fishbein, 1980). The first would help to understand how tourists come to a decision regarding whether or not to evacuate, the second would help to understand how tourists engage in seeking and processing hurricane information and the last would help to understand the saliency of the preventive behavior, in this case evacuation decisions. Figure 4-1 presents the theoretical framework for Chapter 4. It is argued that when a hurricane advisory is received, tourists will engage in the warning confirmatory effort in the form of information seeking and processing, with such efforts being influenced by several determinants. The results of such efforts will aid tourists in their risk appraisal of the situation, which in turn leads to their evacuation decision. The model also outlines several paths between several individual characteristics of risk appraisal to acknowledge that some individuals avoid information search efforts and instead base their judgment on their own stance.

Literature Review

Past Experience

Individuals have a tendency to apply a referent criterion from their past experience to guide them in new situations (Grünig, 1983). Moreover, Johnson and Tversky (1983) argue that individual experiences with certain risks often transfer to their responses to other risks. This includes engaging similar strategies in searching for more information. However, previous studies in hurricane evacuation indicate inconclusive results with

regard to the effect of past hurricane experience on information search behaviors, with some findings determining that it positively influences the strategies of information seeking that individuals engage in during the decision making process (Lenz, 1984; Johnson & Meischke, 1993). Other studies, such as Whitehead (2003) however, found that residents who recurrently experienced hurricane impacts tend to use their own experience in their evacuation decisions and thus demonstrate lower information search efforts regarding hurricanes. Nonetheless, Chapter 2 found a negative association between past hurricane experience and information search with regard to hurricane adversary. Following the findings in Chapter 3, Chapter 4 also proposes that tourists' past experience with hurricane impacts will have a negative association with information search.

H1: Tourists' past hurricane experience with hurricane impacts lessens the information search with regard to a hurricane advisory.

In addition to influencing the information search regarding hurricane advisory, past experience also affects the level of knowledge. That is the more experience an individual has with hurricanes, the more knowledge they have regarding hurricanes. In the area of travel decision-making, Kerstetter and Cho (2004) noted that more experienced travelers tend to be more resourceful than those who are less experienced. More experienced travelers are more adept at knowing where to seek credible information with regard to the issues they face during their travel, in this case the decision of whether or not to evacuate. In concert with past studies, Chapter 3 found that tourists' past experience with hurricane impacts positively affect their hurricane

knowledge. Therefore it is also argued that past experience with hurricane impacts intensifies tourists' knowledge about hurricanes.

H2: Past experience with hurricane impacts increases tourists' knowledge about hurricanes.

Past studies in risk information have related past experience with risk belief regarding hazards (Griffin et al., 1999; Griffin et al., 1998). Griffin, Dunwoody and Neuwirth (1998) affirmed that past experience with a hazard effects individual risk belief associated with the hazard, with those who experienced the impact of a hazard in the past exhibit lower risk belief regarding the hazard. One rationalization is that having experiences escalates a sense of controllability and self-confidence. Thus, those without past experience tend to display higher risk belief as a consequence of a lower sense of controllability.

Similarly, Lehto, O'Leary and Morrison (2004) found when tourists have to make a risky decision such as engaging in a new pursuit at a familiar destination, they are more likely to seek more information beyond their own experience to lessen uncertainty. Chapter 3 found that tourists' past experience with hurricane impacts has a negative association with risk belief. Therefore, in Chapter 4, the relationship between past experience and risk-belief is specified to be negative.

H3: Past experience with hurricane impacts decreases individual risk-belief regarding hurricanes.

Moreover, past experience has also been found to effect individual involvement with a topic of interest (Grunig, 1983; Sriramesh et al., 2007), with more experienced individuals found to be more likely to be involved with those topics. Past studies in

resident's evacuation have also indicated that residents who have experienced hurricane impacts in the past exhibit a higher likelihood to participate in hurricane prevention and preparedness initiatives, including having a hurricane preparedness kit and family evacuation plans. (Mayhorn, 2005; Mileti & O'Brian, 1992). On Chapter 4 the relationship between past experience and involvement is specified to be positive and consistent with the finding on Chapter 3.

H4: Past experience with hurricane impacts escalates an individual's involvement with hurricanes.

With regard to evacuation, Baker (1991) and Riad, Norris and Ruback (1999) asserted that individuals who are in areas that have been affected by a major storm and those involved in a hurricane evacuation in the past indicated a greater likelihood of evacuation than those who are in higher grounds and those who have never experienced an evacuation. Furthermore, Whitehead (2003) contends that the main goal of hurricane evacuations are to alleviate the risk of injury or death and that people who are in flood prone areas have demonstrated a higher likelihood of evacuation than those who are not in at risk areas.

Likewise, residents of hurricane-prone areas constantly receive information regarding hurricanes before and during the hurricane season, and more frequently when a hurricane has the potential to made landfall in their area (Daniels & Loggins, 2007). Likewise, Dow and Cutter (1998) found that 58% of their respondents monitored news media sources all day when a hurricane was within 2–3 days of threatening their area. Phillips and Morrow (2007) found that having a past experience with hurricanes significantly affect residents' decisions as to whether or not they evacuate. That is,

residents of hurricane-prone regions who have experienced impacts of hurricanes in the past have a greater familiarity and thus better comprehension of hurricane-related terminology. Nonetheless, another study by Lindell, Lu and Prater (2005) found that past experiences with hurricane impacts do not significantly affect evacuation decision-making. Chapter 2 confirms the significance of past hurricane experience with those who never experienced hurricane impacts are more likely to evacuate than those with past evacuation experience. Chapter 4 however, takes the finding from Chapter 2 one step further by specifying that past experiences affect evacuation decision making indirectly through several intermediaries.

Risk Beliefs

Risk belief refers to personal beliefs concerning controllability, optimism bias and risk propensity/aversion (Rohrmann, 1995; 1999). Risk belief also echoes the extent of an individual level's of confidence to overcome the uncertainty (Quintal, Lee, & Soutar, 2010; Major, 1993; 1998; Lee & Rodriguez, 2008; Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992). Individuals with high perceptions of controllability have a higher tendency to feel that they are not at risk (Burby & Wagner, 1996). Comparably, individuals with a lower perception of controllability are more likely to perceive that they are at risk. Consequently, those who are less self-confident with their capability to overcome risks linked to hurricanes are more likely to demonstrate a higher level of perception of risks. Such perception has been found to be associated with past experience with related hazards and preventive behaviors (Griffin et al., 1999). Lastly, past studies have consistently found that individuals who are risk averse and demonstrate uncertainty participate in strategies to lessen their risk and uncertainty to a greater degree than others, for example by seeking assurance (Sweeney et al., 1999)

and searching extensively for information (Vogt & Fesenmaier, 1998; Maser & Weiermair, 1998). The findings from Chapter 3 confirmed the role of risk belief in predicting information search, with those who exhibit higher risk belief being more likely to seek information with regard to a hurricane advisory. Consistent with Chapter 3, in Chapter 4, it is posited that risk belief positively affects information search with regard to hurricane advisories. Additionally, it is also assumed that risk belief regarding hurricane has a positive association with risk appraisal, with those who exhibit higher risk belief regarding hurricanes being more likely to exhibit higher risk appraisal regarding hurricane events.

H5: Risk belief with regard to hurricanes increases information search with regard to evacuation.

H6: Risk belief with regard to hurricanes increases risk appraisal with regard to hurricane evacuation.

With regard to the relationship between risk-belief and evacuation decisions, Chapter 2 found that risk-belief did affect tourists' evacuation decisions with those who exhibit higher risk belief about hurricanes being more likely to evacuate. In Chapter 4, it is proposed that the effect of risk belief to evacuation decision is mediated through intermediaries.

Involvement

An individual's level of involvement refers to how personally connected the individual feels to the problem (Grunig, 1989; Aldoory et al., 2010; Sriramesh et al., 2007; Slater et al., 1992). Habitually, the level of involvement can be unraveled by three attributes: interests, importance, and curiosity that individuals have on a certain issue (Zaichkowsky, 1985; Greenwald & Leavitt 1984; Hallahan, 2000). With the escalation of

an individual's involvement level on a specific issue, the greater the amount of knowledge the individual obtains. Chapter 3 confirmed that tourists' involvement with hurricanes increased their level of knowledge regarding hurricanes. Consequently, in Chapter 4 the relationship between involvement and the level of hurricane knowledge is specified to be positive.

H7: Tourists involvement with hurricane increases their level of knowledge about hurricanes.

With regard to the effect of involvement with hurricanes and evacuation decisions, past studies have been inconclusive. Several researchers argued that personal involvement with hurricanes would elevate perceptions of risk, leading to higher evacuation rates (Burton & Kates, 1964; Vitek & Berta, 1982). Peacock et al. (2005) argued that this occurs because those who are personally involved with hurricanes are more alert regarding warning messages compared to those who have not been personally involved with hurricanes. Nevertheless, other researchers such as Lindell and Perry (2000) posit that those with personal involvement with hurricanes are resistant to warning messages as they are more likely to perceive that they are in control, leading to a lower evacuation rate. Chapter 2 however, showed that personal involvement with hurricanes reduced the level of evacuation. In Chapter 4, involvement is specified to negatively affect evacuation decision through intermediaries.

Current Knowledge

Findings on the relationship between current knowledge and information search have been indecisive. Some researchers have found positive relationships between the level of knowledge and information search, with knowledgeable individuals engaging in information seeking behaviors more effectively since they know what information they

need to seek and know where and how to obtain it (Coupey et al., 1998). In addition, it has also been found that one's knowledge level facilitates in processing new information (Gursoy, 2001; Rao & Sieben, 1992). Mitchell and Dacin (1996) posit that informed individuals exhibit a greater tendency to develop new queries about product attributes and are better aware of problems that may appear when purchasing and consuming.

Likewise, Kerstetter and Cho (2004) also found that experts tend to have a greater ability and interest in getting new information and thus are more likely to employ an extensive search. Kerstetter and Cho (2004) in their study found a significant and positive association between prior knowledge and internal search (own knowledge) and external search, particularly on the use of the Internet as an information source.

On the contrary, other researchers such as Coupey, Irwin and Payne (1998) and Fodness & Murray (1999) found a negative relationship between knowledge level and information search behavior. Those with very low knowledge are more likely to conduct more extensive information searching than those with a greater degree of knowledge because they do not have benchmarks for evaluation (Alba & Hutchinson, 1987). One plausible explanation is that individuals with higher levels of knowledge about the attributes of alternatives rely heavily on their own knowledge and therefore less likely to seek information from external sources (Brucks, 1985), as well as exhibit a greater tendency to base their decisions on their current knowledge (Vogt & Fesenmaier, 1998).

Additionally, Griffin, Dunwoody and Neuwirth (1999) asserted that more effortful information search would be motivated when the sufficiency threshold is higher than the amount of such knowledge the individual feels or currently has. That is, the greater the gap between the current level of knowledge and the sufficient threshold, the more

efforts would be needed to diminish the gap. Accordingly it leads to a greater degree of information search. Chapter three indicated a negative association between tourists' level of hurricane knowledge and their information search. Consistent with the findings in Chapter 3, in Chapter 4 knowledge level is specified to have a negative association with information search regarding hurricane advisories.

H8: Current level of hurricane knowledge negatively affect information search with regard to hurricane evacuation.

H9: Current level of hurricane knowledge negatively affects channel belief regarding hurricanes.

Phillips and Morrow (2007) found that knowledge of hurricanes influences evacuation rates. Residents who live in hurricane-prone regions have a superior familiarity and comprehension of hurricane-related terminologies and therefore may be more likely to evacuate than other groups. However, Broad, Leiserowitz, Weinkle and Steketee (2007) found that even residents of Florida (US) the state that is most recurrently hit by hurricanes often misinterpret the cone of uncertainty regarding hurricane forecasts. The findings of Chapter 2 affirm that hurricane knowledge has a negative association with evacuation decision. In Chapter 4, it is predicted that knowledge exhibit negative association with evacuation decision through intermediaries.

Personality

Personality refers to “the pattern of characteristic thoughts, feelings and behaviors that distinguishes one person from another and that persists over time and situation” (Phares, 1991: 4). The effect of personality on information search behaviors has been documented in several studies (e.g. Kernan & Mojena, 1973; Kirton, 1989; Jacobsen, 1998; Heinstrom, 2003; Howard & Howard, 1995). Heinstrom (2003) found that

individuals with lower emotional stability are more susceptible to the tension that can arise as a result of receiving many contradictory messages and therefore prefer less confusing information. Likewise, Miculincer (1997) also asserted that the more secure an individual is, the more likely that person is to affirmatively seek and accept new information. As exhibited in Chapter 3, in Chapter 4, personality is specified to positively influence information search about hurricane advisories.

H10: A tourist's personality positively affects information search behavior with regard to hurricane evacuation.

There has been a fairly widespread consensus that personality factors such as loss of control, believing that fate is in the hands of others or fatalism (the idea what will happen will occur regardless of what one does) affect evacuation behavior. Sorensen and Sorensen (2007) assert that this theory is often perpetuated by anecdotal information or newspaper coverage, which focuses on people who refuse to evacuate and is not based on empirical research. Several studies have found that fatalism reduces warning response times for earthquakes (Turner, Nigg & Paz, 1986) and tornados (Sims & Baumann, 1972). Likewise, Drabek (1999) further argues that when faced with a warning to evacuate, one in ten people respond to it in disbelief, which later is replaced by the reality of the situation. Nonetheless such disbelief has been found to delay the ultimate decision to evacuate (Sorensen & Sorensen, 2007). Consequently, in Chapter 4 personality is predicted to indirectly affect evacuation decisions through multiple intermediaries.

Channel Belief

Beliefs about risk information sources, including their trustworthiness, credibility and usefulness affect the information seeking and processing strategies that people

employ (Griffin et al, 1999). Kosicki and McLeod (1990) argued that people have different perceptions with regard to media, with some believing that certain media outlets represent special interests and thus are biased in their reporting, while some media are viewed to be more accurate and responsible than others. These predispositions about media images are largely affected by political, social and cultural factors. Such attributes have been found to influence the choice and frequency of consumption of particular media while avoiding other media that individuals deem to be bias in their standpoint on certain issues (Dillard et al., 1996).

Furthermore, the image individuals have of media influences the typical information processing strategies that people adopt. Griffin, Dunwoody and Zabala (1998) argue that people tend to actively process media information when they believe the news to be of poor quality. In this case, active processing is the most useful strategy for defending oneself against potential manipulation by media sources. Thus it is argued that individual beliefs about information channels affect their risk information seeking and risk information processing.

Several researchers have explored how various media function in natural disasters, including hurricane situations (e.g. Piotrowski & Amstrong, 1998; Spencer, Seydlitz, Laska, & Triche, 1992). One focus of theory and research in the use of mass media in the event of a disaster is the difference between television and newspaper reporting about natural hazards (Ledingham & Masel-Watters, 1985). Television reports tend to occur with greater frequency and are relatively short, fast paced, and reliant on visuals (Stauffer, Frost & Rybolt, 1983). Newspaper stories tend to be longer, detailed, in-depth and processed at a slower, reader friendly pace. These two media also differ in

the public's perception of accuracy. Some research has shown that television is perceived to be a more accurate media than newspaper reports as television has a more persuasive effect when the material is relatively straightforward and easy to understand (Chaiken & Eagly, 1976).

Piotrowski and Armstrong (1998) in their study during hurricane Danny found that the public relied on local television coverage and local radio reports or bulletins as their major information sources with regard to hurricane forecasts. Specifically most of their respondents relied on Cable TV such as the Weather Channel and CNN. A minority of their respondents utilized Internet weather sites and weather-band radios. Piotrowski and Armstrong's study highlights a significant aspect of the media in a crisis situation. While it has been widely acknowledged that media news reports are usually the only credible information source for the public during a crisis (Sood et al., 1987), the public tends to rely on television as a credible source largely based on the public's preference for visual imagery and heightened dramatic impact, which is referred to as the "vividness effect" (Spencer et al., 1992).

In terms of expertise and trustworthiness, Driscoll and Salwen's (1996) study on Hurricane Andrew that hit landfall in Miami, Florida found that television was ranked first in terms of expertise, followed by radio, newspapers, and peers (friends, relatives, neighbors, and co-workers). However, when the sources were ranked based on trustworthiness, television ranked first followed by radio, peers, and lastly newspapers. These two studies suggest that television is regarded as having the highest expertise and trustworthiness and therefore highly utilized for the purpose of making evacuation

choices. In Chapter 4, it is hypothesized that channel belief will positively affect information search and risk appraisal.

H11: Channel belief positively affects information search regarding hurricane evacuation.

H12: Channel belief positively affects risk appraisal.

Information Search

When a warning is received, people often engage in what evacuation researchers have traditionally called the warning confirmation process, in which individuals contact others to solicit their interpretation of the event (Mileti, 1991; Drabek, 1996) and observe each other's behaviors (Cutter & Barnes, 1982) before deciding whether or not to evacuate.

Information search behavior in Chapter 4 reflects the confirmatory process in the pattern of information acquisition found in typical information search models (Gursoy & McCleary, 2004; Fodness & Murray, 1997, 1999). Typical tourist behavior in this regard also reflects Grunig's Situational Publics' (1983) construct of information seeking and information processing. Research has indicated that information is acquired through active seeking and passive processing (Sriramesh, Moghan & Wei, 2007; Bieger & Laesser, 2004). With regard to hurricanes, although the National Oceanic and Atmospheric Association (NOAA) is the official source of hurricane information, threats are actually transmitted to at-risk populations by several intermediaries (Lindell et al., 2007), including media outlets (Television, Radio, and Newspapers), governmental agencies (e.g., National Hurricane Center) and non-governmental agencies.

Communication researchers have long examined the ways in which members of the public seek information from various sources (Johnson & Meischke, 1993). The

majority of research that examines recipients' uses of media found that people employed a variety of mass and interpersonal channels to achieve personal goals (e.g. Purse & Courtright, 1993). These personal goals include those that represent both cognitive decision making such as problem solving or coping with the risky situation and affective motivation such as engaging in uncertainty reduction (McGuire, 1974). Likewise, Griffin, Dunwoody and Zabala (1998) argued that under a threat situation, individuals actively seek information beyond habitual or routine sources that customarily are used under normal situations. In this case, tourists ask for confirmation about hurricane warnings from hotel staff or local authorities rather than watching the local television in their room (Drabek, 2001). Similarly, tourists may devise ways to avoid or minimize exposure to risk content that they cannot cope with (Drabek, 1996; Drabek 2001). In Chapter 4, information search is specified to have a positive association with risk appraisal regarding hurricane situation.

H13: Information search positively affect hurricane risk appraisal.

Risk Appraisal

Hazard literature generally recognizes that risk appraisal is essential in the protective action decision-making process (Lindell & Perry, 1992; 2004; Sorensen & Sorensen, 2007; Loewenstein et al., 2001). One aspect that contributes to risk appraisal of natural hazards most often cited by researchers is previous experience with a hazard event (Lindell & Perry, 1992; 2004). One would expect that previous personal experience with a natural hazard would be meaningful and lead to a heightened perception of risk (Burton & Kates, 1964; Peacock et al., 2005). Whitehead (2003) and Anderson (1969) found that individuals who had recently experienced a natural hazard were more sensitive to warnings and more likely to respond. Nonetheless, the meaning

one attaches to the experiences can vary across the event and the individuals (Lindell & Perry, 2000) and experience with natural hazards can also result in lower appraisal of risks associated with future events.

In order to understand risk appraisal, researchers often use hypothetical scenarios to evaluate the factors of forecasts that influence evacuation decisions (e.g. a hurricane's predicted path, wind speed, landfall time, etc.) (Bhattacharjee et al., 2009). Dow and Cutter (1997) examined the hypothetical behavior of responses in case of future hurricanes. The largest portion of respondents (48%) indicated that their evacuation decision would "depend" on using the severity of the storm as a criterion. The next largest group (21%) reported that they would not evacuate with a future hurricane threat. Only 2% of these individuals indicated that it was because of a "false alarm" in the past and 81% of them did not evacuate for the previous hurricane. Likewise, Whitehead et al. (2005) found that storm intensity is the most important predictor of evacuation behavior. In Chapter 4, risk appraisal is specified to have a positive association with evacuation decision.

H14: Risk appraisal positively affects evacuation decision.

Methodology

Sampling Procedures

The sampling frame consisted of tourists who were visiting Florida in August to September of 2011. The survey was conducted in two sites in Fort Lauderdale Beach and Orlando to capture potential respondents. Respondents were chosen based on an intercepting approach using 3rd N procedures. Only one person from each travel party was deemed to be eligible. Once eligibility was confirmed and the respondent agreed to participate in the survey, the purpose of the survey was explained and a self-

administrated questionnaire was distributed to participants for completion. Questions were collected onsite.

Measurements

Past experience: Past experience with hurricane impacts was measured by a one yes-no question “I have experienced the impacts of hurricanes in the past.” That was adapted from Whitehead (2003).

Risk specific beliefs was measured by four items about risk beliefs in a 5 point Likert scale about their perception of hurricane with 1= *strongly agree* to 5=*strongly disagree*. The items were “A hurricane exposes me to risks beyond my control,” “I get nervous when there is discussion about approaching hurricanes,” “I avoid thinking about hurricanes,” and “I know what I should do if a hurricane occurs during my stay in the destination.” These items were adapted from Moon (2010) and Paton, Smith, Johnston, Johnston and Ronan (2003).

Involvement was measured by three questions adapted from Major (1998) that comprise three attributes of hurricane involvement (interest, importance, and curiosity) using a 5 point Likert scale with 1= *not at all* to 5= *extremely*. The items were: “Your interest of hurricane topics,” “The importance of hurricane topics for you personally” and “Your curiosity about hurricane topics.”

Current knowledge was measured by 4 True-False questions about hurricanes that were adapted from Moon (2010) and Matyas et al. (2011): “A hurricane watch means a hurricane could hit within 24 hours,” “Hurricane categories (1-5) are based on wind speed only”, “Hurricane season runs from June to October” and “At 50 mph (80 km/hr) wind speed, a tropical storm becomes a hurricane.” A composite score based on these 4 questions was used as an indicator for respondents’ current knowledge.

Personality was measured by a Ten-Item Personality Inventory (TIPI) scale that was adapted from Gosling, Rentfrow and Swann (2003). Respondents were asked to rate their agreement or disagreement with 10 statements using 5 point Likert scale with 1=*strongly disagree* to 5 = *strongly agree*. The items measured five basic dimensions of personality: extraversion, agreeableness, conscientiousness, emotional stability and openness to experiences. Each variable had two dimensions: Extraversion (extraverted-enthusiastic and reserved-quiet), Agreeableness (critical-quarrelsome and sympathetic-warm), Conscientiousness (dependable-self-disciplined and disorganized-careless), Emotional stability dimension (anxious-easily upset and calm-emotionally stable), Openness to experiences (open to new experiences-complex and conventional-uncreative).

Channel belief was measured by asking the respondents to rank which channel they perceive to be credible using a 5 point Likert scale with 1= *not credible at all* to 5=*very credible*. The list included: family & friends, TV stations, social clubs, local tourism office, radio stations, social network sites, locals, weather channel, local authority, newspaper, National Hurricane Center (NHC), hotel staff and other tourists.

Information search was measured by two variables: active information seeking and passive information processing. Active information seeking was measured by asking respondents 8 questions on a five-point Likert type scale about two-way communication. The question was: "Who do you turn to for information in the event of hurricane evacuation while you are vacationing in the destination (1=*never* to 5=*always*)?" The list included family/friends/relatives, locals, other tourists, local tourism office, local authority, social network sites, hotel staff and social clubs. Passive information

processing was measured by five questions on a five-point Likert type scale about one-way communication usage. The question was: "Where do you seek information in the event of hurricane evacuation while you are vacationing in the destination (1=*never* to 5= *always*)?" The list was: TV stations, Weather Channel, Radio stations, Newspaper and the National Hurricane Center.

To elicit risk appraisal and evacuation decision, a hypothetical hurricane forecast was developed. The forecast contained a combination of three major attributes of hurricanes. The attributes of hurricanes that were used were: projected hurricane path (offset the destination but still within the cone of uncertainty), projected intensity at landfall (category 1) and time to the destination (48 hours). The choice of the forecast was based on the assumption that under such condition, mandatory evacuation for tourists was less likely to be issued, thus it gave greater freedom for tourists to decide as to leave the destination or not. Figure 4-2 presents the hurricane forecast. Risk appraisal was measured by asking respondents to evaluate the forecast and respond to one question "How risky do you think it would be for you to stay in your current location for a given condition?" (1= *not at all risky* to 5= *extremely risky*). Evacuation decision was measured by a single question "How likely are you to evacuate/leave your current location at this time and under this situation?" (1= *very unlikely* to 5= *very likely*)?

Data Analysis

The Statistic Package for Social Science (PASW 18) was used for descriptive and inferential analysis to provide respondents' profiles, correlations and Cronbach's reliability. Internal consistency and construct validity was conducted by applying the Cronbach's α test and Principle component analysis, individually. Structural Equation Modeling (SEM), using the MPlus computer program (Muthen & Muthen, 2008-2010),

was utilized to test the causal relationships in the proposed model. By using SEM, significant constructs could be modeled, while taking into consideration the measurement error of the indicators. Additionally, the SEM considers unknown reliability of the measures and ranks the measures in terms of their significance (Byrne, 2012).

Results

Respondents' Profile

The respondents for this Chapter were those who responded to Scenario 4 in Chapter 2. Scenario 4 (Category 1, offset destination and 48 hours to the destination) was the baseline scenario. The use of the baseline scenario allowed greatest freedom for respondents to state their voluntary evacuation decisions. Out of 533 completed questionnaires that were used in Chapter two, 335 respondents responded to Scenario 4, and therefore were used in this Chapter. Of the 335 completed and usable questionnaires, females represented 56.3% of the sample. Among respondents, the mean age was 44 years, with an average annual income between \$50,000 - \$74,999. Those who had a bachelor's degree comprised 49% of the sample. Those who were visiting the destination for the first time represented 36.4%. More than half of the sample was white Caucasian (66%). Those who were from other states comprised 45.4%, while international visitors represented 39.1 %.

Internal Consistency and Construct Validity

As in Chapter 4 the Ten Item Personality Inventory (TIPI) scale was used to measure personality construct, the focus on content validity was emphasized rather than the internal consistency between items (Gosling et al. 2003). The internal consistency of each personality dimension was relatively low as two items only measured each dimension. The low internal consistency was parallel with other

research that employed TIPI scale (Gosling et al., 2003). Specifically, the Cronbach's alphas for extraversion, agreeableness, conscientiousness, emotional stability and openness to new experiences were marginally low with .69, .68, .65, .70, and .60. Table 4-1 presents the means, standard deviations and Cronbach's alphas for TIPI scales. A composite score was calculated to represent each personality dimension.

Factor analysis with principal component Varimax rotation method was employed to test the dimension underlying risk belief, involvement, and channel belief and information search. This procedure was used to avoid the need of having a second order Confirmatory Factor Analysis in the subsequent Structural Equation Modeling procedure (Kline, 2011). For risk belief, one factor emerged explaining 79.36 percent of the variance with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .83, which was higher than the recommended value of .60 (Hair et al., 2010). The Bartlett's test of sphericity was 937.341 ($p = .00$) with Cronbach's alpha of the total scale equal to .91. Applying a similar procedure, the involvement yielded one factor with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .75, which was higher than the recommended value of .60. The chi-square of Bartlett's test of sphericity was 674.883 ($p = .00$).

The channel belief yielded four factors with a eigenvalue of more than one with the KMO's measure of sampling adequacy of .80, the Bartlett's test of sphericity's chi-square of 1471.173 ($p = .00$). Likewise two factors emerged from information search, active seeking and passive processing, with a KMO value of .79 and Bartlett's chi-square of 1466.944 ($p = .00$). There were no cross loadings found above .50, indicating good discriminant validity. Table 4-2 presents the result of component analysis for risk

belief, involvement, channel belief and information search. A composite score was calculated based on the correct responses to represent respondent's knowledge regarding hurricanes. The mean for the composite score was 1.21 with a range of possible scores from 1 to 4. The standard deviation was .94 suggesting that the respondents have a lack of essential knowledge about hurricanes.

Measurement Model

Prior to testing the proposed model using a structural equation modeling, a Confirmatory Factor Analysis (CFA) was employed on variables that were used to establish evidence that the indicator variables were measuring the underlying constructs of interest as well as the test the fitness of the model to the data. The CFA used the procedures in the MPlus program. The model was estimated using Weighted Least Square Mean Variance (WLSMV) estimator with theta parameterization as the model contained both continuous and categorical data. As risk belief and involvement only had one factor that was calculated from multiple items, to take into account possible measurement errors of factors, measurement error variance was inputted in the measurement model. Measurement error variance was computed by $1-\alpha$. Based on the coefficient alpha of both factors (.91), the measurement error variances were set to .09 respectively. A series of modification based on modification indices were employed to increase the fit of the model. Table 4-3 presents the mean, standard deviation and zero order correlation of the variables.

The final measurement model adequately fit the data with χ^2 of model fit = 138.59, degree of freedom of 87 (.000). Although this statistic was significant, it is widely believed that the chi-square value should be used as a guide rather than an absolute

index of fit due to its sensitivity to sample size and the complexity of the model (Anderson & Gerbing, 1982; Hatcher, 1994). Bentler's Comparative Fit Index (CFI) was .96 and Tucker-Lewis Index (TLI) was .94. The Root Mean Square Error of Approximation (RMSEA) was .04. Although the TLI value was lower than the current cutting value of .95, it was still above the traditional cutting value of .90, indicating an adequate fit. Similarly the RMSEA value was also below .06, suggesting the model was adequately fit the data. Standardized factor loadings for indicator variables were all significant ($p < .000$). Table 4-4 presents the result of standardized factor loadings for all observed variables.

The R-square of indicators to constructs was also measured. The R-square value represents the percentage of variance explained by the factor it is designed to measure (Hatcher, 1994). The R-square value for risk belief indicator was .91. The R-square value for involvement indicator was .91. The R-square value of personality indicators ranged from .13 to .49. The R-square values for channel belief indicators ranged from .11 to .37. The R-square values for information search indicators were .22 and .49. The R-square value for past experience, knowledge, risk appraisal and evacuation decision was 1 as their measurement error variances were set to zero respectively.

Structural Equation Model

There were two exogenous latent variables in the model, past experience and personality. There were seven endogenous latent variables: involvement, risk belief, channel belief, information search, risk appraisal and evacuation decision. Similar to the measurement model, the structural equation model was estimated using WLSMV estimator by embedding the prespecified paths to the measurement model. Improvements to the model were achieved by making several modifications suggested

by the modification indices, including allowing the error variances from personality indicators to correlate with each other.

The goodness of fit indices of the final SEM model indicated that the model had an adequate fit. The model fit χ^2 was 167.64 with 103 degrees of freedom ($p < .000$). The Bentler's Comparative Fit Index (CFI) was .95, the Tucker-Lewis (TLI) was .93 and RMSEA was .04. Although the TLI value was less than the current cutting point, the model was deemed adequate as the value of TLI was still higher than the traditional cutting value of .90 and that other fit indices CFI was higher than its cutting value. Likewise the RMSEA was small enough less than the cutting value of .06. Figure 4-3 presents the final model of tourist's evacuation decision.

Findings of the Constructs Relationships

By examining the standardized path coefficients among variables, most of the hypotheses were upheld. The model supported Hypothesis 2, that past experience with hurricane impacts positively affected the level of hurricane knowledge ($\gamma = .33$, $p < .01$). Likewise, Hypothesis 3 was upheld, with past experience with hurricane impacts negatively affected risk belief regarding hurricanes ($\gamma = -.54$, $p < .01$). Hypothesis 5 was also affirmed, with risk belief regarding hurricanes found to positively affect information search with regard to hurricane evacuation ($\beta = .33$, $p < .01$). Hypothesis 6 was upheld, with risk belief regarding hurricanes positively affected risk appraisal ($\beta = .13$, $p < .05$). In addition, hurricane knowledge negatively affected information search ($\beta = -.31$, $p < .01$) and therefore Hypothesis 8 was upheld.

Hypotheses 9, 10 and 11 were also upheld with level of hurricanes negatively affected channel belief ($\beta = -.17$, $p < .05$), personality positively affected information

search ($\gamma = .46$, $p < .01$) and channel belief about hurricane source positively affected information search ($\beta = .30$, $p < .01$). Additionally, hypotheses 12, 13 and 14 were also upheld. Channel belief about hurricane information source positively affected risk appraisal regarding hurricane condition ($\beta = .13$, $p < .05$), information search about hurricane evacuation positively affected risk appraisal of the condition ($\beta = .18$, $p < .05$) and risk appraisal of the condition positively affect evacuation decision ($\beta = .139$, $p < .01$).

The final model, however did not find support for Hypothesis 1, 4 and 7. It was hypothesized that past experience with hurricane impacts would negatively affect information search. The final model indicated that the affect was not significant ($\gamma = -.04$, $p = .70$). The model also indicated that past experience did not significantly affect involvement (Hypothesis 4) and that involvement did not affect knowledge level (Hypothesis 7). This indicated that for the samples of this study, involvement with hurricanes was not an important predictor.

The focus of Chapter 4 is to explain how tourists moved from one stage to another stage leading to their evacuation. To do so, indirect paths were examined regarding the indirect effects of multiple variables in the model in affecting evacuation decision. Table 4-5 presents the multiple paths leading to evacuation decision.

The model indicated that risk belief regarding hurricanes affected risk appraisal regarding hurricane conditions, which in turn affected their evacuation decision ($\beta = .18$). Level of hurricane knowledge was also found to negatively affect evacuation decision through information search to risk appraisal ($\beta = -.08$). The next significant path was from personality to information search to risk appraisal and to evacuation decision ($\beta = .11$).

The next significant paths were from past experience. The first path was from past experience to risk belief to risk appraisal ($\gamma = -.10$). The second path was through knowledge, information search to risk appraisal then to evacuation decision ($\gamma = -.03$). A significant path was also found from channel belief to risk appraisal and then to evacuation decision ($\beta = .19$). The last path was from information search to risk appraisal and to evacuation decision ($\beta = .25$).

Discussion and Implication

The main contribution of this study is the effort to model the process of tourist's evacuation decision-making in the event of hurricanes. The examination of indirect paths among variables in the model leading to evacuation decision-making yields a better picture in understanding evacuation decision-making. The multiple indirect paths leading to evacuation decision suggest that tourist evacuation is a complex matter.

The results of the study provide justifiable evidence that the proposed structural equation model designed to test the relationship among past hurricane impact experience, involvement, hurricane knowledge, risk belief personality, channel belief of information source, information search, risk appraisal of the condition, and evacuation decision is acceptable. As discussed earlier, while in the literature the aforesaid variables have been examined individually in their role in travel related decisions as well as in evacuation studies, a conceptual model and empirical studies relating to causal relationships among these variables have not been examined, especially in predicting tourists' decisions when faced with environmental threats.

Using data generated from the survey of tourists visiting the State of Florida in August- September of 2011, most of the hypotheses were supported. For the tourists in

this study, their past experience with hurricane impacts in the affect their level of hurricane knowledge, which is expected. Having real life experiences with hurricane impacts increases individual levels of hurricane knowledge, which is parallel with other studies such as Griffin, Dunwoody and Neuwirth (1999) and Taylor, Priest, Sisco, Banning and Campbell (2009).

The model, however, finds no support for the effect of past hurricane experience and involvement with hurricanes as well as the effect of involvement on the level of hurricane knowledge as well as the effect of past hurricane experience on information search. These three paths were found to be significant in the final model presented in Chapter 3. Furthermore, the examination of the role of involvement in predicting evacuation decision yields a non-significant association ($\beta = -.00$). Therefore for tourists in this study, the level of involvement with hurricanes (whether it is high or low) does not influence their evacuation decision. One possible explanation was attributed to the sample of the tourists. To predict information search behavior in Chapter 3, the sample comprised all eligible tourists in the sample who responded to all hypothetical hurricane forecasts (scenario 1 – 8). Chapter 4, however, only used a sub-sample of those who responded to scenario 4 (projected category in the destination 1, projected landfall in the destination 48 hours and offset the destination). Scenario 4 was the baseline scenario. Therefore, there is more variability in the full sample than the subsample that was used for Chapter 4. It is possible that the path between past experience with involvement, from involvement to knowledge and from past experience to information search would be more significant when respondents receive a more severe hurricane

advisory. Nonetheless, further study needs to be conducted with a more severe hurricane scenario to confirm this assumption.

Other paths were supported. As predicted, past experience with hurricane impacts significantly affects the risk belief regarding hurricanes. This affect was found to be inversed with tourists who experienced hurricane impacts in the past having been found to be more likely to exhibit less risk belief regarding hurricanes. One possible explanation is that having experiences with the impact of hurricanes builds individual confidence in themselves, gives them a sense of having more control over their life and therefore they feel less prone to external threats, which in turn reduces risk belief regarding hurricanes (Griffin et al., 1998).

Additionally, tourists' experience with past hurricane impacts also affect their evacuation decisions through their risk belief to risk appraisal and their level of knowledge to information search to risk appraisal. This confirms the utility maximization theory with regard to the role of past hurricane experience in predicting evacuation decision (Burton et al., 1993; Viscusi, 1995). In this study such relationships were found to be inversely related. One possible explanation was that individuals tend incorporate their own experience into future behaviors. Johnston and Tversky (1983) found that an individual's response to one risk can transfer to responses to other risks, including the associated preventive behavior. The inverse relationship may be due to the nature of hurricanes that the tourists in the sample experienced in the past. Those who actually evacuated as a result of a past hurricane may appraise the severity of the condition differently than those who have never experienced the hurricane impacts or may have experienced less severe hurricanes. Therefore, the paths from past hurricane

experience to evacuation decision provides empirical evidence that not only do tourists apply their personal hurricane experience in their information search (Lenz, 1984; Jonson & Meischke, 1983) but also their perception of the risk posed by hurricanes (Griffin et al., 1994) and their evaluation of the severity of the condition (Mileti & Darlington, 1997) leading to their decision to voluntary evacuation.

This study also finds supports for the idea that tourists' risk belief regarding hurricanes affects their information search as well as their appraisal of the riskiness of the condition leading to their voluntary evacuation decision. This is also understandable, as tourists who believe that hurricanes expose them to risks beyond their control would find ways to gain control and mitigate the uncertainty, with one possible way being seeking more information. This is parallel with other studies that were conducted by Maser and Weiermaier (1998) or Mileti and Darlington (1997). It is understandable that those with higher risk belief regarding hurricanes would also exhibit higher risk appraisal regarding the condition, and that they are more likely to evacuate for a given scenario. This is because in appraising the actual condition individuals will use their beliefs regarding their perceived controllability of the event. If these individuals believe that a hurricane would expose them to a risk beyond their control and that they were anxious about hurricanes, these individuals will use such beliefs in assessing the condition following the issuance of a hurricane advisory leading to their voluntary evacuation decision.

As predicted, the level of hurricane knowledge negatively affects information search as well as channel belief of hurricane information source, which in turn affects risk appraisal leading to the voluntary evacuation decision. One possible explanation of

such association is that tourists in this study seemed to rely on their own level of knowledge when they receive a hurricane advisory. The reliance on individual knowledge under an environmental threat is also predicted by other researchers such as Alba and Hutchinson (1987) and Brucks (1985).

Likewise, the HSM model explains that an inverse relationship between knowledge information search and channel belief occurs because of the lack of sufficiency of the information. This is attributed to the fact that under hurricane threats, individuals often find themselves in an uncomfortable state when important needs are unmet and motivation can increase under this condition, which results in a more elaborate information search to achieve a desired level of judgmental confidence (Chaiken, Giner-Sorilla & Chen, 1996). In addition, the reliance on personal knowledge becomes obvious, as the hypothetical forecast used in this study was not the most severe one. Therefore, further studies utilizing other more severe hurricane forecasts may deem necessary to test such a relationship.

Correspondingly, level of hurricane knowledge has an inverse relationship with channel belief of hurricane information source. Past studies have noted the importance of trust and credibility in the information source in predicting public responses to that information (Frewer, 1999). The inversed path from knowledge to channel belief suggests that trust and credibility of the information source is critical for hurricane advisory situations where individuals previously held low knowledge about hurricanes. The inversed paths from knowledge to channel belief and information search also suggest that under the hypothetical scenario used for this study, tourists are more likely to assess the information with which they are presented to see if it parallel with the

knowledge they already hold. If it does not then they are more likely to change their opinion regarding information source (Miles & Frewer, 1998; Frewer et al., 1997). Thus, it provides support for the defense-motivated processing as elucidated by the HSM model.

Tourists' personality was found to affect their information search, which in turn affects their risk appraisal leading to their voluntary evacuation. The finding is parallel with studies by Miculincer (1997) and Heinstrom (2003). They found that personality influences the information management that individuals employed, which in turn influenced how the individuals evaluated the severity of the condition leading to their voluntary evacuation.

Channel belief was found to positively affect information search and risk appraisal regarding the condition, which in turn affects their voluntary evacuation decision. Thus tourists' belief regarding the credibility and trustworthiness of the hurricane information source affects their information search regarding hurricane advisory. This is understandable, as individuals tend to seek information from sources based on what they believe about the source. When tourists deem a source to be credible they are more likely to utilize that source in seeking information regarding hurricane advisories. Similarly, their opinions regarding the trustworthiness and credibility of the source also influence the way tourists appraise the riskiness of the condition. This finding is parallel with other studies conducted by Frewer (1999) and Trumbo and McComas (2003). Trumbo and McComas found that perceiving higher credibility for citizen groups directly predicts greater risk appraisal. This study however did not employ post hoc analysis to examine how certain groups of information sources predict tourist's appraisal of the

severity of the condition. Further research is warranted to fully understand the role of tourists channel belief in predicting the risk appraisal.

Information search was found to positively affect risk appraisal, which affects their evacuation decision. This is parallel with the Rohrmann (1999) study and other studies in risk information (Burnside et al., 2007; Taylor et al., 2009). This association confirms the power of the society on influencing tourists' evacuation decision as predicted by the utility maximization theory (Burton et al., 1993; Viscusi, 1995). In this study, tourists seek information to guide them in appraising the riskiness and the severity on the condition. In this process they utilize the information they receive as a way to evaluate the condition. Then they will use the output of the appraisal to make a decision as to whether or not to evacuate. The estimated path between risk appraisal and evacuation decision was found to be high, suggesting a high correlation between these two variables, which is also predicted by other studies in risk information (Rodriquez et al., 2004, Eisenman et al., 2007).

The multiple paths through information search to evacuation decision suggest the utility of theory of planned behavior in modeling tourist's evacuation decision. According to Fishbein and Ajzen (1975), attitudes toward performing a behavior are influenced by salient behavioral beliefs that the individuals take into account when deciding how to behave. A behavioral belief relates performance of the behavior with specific outcomes e.g A tourist might believe that the behavior of evacuating from the destination will probably save them from improbable risks when the projected hurricane makes landfall. This tourist weighs each behavioral belief amidst a set of others that the individual also holds such as extra expenses associated with evacuating from the destination such as

purchasing a new flight to form the basis for an attitude toward engaging in the behavior. Such beliefs are formed through personal experience or from processing information from several sources. Lutz (1977) and Griffin, Dunwoody and Neuwirth (1999) argued that information search could alter the strength and saliency of a belief by altering its evaluation. Therefore, those who actively seek information about hurricane evacuation and process the messages more intensely will bring more behavioral beliefs (e.g weight more costs and more benefits) to their judgment about performing the behavior that leads to a more stable and salient behavior.

Based on the aforesaid findings, several practical implications are recommended. First, the goal of tourist evacuation communication is to assist tourists in making their evacuation decisions. This includes providing clear messages with easy to understand fonts and sentences and plain language with no technical terms. Multiple transmission formats such as social media are also encouraged as the use of social media such as twitter may work for communicating hurricane advisory to tourists. Nonetheless, as social media is not traditionally designed to communicate risk information to general publics, an exploration of concise affective messages is needed. While social media may work better for domestic tourists, it may not work well for international tourists who may turn off their smart phones in order to avoid international roaming costs, although the current version of smart phone has a flight mode setting that still allows internet connectivity through WIFI without a concern over international roaming costs. Nonetheless, alternative methods such as mobilizing hotel staff to communicate advisories may be more effective. Therefore, hurricane preparedness training for hotel staff is needed to ensure that they know what to communicate and how to communicate

the hurricane advisory to their guests effectively. Additionally tourists in this study demonstrated a lack of hurricane knowledge. This highlights the value of education of common hurricane terms such as hurricane category 1 to 5 (Saffir-Simpson Hurricane Categories) to tourists and other transient groups as an important aspect of hurricane communication policy. Education provided by local Convention and Visitor Bureaus in collaboration with Emergency planners and policy makers can increase tourists knowledge that would help them in their decision making process.

Likewise, as the study found the that channel belief affects evacuation decision and that tourists value information sources differently, emergency planners needs to partner with organizations that are part of tourist networks such as local CVBs, hotels, travel agents, transportations and tour operators that may better communicate new information to tourists who value information received from this networks. Lastly, to better assist tourists in their decision making process, information regarding refund policy, price gouging policy, evacuation routes and their alternatives would also suggested.

Concluding Remarks

The study analyzes the determinants of hurricane evacuation decisions made by tourists visiting Florida. Chapter 4 contributes to the literature by modeling several variables that normally examined individually. Using structural equation modeling, the relationships among variables in predicting voluntary evacuation decision of tourists become clearer. The findings suggest that tourists' voluntary evacuation decision making is indeed a complex issues as a result of an association among several variables including past experience with hurricane impacts, level of knowledge, risk

belief regarding hurricanes, personality, channel belief, information search and risk appraisal.

The limitation of this study was attributed to three areas. First, this study use Category 1 hurricane to model tourist evacuation decision. Therefore, unlike what is predicted, the role of involvement in predicting evacuation decision is diminished. Second, the model is tested in Florida, a state that is considered to have better hurricane information mechanisms for tourists than other states. Therefore, it is recommended that future studies should try to replicate the study in other settings in order to evaluate the extent of the association among variables. Third, this study uses psychometric measures only. Several variables that affect evacuation decision are not psychometric in nature, and therefore beyond the scope of the model. It is believed that there are other variables that also contribute to the evacuation decisions such as where, when and how tourist first receives the hurricane evacuation information. Thus further research should try to incorporate that variables including tourists' expectation on potential impact of a storm in their decision-making to better understand tourist evacuation decision process.

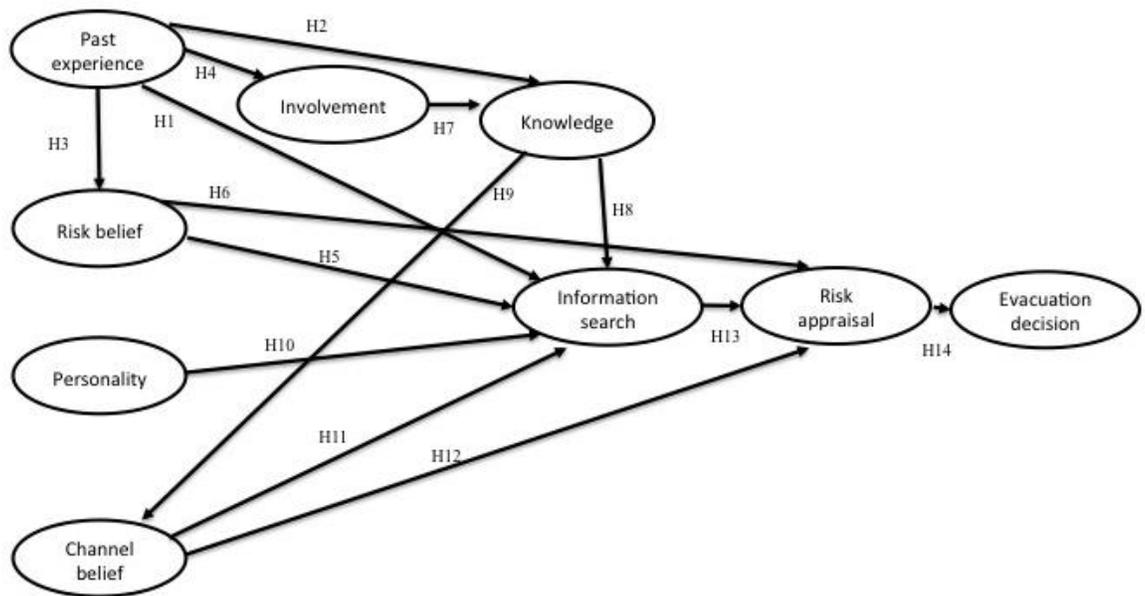


Figure 4-1. Theoretical model



Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane within your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure 4-2. Hypothetical hurricane forecast (Orlando)

Table 4-1. Means, standard deviations and Cronbach's alphas for personality construct

TIPI Items	Mean	Standard Deviation	Cronbach Alpha
Extraversion			.69
Extraverted, enthusiastic	3.76	1.07	
Reserved, quiet (R)	3.46	1.18	
Agreeableness			.68
Critical, quarrelsome (R)	3.56	1.19	
Sympathetic, warm	3.95	.96	
Conscientiousness			.65
Dependable, self-disciplined	4.06	1.11	
Disorganized, careless (R)	3.98	1.21	
Emotional Stability			.70
Anxious, easily upset (R)	3.72	1.14	
Calm, emotionally stable	3.79	1.05	
Openness to Experiences			.60
Open to new experiences, complex	4.01	1.10	
Conventional, uncreative (R)	3.68	1.17	

R= Reversed code

Table 4-2. Principal component analyses of risk belief, involvement, channel belief and information search

Scale item	Factor Loading	Eigenvalue	Variance explained	Cronbach's Alpha
Risk Belief		3.17	79.36	.91
a) A hurricane exposes me to risk beyond my control.	.90			
b) I get nervous when there is discussion about approaching hurricanes.	.91			
c) I avoid thinking about hurricanes.	.89			
d) I know what I should do if a hurricane occurs during my stay in the destination. (R)	.86			
Involvement		2.54	84.75	.91
a) Interest of hurricane topics	.93			
b) Importance of hurricane topics personally	.92			
c) Curiosity about hurricane topics	.91			
Channel Belief				
<i>Channel Belief 1</i>		4.26	32.76	.79
a) TV	.84			
b) Radio	.78			
c) Weather Channel	.75			
d) Newspaper	.57			
<i>Channel Belief 2</i>		2.11	16.23	.74
a) Social clubs	.60			
b) Local tourism office	.65			
c) Social Networks	.60			
d) Hotel Staff	.74			
e) Other tourists	.66			
<i>Channel Belief 3</i>		1.14	8.73	.78
a) Local authorities	.80			
b) National Hurricane Center	.83			
<i>Channel Belief 4</i>		1.04	8.01	.67
a) Family	.81			
b) Locals	.67			
Information search				
<i>Active Information Seeking</i>		4.29	33	.80
a) Family, friends, relatives	.55			
b) Locals	.63			
c) Other tourists	.47			
d) Local tourism office	.69			
e) Local authority	.55			
f) Social network	.56			
g) Hotel staff	.70			
h) Social clubs	.55			
<i>Passive Information processing</i>		2.14	18.48	.80
a) TV stations	.71			
b) Weather channel	.81			
c) Radio stations	.86			
d) Newspaper	.73			
e) National Hurricane Center	.71			

Table 4-3. Means, standard deviation and zero-ordered correlation of the variables

Variables	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.
Past experience	.30	.46								
Extraversion	3.63	.83	-.04							
Agreeableness	3.67	.77	-.10	.24**						
Consciousness	3.67	.83	-.12*	.18**	.32**					
Openness	3.54	.90	-.14**	.32**	.33**	.33**				
Emotion Stability	3.80	.79	-.07	.21**	.39**	.23**	.30**			
Involvement	2.72	1.13	.10	-.02	-.11*	-.03	-.07	-.10		
Channel Belief 1	4.08	.73	-.02	.01	-.05	-.07	.01	-.09	-.03	
Channel Belief 2	2.72	1.13	.03	.03	-.05	-.01	.01	-.10	-.05	.26**
Channel Belief 3	4.38	.59	.03	-.02	.01	.00	-.02	-.02	-.10	.31**
Channel Belief 4	3.17	.85	-.09	.04	-.07	-.10	-.04	-.01	-.02	.16**
Knowledge	1.21	.94	.30**	-.03	.08	.01	-.03	.16**	.06	-.06
Risk Belief	3.35	.99	-.49**	-.10	-.07	-.06	-.03	-.12*	.01	-.01
Active Seeking	3.01	.77	-.39**	.11*	.18**	.14*	.17**	.03	-.04	.12*
Passive Processing	4.08	.84	-.09	.17**	.24**	.17**	.19**	.01	.08	.11*
Risk Appraisal	3.41	1.25	-.14*	-.05	-.14*	-.08	.09	-.16**	-.00	.12*
Evacuation Decision	2.48	1.18	-.17**	.04	-.22**	-.13*	.07	-.25**	-.03	.09

** Significant at .001, * significant at .05*

Table 4-3. Continued

Variables	9.	10.	11.	12.	13.	14.	15.	16.	17.
Past experience									
Extraversion									
Agreeableness									
Conscientiousness									
Openness									
Emotion Stability									
Involvement									
Channel Belief 1									
Channel Belief 2									
Channel Belief 3	.17**								
Channel Belief 4	.36**	.21**							
Knowledge	-.10	-.06	-.10						
Risk Belief	.02	.01	.01	-.33**					
Active Seeking	.13*	.07	.15**	-.39**	.28**				
Passive Processing	.15**	.06	-.06	-.17**	.11*	.33**			
Risk Appraisal	.11*	.08	.09	-.09	.16**	.14**	.23**		
Evacuation Decision	.16**	.12*	.22**	-.18**	.30**	.12*	.12*	.77**	

** Significant at .001, * significant at .05*

Table 4-4. Confirmatory factor analysis results

Construct and factor	Standardized Factor Loadings	R-Square
Past experience		
Past hurricane experience	1.0	1.0
Risk Belief		
Risk belief	.95	.91
Involvement		
Hurricane involvement	.96	.91
Knowledge		
Hurricane knowledge	1.0	1.0
Personality		
Extraversion	.37	.13
Agreeableness	.70	.49
Consciousness	.51	.25
Emotional stability	.53	.29
Openness	.51	.25
Channel belief		
Channel belief 1	.39	.15
Channel belief 2	.61	.37
Channel belief 3	.32	.11
Channel belief 4	.54	.29
Information search		
Active	.75	.49
Passive	.47	.22
Risk appraisal		
Risk appraisal	1.0	1.0
Evacuation decision	1.0	1.0

χ^2 test of model fit = 138.593, df =87 (p=.000)
 RMSEA= .04, CFI/TLI= .96, .94, WRMR= .82

Table 4-5. Indirect paths to evacuation decision

Path	γ/β	Sig.
Risk belief > risk appraisal > evacuation decision	.18	.01*
Knowledge > information search > risk appraisal > evacuation decision	-.08	.04*
Personality > information search > risk appraisal > evacuation decision	.11	.04*
Past experience > risk belief > risk appraisal > evacuation decision	-.10	.02*
Past experience > knowledge > information search > risk appraisal > evacuation decision	-.03	.04*
Channel belief > risk appraisal > evacuation decision	.19	.02*
Information search > risk appraisal > evacuation decision	.25	.02*

* <.05

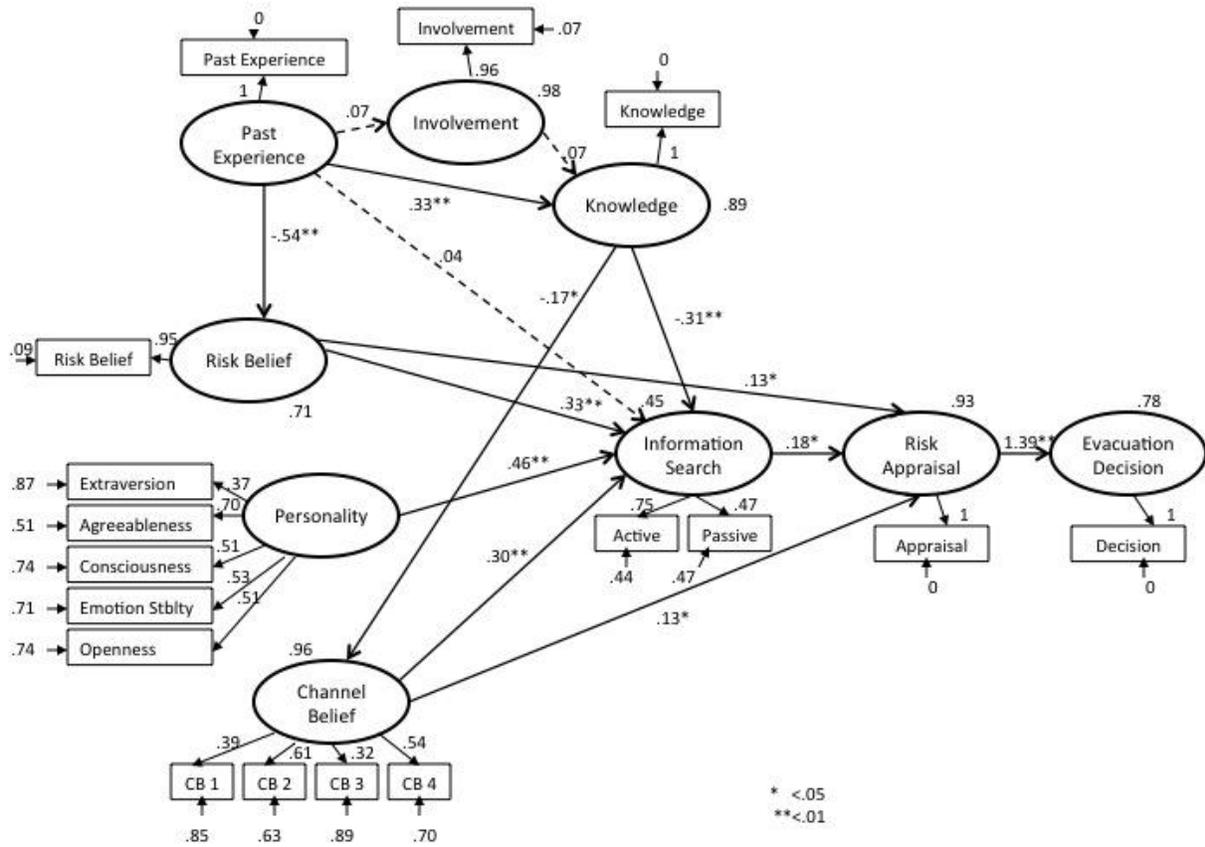


Figure 4-3. Final model of tourist evacuation decision process

CHAPTER 5 CONCLUSION

Chapter 5 presents a summary of major findings from Chapter 2, 3 and 4, general applications of the findings, limitations and recommendation for future study.

Summary of Major Findings

This study suggests that tourist's evacuation decision-making is a very complex process that is influenced by several factors. This study examines effects of several variables in predicting tourist's voluntary evacuation. These variables include individual characteristics, socio-demographics, channel belief information search and risk appraisal. The findings of this study can be summarized as follows:

1. Tourists' risk belief regarding hurricanes positively affects their evacuation decision. This belief also affects the evacuation decision through several intermediaries.
2. Tourists' involvement with hurricanes reduces their evacuation rate. This effect however, diminishes in a low hurricane condition.
3. Tourists with low hurricane knowledge are more likely to seek information regarding hurricane advisory. Those with higher knowledge are more likely to stay in the destination.
4. Past experience with hurricanes positively affects information search but negatively affects hurricane evacuation decision.
5. Personality has a positive effect on information search regarding hurricane advisory and evacuation decision.
6. Tourists' belief of the information source positively affects information search and evacuation decision.
7. Information search positively affects evacuation decision.
8. Risk appraisal positively affects evacuation decision.
9. Tourists in a larger travel party, first timers, with children, air travelers or driver tourists are more likely to evacuate than their counter parts.
10. Tourists who travel with the elderly and rent vehicles in Florida are more likely to stay than their counterparts.

11. Female tourists and older tourists are more likely to evacuate than their counterparts.
12. International tourists and tourists from other states are more likely to leave the destination in the event of a hurricane than those who are from other areas in Florida.

Theoretical Implication

This study exemplifies the utility of the Utility Maximization Under Threat, Heuristic-Systemic Model and the theory of Planned Behaviors in modeling tourist's evacuation decision-making. The first theory, the Utility Maximization Under Threat posits that under environmental threats, individual responses would be determined by prior experience with the hazards, individual wealth, their intrinsic characteristics and their interaction with society. The findings of this study especially on Chapter 2 clearly support the theory. In this study, tourist's past experience with hurricane impacts was found to negatively affect the evacuation decision. Likewise, the wealth was also found to significantly influence the evacuation decision. Having reserved funds that could be accessed for the incidental expenses related to travel interruption was deemed necessary in the event of evacuation, which explained why those with higher income were more likely to evacuate. Likewise, this study also found that several intrinsic characteristics of tourists such as their knowledge and risk belief of hurricane also influence the evacuation decision, which provide support to the utility of maximization under threat theory.

The findings of the study, especially Chapter 3 provide support for the utility of Heuristic-Systemic Model of information search. Parallel with Griffin, Neuwirth and Dunwoody (1995), the path of information search depends on the relevance of the topic and the perceived gap between what people know and what they need to know about

the risks. The findings in Chapter 2 highlight the aforesaid assertion, with those who believe that hurricanes pose a risk beyond their control are more likely to seek more information about hurricane evacuation than those who believe that they were not at risk. Furthermore, those who perceive that they have low knowledge of hurricane were more likely to seek more information about hurricane evacuation than those who perceive that they have higher hurricane knowledge.

The findings on Chapter 4 provide support for the utility of theory of Planned Behaviors, Heuristic-Systemic Model as well as Utility Maximization Under Threat. According to the utility maximization under threat, individual response to environment threat would be affected by their interaction with society. Such interaction refers to the information search behaviors. The multiple significant indirect paths through information search variables leading to evacuation decisions support the aforesaid assertion. Likewise, it also indicates the utility of heuristic systemic model in understanding tourists' evacuation. Furthermore, according to Fishbein and Ajzen (1975), attitudes toward performing a behavior are affected by salient behavioral belief that the individuals take into account when deciding how to behave. Such behavioral beliefs are formed by personal experience or from processing information from several sources. The multiple paths through information search to evacuation decision highlight the importance of information search in the decision-making. The findings therefore exemplify Griffin, Dunwoody and Neuwirth's (1999) assertion that in the context of theory of planned behavior, information search could alter the strength and salience of a belief by altering its evaluation by strengthening the current belief or introducing new beliefs to their judgment about performing the evacuation decision that are more stable.

In addition to providing supports to the aforesaid theories, this study also contributes to the literature, especially tourism by employing a stated preference survey method in data collection. While the method has been used in other areas, the method is rarely been used in the tourism context, especially in travel decision-making. The use of the stated preference surveys provides an alternative mechanism to elicit respondent's preferences, as well as allow comparisons among hypothetical scenarios that affect behavioral outcomes the most. Consequently, the utilization of stated preference survey in examining decision-making process in tourism related contexts is highly recommended.

Policy Implementation

While some of the variables cannot be manipulated, the findings of this study provide several ways to emergency planners and Destination Management Organizations (DMO) to improve the hurricane communication messages targeted to tourists. This section presents several recommendations to improve the effectiveness of hurricane advisory messages to tourists.

The study found the importance of information search in influencing evacuation decision through risk appraisal. Thus, the goal of hurricane information messages is to assist tourists in their risk management effort, especially in appraising the potential risks. To assist tourists in appraising the risks, several improvements on hurricane information messages can be made. With respect to the content of the messages, in order to improve the effectiveness of the messages several improvements can be taken. Due to the background of tourists, who are not from the destinations, the design of messages could be improved. For instance, as in this study age was found to be a significant predictor of evacuation decision, with older tourists were more likely to leave

the destination, choosing age-appropriate warning characteristics by tailoring the physical characteristics of messages to compensate for age-related changes in perception.

For messages that are targeted to elderly, the message that would be presented visually, typographical characteristics of text can be enhanced. For instance by the use of sanserif fonts such as Helvetica which has been found to increase text legibility for elderly (Hartley, 1999). Likewise, for auditory messages, they need to be broadcast at frequencies that are not affected by noise-induced loss so that elderly can comprehend the message better. In addition, sometimes fast moving text-crawlers on the television screen may be subject to glare and use small text size, international tourists who may not speak English may find it difficult to comprehend the content of the message. Slower movement and the use of larger fonts may be needed to aid international tourists to perceive the messages.

Another approach to improving tourists' text comprehension for written warnings is to increase the readability by making the text message simple, direct and easy to understand. To do so, Mileti and Sorensen (1995) suggests the use of specific pieces of information anchors; hazard, location, time and guidance. Therefore, messages directed to tourists need to have a simplified sentence structures with non-technical jargons. The content of the message need to be written to lessen the need for tourists for inferential processing.

When new information received, individuals often interpret it in the context of their preexisting knowledge. As found in this study, when individuals are presented hurricane advisory messages, they will likely tap into their past experience or their knowledge with

hurricanes and other hazards and react based on the outcomes of those actions. Therefore, warning messages should be presented in a fashion that is consistent with what they already know. By doing so, the credibility of the warning message will also be amended. To assess of what tourists already know about hurricane risk and evacuation procedures, efforts should be made to regularly review the effectiveness of tourists hurricane awareness programs. Because much of tourists' knowledge about hurricanes, especially repeat tourists will be determined by exposures to general information materials such as pamphlets that are encountered during a hurricane season, it is pivotal to determine what information is most comprehensible and memorable. To assess tourists' hurricane knowledge, Emergency planners can collaborate with DMOs to conduct surveys, structured interviews or focus groups. One advantage of such programs is a better understanding of how tourists' conceptualize hurricane risks. If for instance tourists have misconceptions regarding the complexity of refund policies associated with hotels or flights, the hurricane awareness and warnings could be redesigned to focus and eradicate these misunderstandings.

With regard to warning dissemination, multiple channels are also recommended. This may include but not limited to brochures or pamphlets. Based on the mean scores of what the respondents used in the event of evacuation, the top six information sources are Weather channel (4.50), TV (4.40), National Hurricane Center (4.25), Local Authority (4.17), radio (3.78) and hotel staff (3.56). Maximizing the use of these sources is recommended. Another form of evacuation information communication that has gained favor with emergency planners is the Internet with its social media. In this study the mean of social media usage is 2.65. Several State Emergency agencies maintain

websites to keep publics informed of evacuation routes, road conditions and weather information. These Internet information systems have been focused primarily for use prior to evacuation because of the limited availability of wireless Internet among general publics. Nonetheless, with recent development in smart phones and wireless technology there is no doubt that wireless Internet technologies will allow them to be utilized en-route. In Florida, the Division of Emergency Management website also provides links to hotels in Florida, Alabama and Georgia to facilitate booking hotel reservations. In addition to such information, the website may also provide other information such as shelter locations, alternative evacuation routes, congestion, incident information and services such as gas stations, rest area locations and so forth.

Recently the use of social media such as tweeters in communicating hurricane advisory received a significant attention. Hurricane Irene in 2011 that hit New York City, Washington D.C and other cities in east coast of United States provided a good example on how social media (tweeters) became an alternative way to disseminate evacuation orders. When Irene was probable, people began to tweet helpful information about traffics, availability of shelters, and generally respond to their fellow tweets in need as they can. Consequently, connecting with friends and family are tweets away, and the ability to reach out and help someone is also far more personal. Nonetheless, it should be acknowledged that just as social media can magnify the good in humanity, it could also intensify the bad. Beyond that, people also tend to become overwhelmed by information leading to confusion. So there may be a lot of false rumors and outdated information circulating, such as old evacuation routes, places to go for assistance and other data that are not meant to harm or hurt, but could make filtering the information

people should trust a challenge. To date, most emergency agencies and local authorities are aggressively using their social media profiles to communicate quickly about hurricane advisory. DMOs can also team up to encourage tourists to subscribe or pay attention to authorities, DMOs and news agency social posts during their stay in the destinations. Therefore, although the respondents for this study indicate that they have a low social network usage in the event of hurricane evacuation, this area is still worth of further research.

In addition, for the lodging industry having a comprehensive hurricane plan is needed. Such plan needs to ensure the roles of each personnel in the event of hurricane evacuation. DMOs and lodging industry can team up to provide trainings, workshops and guidelines so that hotel staff knows what to communicate and how to communicate hurricane evacuation to their guests. DMOs also need to communicate and enforce the price gauging law and to ensure that hotels have reasonable refund policies.

Limitations and Future Research

It is important to note that while generalizations of the findings are warranted; the findings of this study should be interpreted with caution due to the several limitations. First, the data for this study was collected a week following hurricane Irene that prompted evacuation orders in New York City, Washington D.C. and several cities in Northeast United States. During this time publics were bombarded with information about hurricane Irene through multiple channels, this situation might increase the risk perception over hurricanes that in the end affect the way the respondents responded to the hypothetical hurricane scenarios in this study, this might also explained that the findings on international tourists and knowledge were inverted from the preliminary

study that was conducted in 2009. Second, the fact that this study used hypothetical hurricane scenarios to elicit tourist's evacuation decision may not reflect the actual behaviors. Third, the data were collected during hurricane season, in which people tends to be cognitively aware of hurricanes. Those with low risk belief might decide not to travel to Florida and therefore might affect the result of the study. Fourth, data for this study were collected in Florida that was considered to have a good tourist's hurricane evacuation mechanism. This perception might somehow affect the way the respondents perceived hurricane risk in Florida. Fifth, just like other studies utilizing cross-sectional data, the issue of causality might be a concern. While the findings of the study provide supports causal relationships among variables based on the theoretical framework, and that the use of SEM to model the causal relationship was supported, the fact that the study use a cross sectional data to model the casual relationship among variables in the model became limitation of this study.

To address the limitations of this study several thematic areas are suggested for future research:

Area 1: Samples and population. The samples of this study were tourists who were currently at destinations. As tourists are diverse groups, it is pivotal to a have a closer look at specific group of tourists based on their demographic and psychographic traits. Closer examination on each segment may help to reveal different attitudes toward hurricane risks leading to their evacuation behaviors. For instance, tourists with disability or those who travel with their pets. Additionally, as tourists are only one example of transient population, further examination of other vulnerable transient populations such as those who in the destination for non-leisure purpose, is also

recommended. Another possible study is how the length of stay in the destination affects evacuation decision. Those who have just arrived in the destination and those who have been in the destination several days may interpret the risks differently leading to different evacuation behaviors.

The findings on Chapter 2 did not find support on the influence of race and ethnicity on evacuation decision. As the population of this study was tourists that comprised International and domestic tourists, it may be more meaningful to explain the demography of tourists using their place of residency rather than race and ethnicity. Further study needs to be conducted to see the effect of race and ethnicity on domestic tourists only.

Area 2: Site of data collection. This study was conducted in Florida where has been commonly known to have a better hurricane risk communication to visitors compared to other states. As indicated earlier, such perception may alleviate the perception of risks for tourists visiting Florida that might affect the result of this study. Therefore future study needs to be replicated in other destinations such as Louisiana, Texas, Mississippi and other states in the eastern seaboard to validate the results. Likewise, as this study was conducted during hurricane season, and therefore might self-select participants, with those who exhibit a high perception of risk might already have decided to avoid Florida, and therefore were not part of the sample for this study. Future study therefore needs to be conducted during a non-hurricane season to capture these groups. Likewise, a longitudinal study needs to be conducted to test the casual relationship among variables in the model to create a more stable model of tourist's evacuation decision.

Area 3: Measurements. While a careful consideration has been taken to ensure the validity and reliability of the measurements used in this study, further refinements are recommended. For example the uses of credibility scale (Trumbo & McComas, 2003) to measure credibility of information sources. In addition, creating a better measurement items to measure the level of hurricane knowledge is also needed. The influence of knowledge in evacuation decision was inverted from the preliminary study in 2009 that found positive relationship. While a possible explanation was associated with the time frame of data collection, that was a week following hurricane Irene, future study is needed to retest the effect of hurricane knowledge to evacuation decision.

Likewise, for research that is intended to be analyzed using Structural Equation Modeling Procedures, latent constructs are recommended to be measured using multiple items (Kline, 2011). A few constructs on this study were measured using a single item scale (e.g. past experience, risk perception, evacuation decision), the use of a single item scale in the SEM without imposing constraints often leads to a non stable model as SEM is intended for testing multi items model. Therefore, alternative scales to measure latent constructs may need to be explored for instance by creating multi items to measure risk perception.

This study utilized the five personality dimensions as items to explain the personality as a latent variable. Further study needs to be conducted to examine the different effects of the five dimensions of personality on evacuation decision. Doing so would help to fully understand the role of personality in evacuation decision.

Likewise, inclusion of other variables that may affect tourists' voluntary evacuation is also recommended. Such variables may include but not limited to likelihood to visit

the destination in the future, purpose of travel and so forth. Additionally, with recent development in the creation and development of new technologies such as social media with their advantages and problems that they may generate, it is time to rethink, re-conceptualize and re-evaluate warning systems and their impact on tourists' individual crisis preparedness and responses.

Finally, there are a variety of issues that emerge with the creation and development of new technology: What are the major advantages and disadvantages of such system, particularly as they relate to communicating extreme weather forecasts, warnings and evacuation to tourists? How effective, accurate and reliable is that technology to disseminate hurricane advisory to tourists? What types of education and trainings has been provided to end-user to enhance their use and management of new technology and therefore minimize inaccuracy or incorrect information? How has this technology increased our resilience as well as our vulnerability to natural or human-induced hazards? Future studies need to take into account the aforesaid questions in order to broaden our understanding regarding hazard communication to tourists and other transient populations.

APPENDIX A QUESTIONNAIRE

Tourist Hurricane Evacuation Survey University of Florida	Date: S.ID: Site/Q.ID:
--	------------------------------

1. Is this your first visit to this destination?
 Yes No
2. In this trip are you travelling with family members?
 Yes No
3. How many persons are in your travel group including your self _____ (persons)?
(if you are travelling alone please skip to question 4)
4. Please indicate the presence of these individuals in your travel group (check all that apply).
 Children (<12 years)
 Age 12 - 18 years
 Elderly
 Person(s) employed in media
 Person(s) with a disability
 Person(s) who have experienced a hurricane first hand
5. What mode of transportation did you use for this trip? (check all that apply)
 Plane Personal vehicle
 Rental vehicle Public transportation
 Taxi Other, please specify _____
6. What type of accommodation are you staying in? (check all that apply)
 Hotel/motel Resort
 Bed and Breakfast Friends/Relatives' home
 Other, please specify _____
7. Please circle the number which best represents the extent to which you agree or disagree with **each pair** of statements, with 1 = *strongly disagree*, to 5 = *strongly agree*.

I see myself as:

a. Extraverted, enthusiastic	1	2	3	4	5
b. Critical, quarrelsome	1	2	3	4	5
c. Dependable, self-disciplined	1	2	3	4	5
d. Anxious, easily upset	1	2	3	4	5
e. Open to new experiences, complex	1	2	3	4	5
f. Reserved, quiet	1	2	3	4	5
g. Sympathetic, warm	1	2	3	4	5
h. Disorganized, careless	1	2	3	4	5
i. Calm, emotionally stable	1	2	3	4	5
j. Conventional, uncreative	1	2	3	4	5

8. Please respond the following statements with **Yes(Y)** or **No(N)**.

a. I have experienced impacts from hurricanes in the past.	Y	N
b. My friends/family have told me that they have experienced impacts from hurricanes in the past.	Y	N

9. Using a scale of 1 to 5 where 1 = *strongly disagree* and 5 = *strongly agree*, please rate the extent to which you feel about the following statements. (circle only one number)

a. A hurricane exposes me to risks beyond my control.	1	2	3	4	5
b. I get nervous when there is discussion about approaching hurricanes.	1	2	3	4	5
c. I avoid thinking about hurricanes.	1	2	3	4	5
d. I know what I should do if a hurricane occurs during my stay in the destination.	1	2	3	4	5

10. Using a scale 1 to 5 with 1 = *not at all* and 5 = *extremely*, please rate the following statements. (circle only one number)

a. Your interest of hurricane topics	1	2	3	4	5
b. The importance of hurricane topics for you personally	1	2	3	4	5
c. Your curiosity about hurricane topics	1	2	3	4	5

11. Please respond to the following statements with **True(T)**, **False(F)** or **Don't Know(DK)**. (circle only one)

a. A hurricane watch means a hurricane could hit within 24 hours.	T	F	DK
b. Hurricane categories (1 to 5) are based on wind speed only.	T	F	DK
c. Hurricane season runs from June to October.	T	F	DK
d. At 50 mph (80 km/hr) wind speed, a tropical storm becomes a hurricane.	T	F	DK

12. Using a scale of 1 to 5 with 1= *not credible at all* and 5= *very credible*, please rate the level of credibility of each of the following channels with regard to hurricanes information. (circle only one number)

Family, friends, relatives	1	2	3	4	5
TV stations	1	2	3	4	5
Social clubs	1	2	3	4	5
Local tourism office	1	2	3	4	5
Radio stations	1	2	3	4	5
Social network sites	1	2	3	4	5
Locals	1	2	3	4	5
Weather channel	1	2	3	4	5
Local authority	1	2	3	4	5
Newspaper	1	2	3	4	5
National Hurricane Center	1	2	3	4	5
Hotel staff	1	2	3	4	5
Other tourists	1	2	3	4	5

13. Do you have friends or relatives in your current destination?
 Yes No

14. You are presented with four hurricane forecasts. After reviewing each forecast, answer the following questions:

- A) How risky do you think it would be for you to stay in your current location (1= *not risky at all* to 5= *Extremely risky*)?
- B) How likely are you to evacuate/leave your current location at this time and under this situation? (1= *very unlikely* to 5= *very likely*)?
- C) If you decided to evacuate, where would you most likely go for each given scenario?
 1 = another destination in Florida
 2 = another destination outside Florida

Scenario ID*	Question A (1 to 5)					Question B (1 to 5)					Question C (1 or 2)	
	1	2	3	4	5	1	2	3	4	5	1	2

*Clearly enter the Scenario ID (number) indicated on the top right corner of the picture.

15. Who do you **TURN** to for information in the event of hurricane evacuation while you are vacationing in

the destination? (1= *never*, 3= *sometimes*, 5= *always*) (circle only one number)

Family, friends, relatives	1	2	3	4	5
Locals	1	2	3	4	5
Other tourists	1	2	3	4	5
Local tourism office	1	2	3	4	5
Local authority	1	2	3	4	5
Social network sites	1	2	3	4	5
Hotel staff	1	2	3	4	5
Social clubs	1	2	3	4	5
Other:	1	2	3	4	5

16. Where do you **SEEK** information in the event of hurricane evacuation while you are vacationing in the destination (1= *never*, 3= *sometimes*, 5= *always*)? (circle only one number)

TV stations	1	2	3	4	5
Weather channel	1	2	3	4	5
Radio stations	1	2	3	4	5
Newspaper	1	2	3	4	5
National Hurricane Center	1	2	3	4	5
Other:	1	2	3	4	5

17. Are you? Male Female

18. In what year were you born? _____

19. What is the highest level of education you have completed?

- High school Master or Higher
 Bachelor degree Other

20. What statement best describes your total 2010 annual household income (from all sources and before taxes) in US \$2010?

- Less than \$24,000 \$75,000 - \$99,999
 \$24,000 - \$34,999 \$100,000 - \$124,999
 \$35,000 - \$49,999 \$125,000 and above
 \$50,000 - \$74,999

21. Do you consider yourself to be?

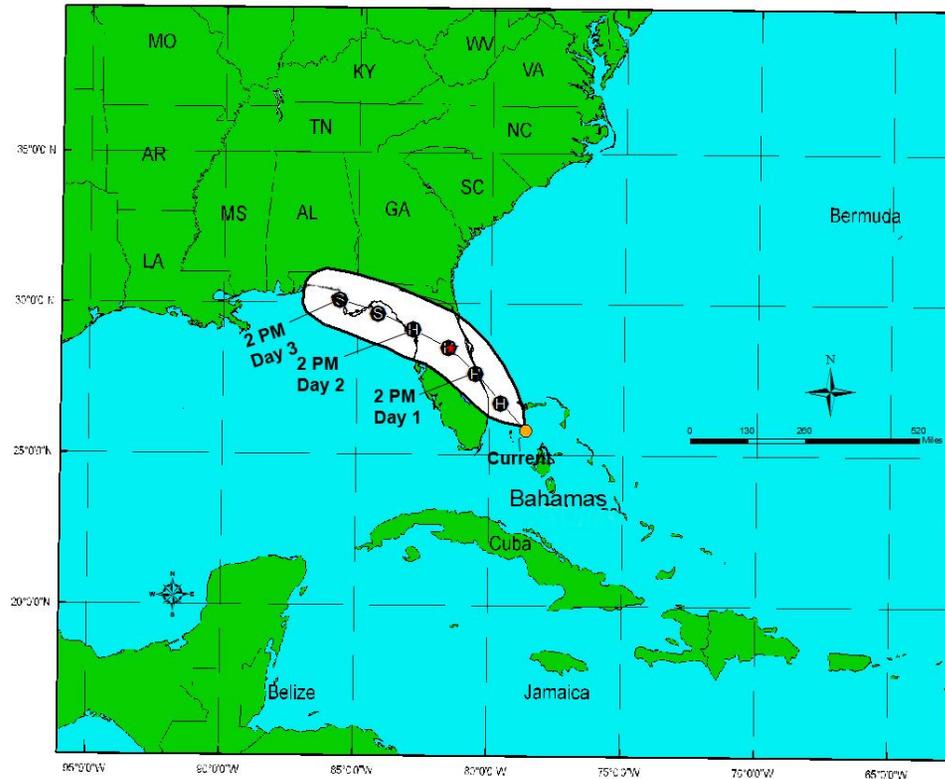
- Caucasian Pacific Islander
 African American Native American
 Hispanic Multi-racial/ multi race
 Asian Other

22. What is the zip code of your permanent residence (US RESIDENTS ONLY)? _____

23. What is your country of permanent residence (INTERNATIONAL RESIDENTS ONLY)? _____

Thank you for taking the time to complete this survey. Your assistance in providing information is very much appreciated. Your responses will help us better understand tourists' evacuation decision in the event of a hurricane. If you need more information about this study please contact: Ignatius Cahyanto, M.S. or Lori Pennington-Gray, PhD. Tourism Crisis Management Institute, University of Florida, Gainesville, FL 32611-8208; (352) 392 4042, ignatius@hnp.ufl.edu/penngray@hnp.ufl.edu

APPENDIX B
HYPOTHETICAL HURRICANE FORECASTS FOR ORLANDO

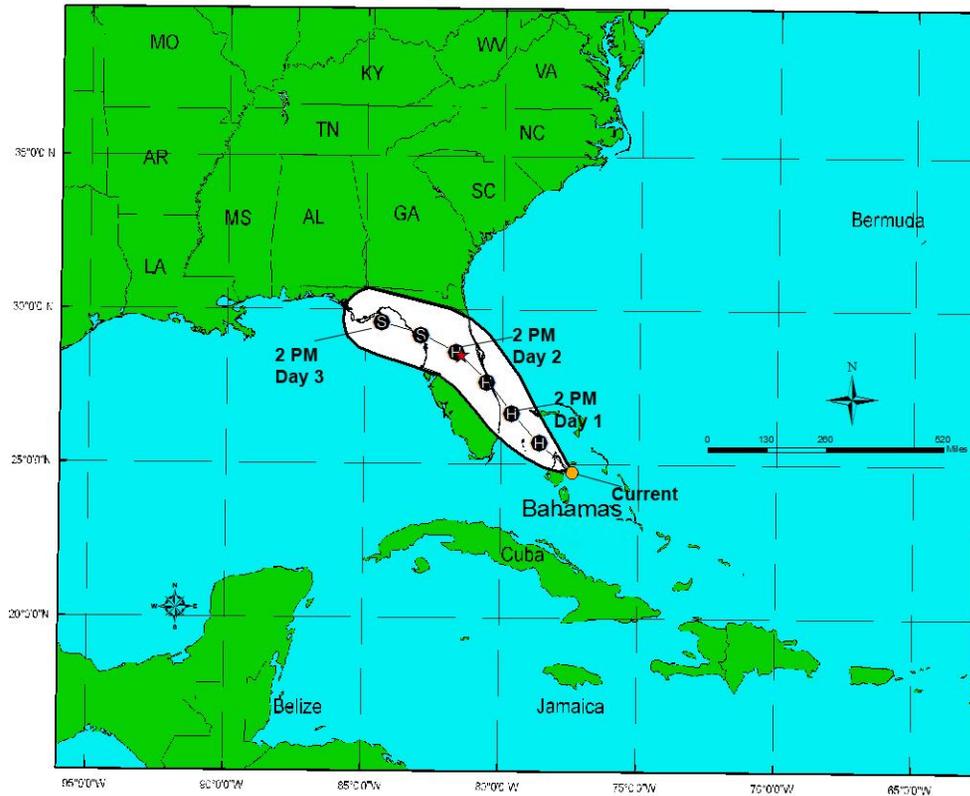


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane at your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure B-1. Hypothetical hurricane forecast Orlando 1

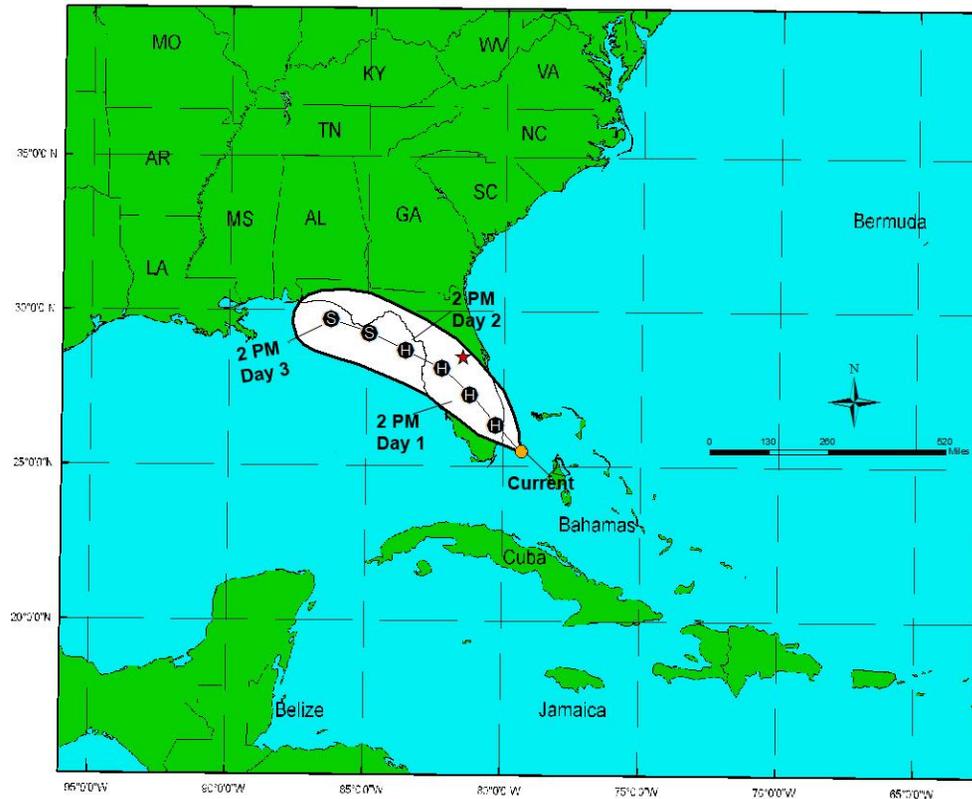


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane at your location.

- Sustained winds 74-95 mph or 119-153 km/hr

Figure B-2. Hypothetical hurricane forecast Orlando 2



Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane within your location.

*Sustained winds 74-95 mph or 119-153 km/hr

Figure B-3. Hypothetical hurricane forecast Orlando 3

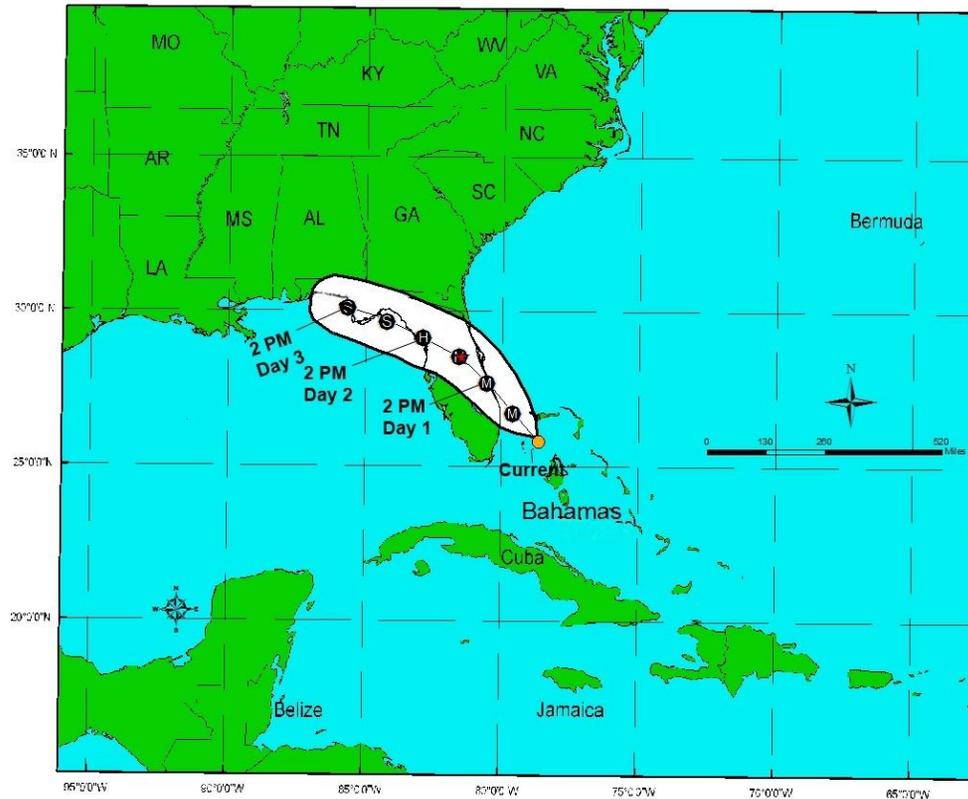


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane within your location.

*Sustained winds 74-95 mph or 119-153 km/hr

Figure B-4. Hypothetical hurricane forecast Orlando 4

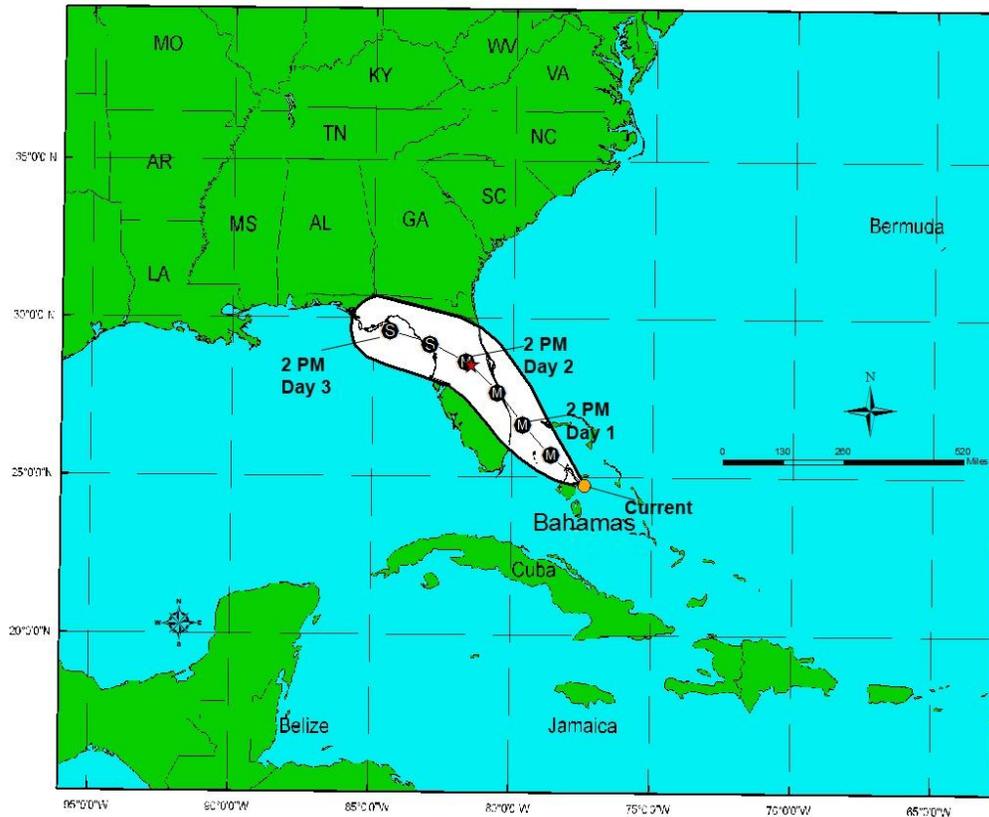


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane at your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure B-5. Hypothetical hurricane forecast Orlando 5

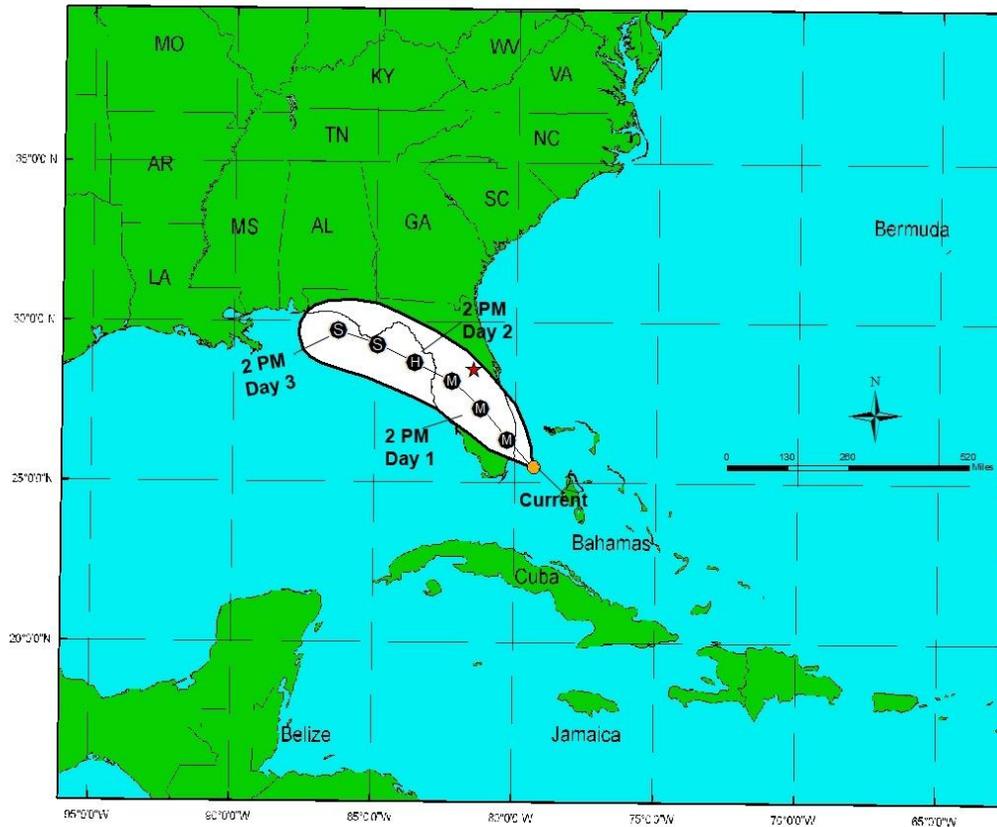


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location.
This is expected to be a **Category 4*** hurricane at your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure B-6. Hypothetical hurricane forecast Orlando 6



Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane within your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure B-7. Hypothetical hurricane forecast Orlando 7



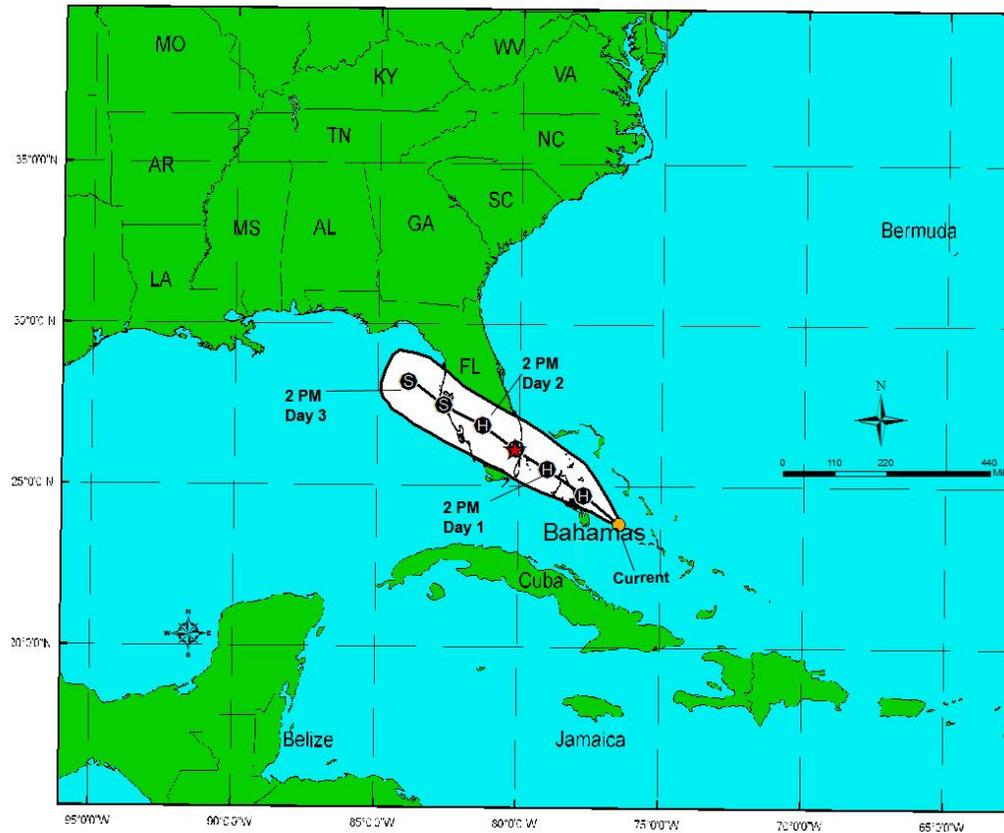
Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane within your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure B-8. Hypothetical hurricane forecast Orlando 8

APPENDIX C
HYPOTHETICAL HURRICANE FORECASTS FOR FORT LAUDERDALE BEACH

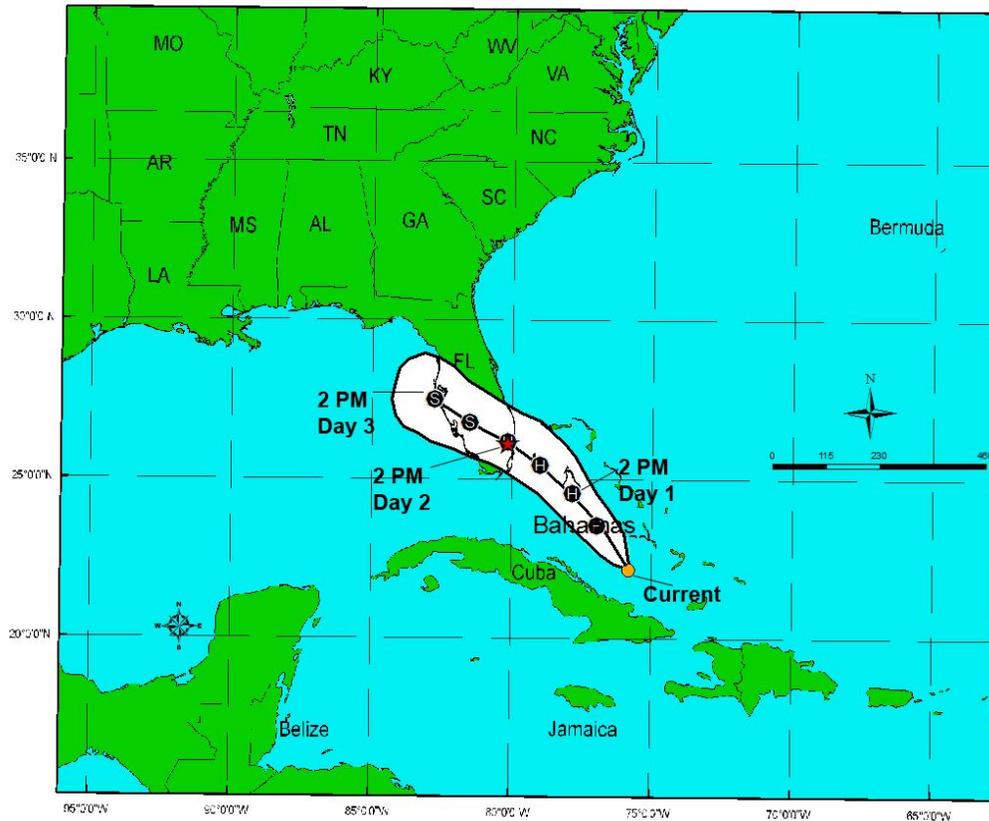


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane at your location.

* Sustained winds 74-95 mph or 119-153 km/h

Figure C-1. Hypothetical hurricane forecast Fort Lauderdale Beach 1

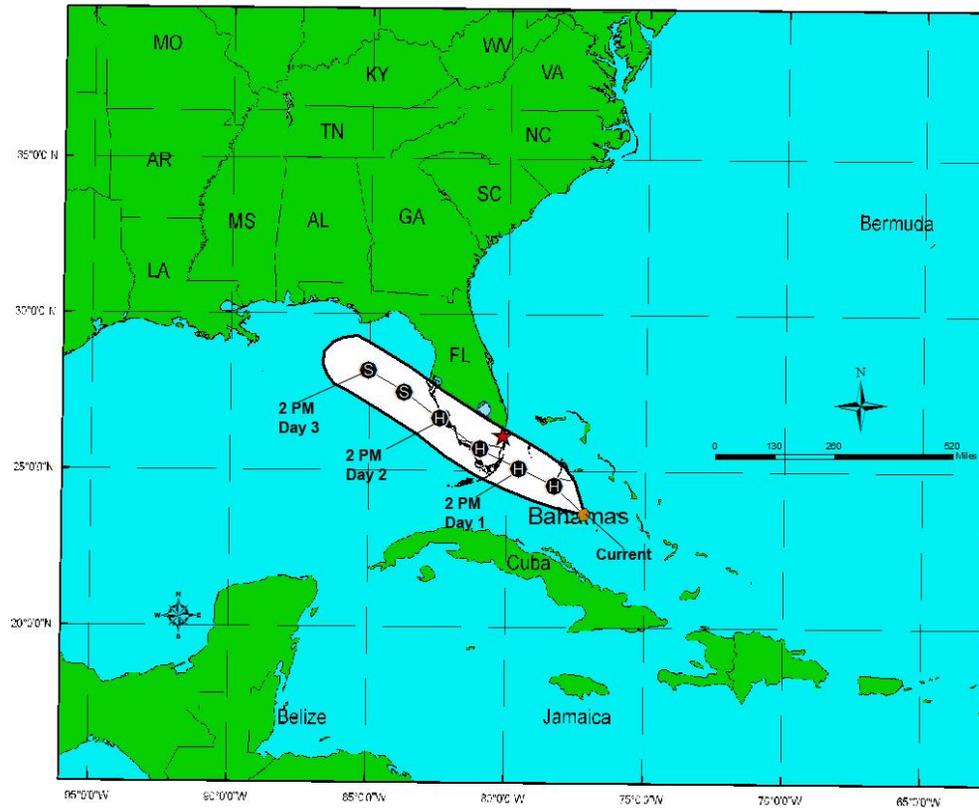


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane at your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure C-2. Hypothetical hurricane forecast Fort Lauderdale Beach 2

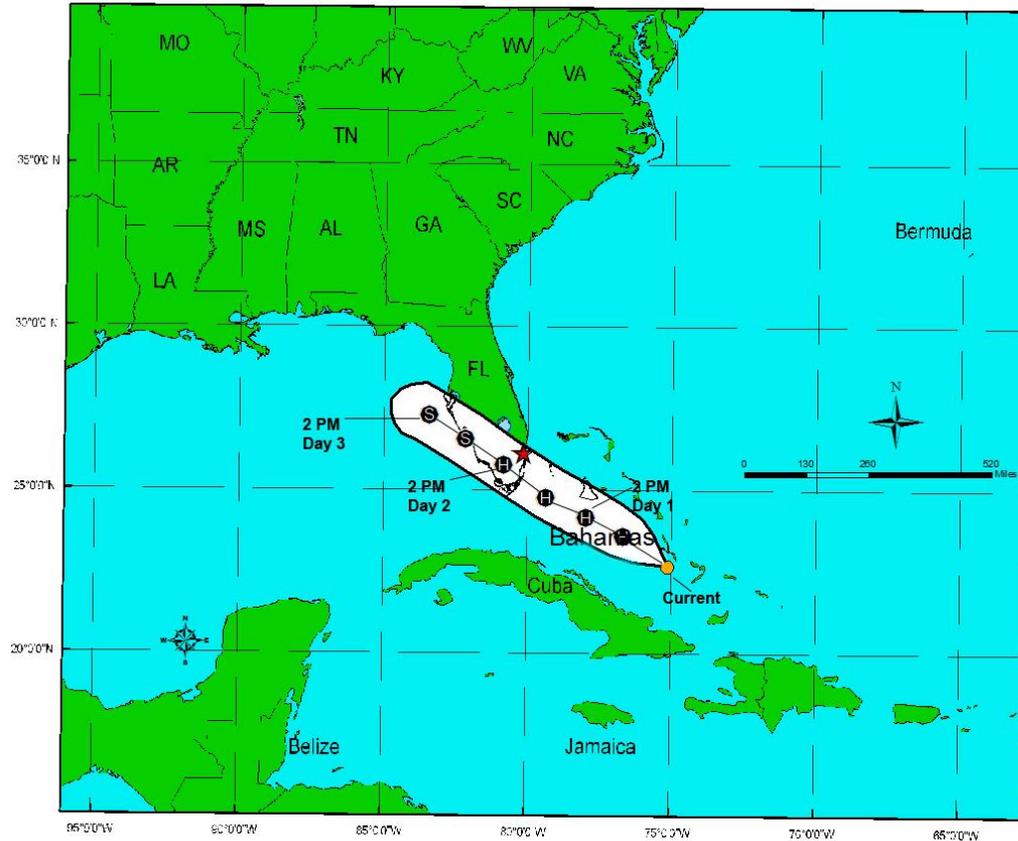


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane within your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure C-3. Hypothetical hurricane forecast Fort Lauderdale Beach 3

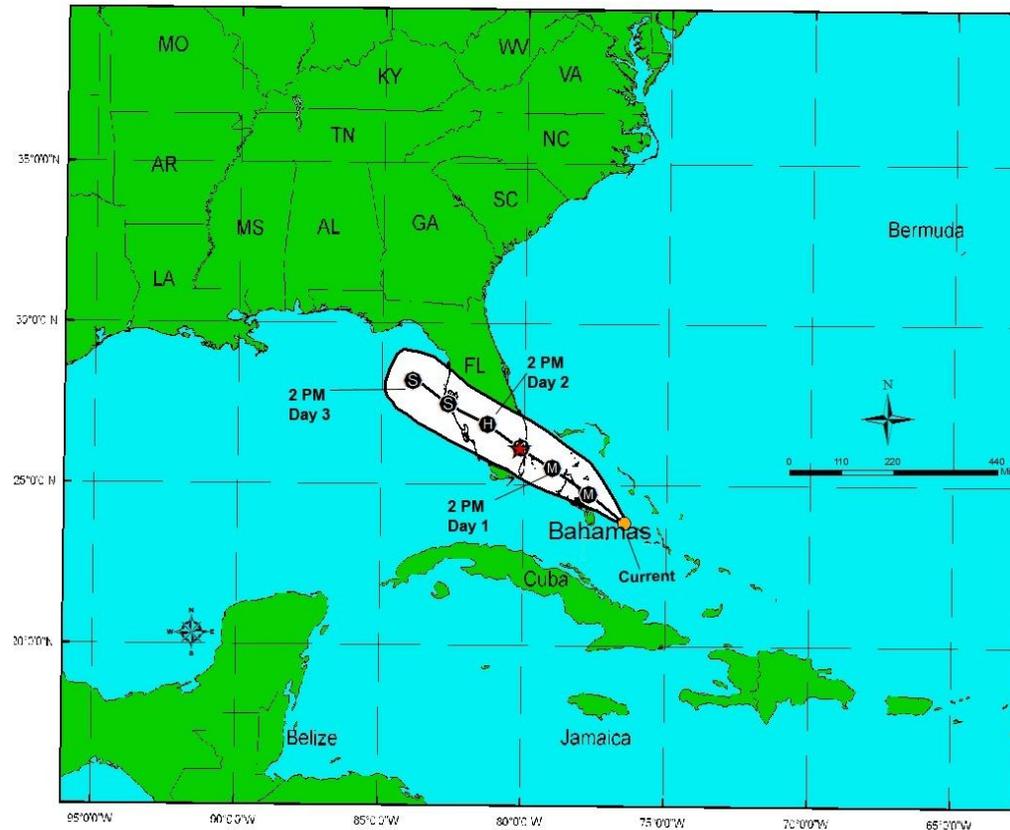


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 1*** hurricane within your location.

* Sustained winds 74-95 mph or 119-153 km/hr

Figure C-4. Hypothetical hurricane forecast Fort Lauderdale Beach 4

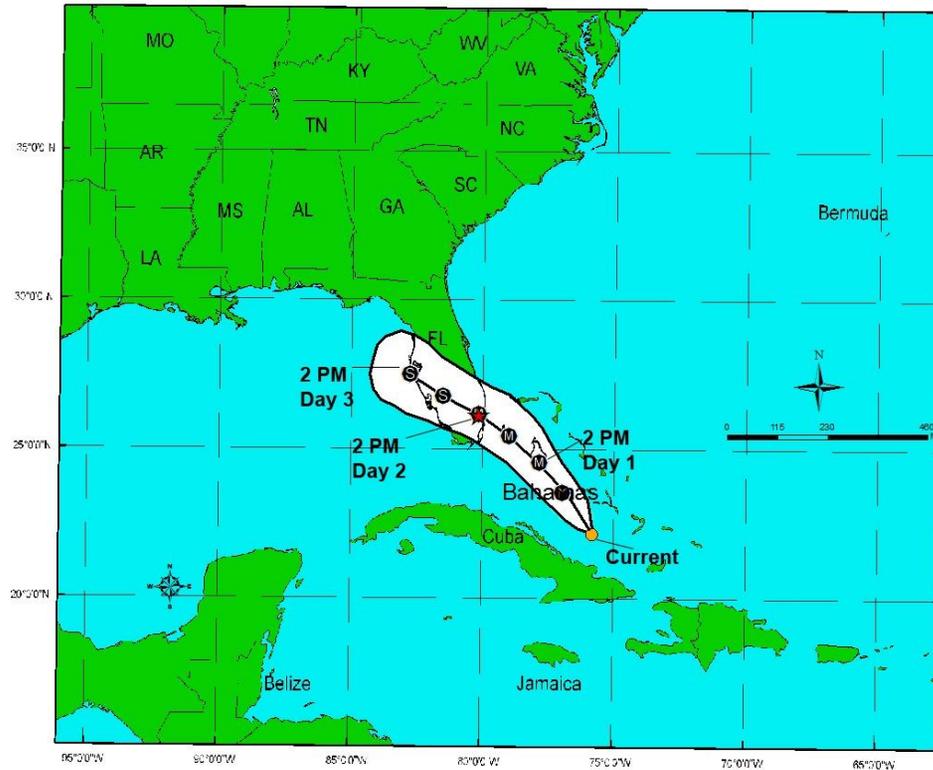


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane at your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure C-5. Hypothetical hurricane forecast Fort Lauderdale Beach 5

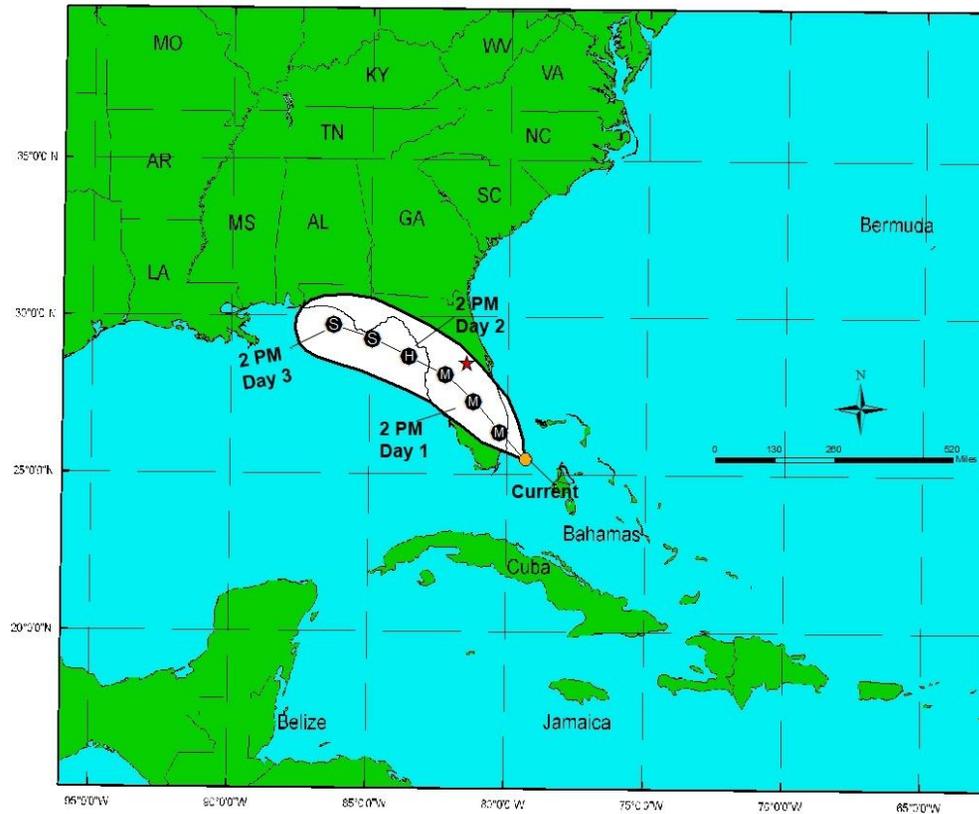


Hurricane Alex 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane at your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure C-6. Hypothetical hurricane forecast Fort Lauderdale Beach 6

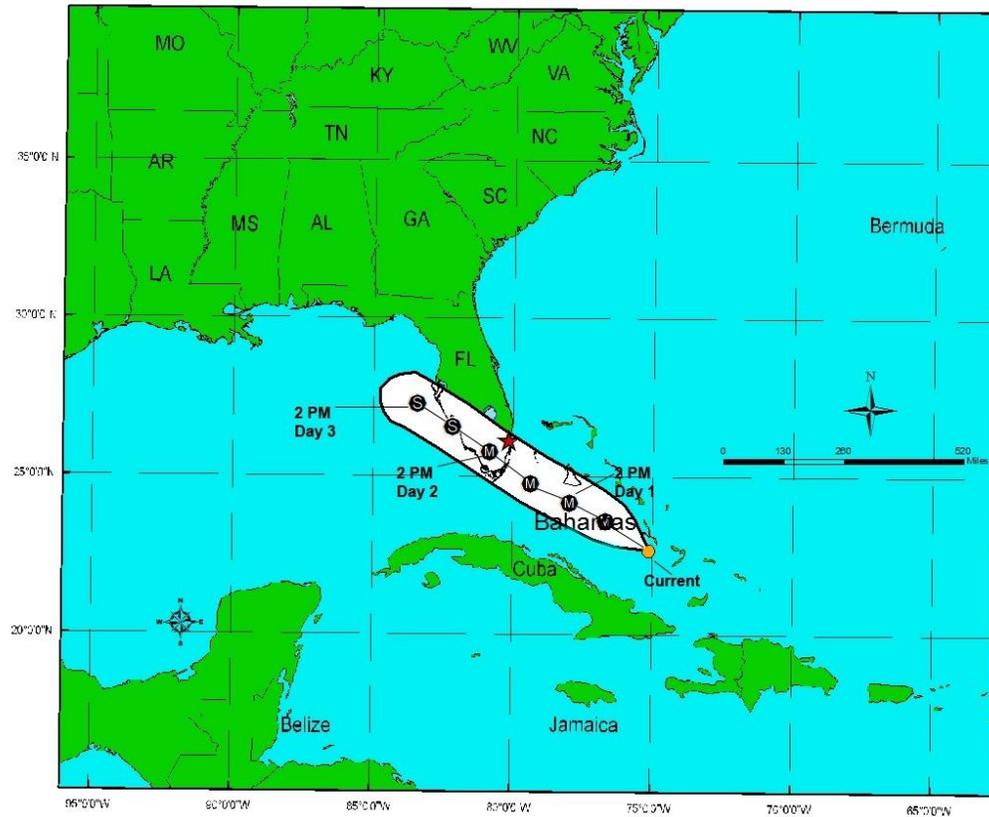


Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane within your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure C-7. Hypothetical hurricane forecast Fort Lauderdale Beach 7



Hurricane 3-day Forecast

You are in the middle of your trip. The star on the map indicates your current location. This is expected to be a **Category 4*** hurricane within your location.

*Sustained winds 131-155 mph or 210-249 km/hr

Figure C-8. Hypothetical hurricane forecast Fort Lauderdale Beach 8

APPENDIX D
INSTITUTIONAL REVIEW BOARD APPROVAL



PO Box 112250
Gainesville, FL 32611-2250
352-392-0433 (Phone)
352-392-9234 (Fax)
irb2@ufl.edu

DATE: August 17, 2011

TO: Ignatius Cahyanto
PO Box 118208
Campus

FROM: Ira S. Fischler, PhD; Chair *ISF*
University of Florida
Institutional Review Board 02

SUBJECT: **Approval of UFIRB # 2011-U-0814**
Modeling Tourists Evacuation Choices while at the Destination: Effects of Individual Characteristics, Social Contexts, Information Search, and Hurricane Forecasts

SPONSOR: Tourism Cares

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants. Your protocol was approved as an expedited study under category 7: *Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

Given this status, it is essential that you obtain signed documentation of informed consent from each participant. Enclosed is the dated, IRB-approved informed consent to be used when recruiting participants for the research. If you wish to make any changes to this protocol, *including the need to increase the number of participants authorized*, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

It is essential that each of your participants sign a copy of your approved informed consent that bears the IRB approval stamp and expiration date.

Your approval is valid through **August 17, 2012**. If you have not completed the protocol by this date, please telephone our office (392-0433), and we will discuss the renewal process with you. It is important that you keep your Department Chair informed about the status of this research protocol.

ISF:dl

APPENDIX E
PARTICIPANT CONSENT FORM

Tourism Crisis Management Institute
University of Florida
PO Box 118208
Gainesville, FL 32611-8208
Phone: 352.392.4042 ext. 1315
Fax. 352.392.75.88

Dear Participant,

I am a researcher at the Tourism Crisis Management Institute at the University of Florida, conducting a survey of current tourists in Florida. The purpose of this study is to better understand hurricane evacuation decisions of tourists visiting Florida. You have been selected as you have been identified as a current tourist. Only a sample of tourists will be contacted, so your input is very important to design a better hurricane information system for tourists in the state of Florida.

You will be asked to complete the questionnaire. This survey should take less than 15 minutes to complete. Your identity will be kept confidential to the extent provided by law. Your information will be assigned a code number and the findings will never discuss individual responses. There are no anticipated risks, compensation, or other direct benefits to you as a participant. You do not have to answer any questions that you do not wish to answer. You are free to withdraw your participation at any time without consequence. By signing this form, you are also consenting to the aggregate data generated from the survey to be utilized for future publications and reports.

This study has been approved by the University of Florida's Institutional Review Board. If you have questions or concerns about research participants' rights, you can contact the UFIRB office, PO Box 112250, University of Florida, Gainesville, FL 32611-2250 or at (352)392-0433. Should you have any questions regarding this study please contact me at [REDACTED] or by email at ignatius@hhp.ufl.edu or Dr. Lori Pennington-Gray by phone at (352) 392-4042 ext. 1318 or email at penngray@hhp.ufl.edu.

Thank you in advance for your participation in this project.

Ignatius Cahyanto, M.S.

I have read the procedures described above. I voluntarily agree to participate in the survey and I have received a copy of this description.

Signature of participant, Date

Approved by
University of Florida
Institutional Review Board 02
Protocol # 2011-U-0814
For Use Through 08-17-2012

APPENDIX F CYE INSURANCE FOR FLORIDA MEETINGS AND CONFERENCES

COVER YOUR EVENT (CYE) INSURANCE FOR FLORIDA MEETINGS & CONFERENCES

CYE Applications for August, September, and October 2011 and 2012 are now being accepted.

Just like its nearly ever-present sunshine, Florida welcomes visitors year 'round. The summer and early fall months, however, bring less leisure travel to the Sunshine State and the perfect opportunity for your group to visit for a meeting or conference. You'll enjoy reasonably priced group rates, and your attendees will enjoy vacationing with their families during your meeting.

With this in mind, VISIT FLORIDA® has adopted complimentary Cover Your Event (CYE) Insurance. This supplemental insurance is intended to cover any costs directly related to re-booking a meeting should it be displaced due to a named hurricane. CYE ensures that you can plan your meeting with confidence and take full advantage of Florida's unsurpassed venues any time of year, while benefiting from those outstanding summer and fall values.

CYE applications for August, September, and October 2011 and 2012 are now being accepted. To apply, carefully review the details and disclaimer below and click Submit..

Supplemental Hurricane Insurance Details

- Sub limit per insured event of \$100,000 if 100-300 room nights; \$150,000 if 301-500 room nights; and \$200,000 if over 500 room nights over a minimum of two nights. Available during August, September, and October 2011 and 2012.
- Loss due to named hurricanes only.
- Coverage will pay for room rate differential and any extra expense of rescheduling event. Examples of extra expenses are reprinting of program books, signage, banners, etc.
- Event must be rescheduled in Florida at same or nearest available venue within 12 months.
- If the event is not rescheduled there is no claim.
- Lost profits are not a covered loss.
- VISIT FLORIDA will pay for all premiums.
- Offered by Marsh Affinity Group Services, a service of Seabury and Smith out of Chicago, IL.
- Limited availability and subject to insurance carrier approval.
- August, September and October 2011 and 2012 are available.
- This offer is good for meetings that are designed for business purposes only.

DISCLAIMER: VISIT FLORIDA and Marsh Affinity will make every effort, but CANNOT guarantee coverage if the meeting you have requested CYE insurance for is scheduled to start within twenty-one (21) days from the date you completed your application. Furthermore, any NAMED hurricanes will be excluded from coverage if they already exist at the time of your application.

I have read and understand the details, limited scope and availability of this offering.

SUBMIT >

Questions: please contact cye@VISITFLORIDA.org

The form is available on www.VISITFLORIDA.org

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BIOGRAPHICAL SKETCH

Ignatius Cahyanto earned a Bachelor of Education degree in English language education from Sanata Dharma University in Indonesia 2002 and a Bachelor of Arts in Indonesian literature from Gadjah Mada University in Indonesia in 2005. He received a Master of Science from University of Florida (UF) in 2008. He is affiliated with the Eric Friedheim Tourism Institute and the Tourism Crisis Management Institute at UF as associate researcher. His research interest is gravitated around crisis management for the tourism industry. He is particularly interested in understanding tourists' behavior in the event of crises. He involved heavily in several research projects in the area of tourism crisis management. He received multiple research grants to complete his dissertation on tourists' hurricane evacuations. He wrote several technical reports and white papers with regard to tourism crisis management. He authored and co-authored several research articles and has presented his research at several international conferences in the United States, Italy, Indonesia, and Canada.

Upon completion of his Ph.D program in August 2012, Ignatius began his appointments as an assistant professor and program coordinator of tourism management at Black Hills State University, South Dakota as well as a program officer for the Indonesian government's multi projects to strengthen partnerships and collaborations in education and research between universities in the U.S. and Indonesia. Ignatius split his time between Spearfish, S.D. and the Indonesian Embassy in Washington D.C.