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## Stated Preferences of Tourists for Evacuating in the Event of a Hurricane

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### ABSTRACT

*This study employed a Stated Preference Survey to examine factors that influence tourists' decisions regarding whether or not to evacuate when a hurricane strikes. Data were gathered in June-July 2009, during the hurricane season. A total of 465 tourists in Florida participated in the study. The examination of the results found that evacuation decisions were influenced by the severity of hurricanes, the location of the destination, and individual characteristics of tourists. The study also found that Stated Preference Surveys can be an effective technique to examine tourists' risk behavior while in the destination. Finally, application of the findings is presented.*

**Key word:** tourists, hurricanes, evacuation, Stated Preference Survey

## INTRODUCTION

Tourists are a vulnerable and understudied group with regard to encountering a hurricane. In Florida where the tourism industry welcomes more than 83 million visitors generating more than \$62 billion in tourism/recreation taxable sales each year (VISIT FLORIDA®, 2009), it is imperative to specifically address the evacuation of tourists. Unlike Florida residents, tourists visiting Florida may encounter greater risks associated with a hurricane as they may not speak and/or read the host language and may lack the knowledge about the risk posed by a hurricane despite vacation destinations in Florida being in hurricane-prone areas, and hence may be unable to receive, interpret, and respond appropriately to risks presented by a hurricane (Burby & Wagner, 1996; UNWTO, 1998). Tourist characteristics such as socio-demographics, past experiences, destination location and their past knowledge may affect their information processing leading to their evacuation decision.

The examination of tourists' evacuation behavior is understudied. The few contributions on the evacuation of tourists during hurricanes were published in the early and mid 1990s by one author (Drabek, 1991; 1993; 1994; 1996). Drabek's study focused specifically on evacuation strategies from a supply side, whereas this study examined the demand perspective. The goal of this study was to understand how hurricane messages are processed by heterogeneous tourist groups leading to their evacuation decisions. Three questions guided this study: 1) Is there any impact of the various content of hurricane risk communication on tourists' evacuation decisions? 2) Is there any impact of the locations of tourists on their evacuation decisions, and 3) Are there any impacts of the tourists' characteristics regarding their evacuation decisions? The findings of this study would be of substantial interest for Destination Management Organizations, Emergency Management Agencies, and policy makers to craft suitable hurricane risk information.

## LITERATURE REVIEW

With all forms of risk communication there is a degree of uncertainty involved in transmitting meaningful messages since receptors do not necessarily interpret messages the way in which they were intended (Dash & Gladwin, 2007; Mileti & Beck, 1975). The inability to understand the language of hurricane messages and warnings as well as interpreting these meanings may prevent an individual from determining if the message is relevant to their situation (Dow & Cutter, 2002; Lindell & Perry, 2004; Smith & McCarty, 2008; Sorensen, 2000). Hurricane-related communication needs to recognize that a variety of cognitive, affective, and connotative processes influence comprehension and understanding (Cameron, 2003).

In recent years, perception of travel risks associated with natural disasters received increased attention (Faulkner, 2001; Mazzocchi & Montini, 2001; Poon & Adams, 2000; Scott & Laws, 2005;) and in particular, risks associated with natural disasters have been identified as influential in changing travel intentions, even among experienced travelers (Faulkner, 2001; Ritchie, 2004; Faulkner & Vikulov, 2001). Research suggests that specific locations are more risky than other destinations in terms of perceptions of risk by tourists (Floyd & Pennington-Gray, 2004; Sönmez & Graefe, 1998a, 1998b). Coastal versus non-coastal areas may have

varying levels of perceived risk, particularly as they relate to hurricanes.

Communicators should not assume that all members of the general public in an area where a hurricane makes landfall have the requisite prior knowledge to comprehend and process hurricane forecasts, warnings, and watches or evacuation orders at the same speed or in the same manner (Phillips & Morrow, 2007). Residents of hurricane-prone regions receive information explaining hurricane-related terminology before and during the hurricane season, and more frequently when a hurricane has the potential to strike their area (Daniels & Loggins, 2007).

The Stated Preference (SP) survey is rarely used in tourism studies (Kelly, Haider, Williams & Englund, 2007), especially in the context of a tourism crisis. The SP survey elicits behavioral intentions of respondents under hypothetical scenarios, thus it enabled data collection prior to the actual crisis. The scenarios could include, for example, alternate levels of hurricane threats, alternate information content, and alternate media of information dissemination (Dow & Cutter, 1997; Whitehead *et al.*, 2000; Whitehead, 2003, Whitehead, 2005; Fu, 2004). The SP enabled us to evaluate scenarios that did not exist in the real world currently, but could potentially be achieved. At the same time, it is also essential to recognize that what people say they would do may not exactly be what they actually do.

## METHODOLOGY

The survey used an interception approach to administer the SP survey. Participants for this study were tourists visiting Orlando and Clearwater-Saint Petersburg Beach. The sites were chosen based on the probability to receive a high volume of tourists. At each respective location, a random sample of tourists were intercepted and requested to complete the questionnaire. A screening question was employed to identify eligible tourists. One adult from each travel party was identified and sampled. All surveys were self administered and took approximately 16 minutes to complete the responses based on an oral interview. Sampling occurred on weekdays and weekend in both regions to capture tourists who travel to the regions during weekdays and on weekends. A total of 465 completed surveys were completed (response rate 25%).

### Measurements

The SP survey instrument was comprised of five sections: In the first section trip, trip characteristics were elicited (e.g. mode of transportation, group composition). The second section measured tourists' general attitudes and emotions with 4 questions (e.g. *I would rather be safe than sorry* in a Likert scale format). The third section measured tourists' hurricane knowledge (4 True/False/ Don't know questions e.g. "A *category 1 hurricane has the least intensity among all hurricanes*"). The fourth section measured hurricane experiences (e.g. *Have you ever been effected by a hurricane while traveling?*). The fifth section contained hypothetical hurricane scenarios. Each scenario (message/map/picture) featured a different set of information about a hurricane landfall and its potential to affect the Orlando and Clearwater-St Pete areas. A total of 32 scenarios featured the following attributes: 1) direction of approach (Gulf or Atlantic), 2) center line of the hurricane path (through the location or offset from the location), 3) time at land fall (24 hours or 48 hours), 4) category at landfall (1 - 5) duration of hurricane-force winds at location (short or long – the short durations were respectively 3 and 6 hours for category 1 and 4 and the long duration were 12 and 18 hours respectively for category 1 and 4). Each tourist was

asked to review 4 different scenarios, then they were asked to describe how they felt, their perceived risk associated with staying in their current location, and the likelihood they would evacuate given a specific scenario (5 Likert scale ranging from “*very unlikely*” to “*very likely*”). The respondents were also given the option of indicating “*don’t know.*”

**Table 1**  
**Ordered Response Model for Hurricane Evacuation**

Variables	Parameter	P value
Scenario Characteristics		
Atlantic approach	-.172	.050
Center line of approach is offset from the location	-.190	.032
Time to landfall = 1 Day	.184	.040
Category 1 at landfall	-.395	.000
Duration of hurricane-force winds is short	.207	.021
Location		
Coastal	.389	.000
Hurricane Knowledge		
#Questions for which the response was “Don’t Know”	.158	.000
Hurricane Experience		
Affected by hurricane while traveling in the past	-.558	.000
Hurricane Preparedness		
Checked for hurricane prior to departure	.397	.000
Attitudes and Emotion		
Highly risk averse	.247	.030
Risk seeking	-1.636	.007
Not easily frightened	-.219	.048
Trip Mode		
Airplane	-.151	.005
Personal vehicle	.146	.006
Demographics		
Male	-.271	.004
Threshold Parameters		
[Evacuate=1]	-3.236	.000
[Evacuate=2]	-2.189	.000
[Evacuate=3]	-1.311	.031
[Evacuate=4]	-.501	.409
Number of Cases	1633	
Log-likelihood at Convergence	-2493.599	
Log-likelihood at Threshold-only Model	-2412.278	

*\*Only values which were significant at  $p < 0.05$  is presented.*

## RESULTS

Among all survey respondents and across all survey locations, a total of 1,868 responses were obtained (each response referred to one scenario). An ordered-response (logit) model was

used to relate the evacuation decisions of tourists to several explanatory factors. Only those cases in which acceptable responses were provided to the question on likelihood of evacuation were used in the model.

The parameter estimates and the level of significance are provided in Table 1. In general, a positive sign on parameter indicates that the corresponding factor increases the likelihood of evacuation and a negative sign indicates the opposite. Almost all the parameters presented in the model are statistically significant at 95%. The ordered-response model clearly highlights the strong impacts of several factors on tourists' evacuation decisions.

With regard to research Question 1, all five hurricane attributes were found to strongly influence evacuation decisions. In scenarios with a hurricane approaching from the Atlantic, the respondents were found to be less likely to evacuate as indicated by the negative coefficient (coef =  $-.172$ ,  $p=.050$ ). If the center-line path of the hurricanes was offset from the location, respondents were less likely to evacuate (coef =  $-.190$ ,  $p=.032$ ) compared to scenarios in which the center-line passed right through the destination. The respondents were more likely to evacuate if the hurricane was to make the landfall within one day (coef= $.184$ ,  $p=.040$ ). Respondents were also more likely to evacuate from a category 4 hurricane than a category 1 hurricane (coef. =  $-.395$ ,  $p=.000$ ), with longer duration of wind (coef= $.207$ ,  $p=.021$ ). With regard to research question 2, respondents in coastal areas (St. Petersburg/Clearwater) were more likely to evacuate compared to in-land areas (Orlando) (coef= $.389$ ,  $p=.000$ ).

With regard to research question 3, respondents' knowledge about hurricanes played a significant role in the evacuation decision with those who showed greater "*don't know*" responses having a greater the likelihood to evacuate (coef= $.158$ ,  $p=.000$ ). It was found that respondents who were affected by hurricanes in the past, were less likely to evacuate (coef= $-.558$ ,  $p=.000$ ). With regard to general attitudes and emotions, those who were highly risk averse were more likely to evacuate (coef =  $.247$ ,  $p=.030$ ). Likelihood to evacuate was also influenced by the mode of transportation with those who flew being less likely to evacuate (coef= $-.151$ ,  $p=.005$ ), and respondents' gender, with men being less likely to evacuate than women (coef= $-.271$ ,  $p=.004$ ).

## **DISCUSSION AND CONCLUSION**

The results of this study suggest that the hurricane risk information can be improved in many ways. For instance as tourists viewed coastal locations riskier than in-land locations, the lead time for tourists' evacuation then may need to be increased, with extra time given to areas with large tourists. As the study found that those who flew were more likely to stay in the destination in the event of a hurricane, the Emergency agency and the DMOs can team up to provide tourists better information about what they need to do if a hurricane strikes. Hotels and other accommodations may need plans and guidelines to assist tourists and such plans should not be limited to assistance with looking the nearest shelter should it be needed.

The tourists' evacuations were also influenced by tourists' hurricane knowledge and past experience. Therefore, Florida DMOs and emergency agencies need to provide appropriate hurricane information aids such as brochures or other education materials that can be accessed by

tourists. Lastly, this study demonstrated that the SP survey can be used as an alternative way to examine tourists' behavior in the event of a crisis without having to wait the actual crisis to occur. Nonetheless, further study on how the actual situation in which the survey was administered (i.e. asking tourists' their evacuation decision with regard to hurricanes in a bright sunny day) may impinge on the respondents' responses needs to be conducted to widen our horizon on SP survey usage in the tourism studies and crisis management.

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