

# Leaving the Big Easy: An Examination of the Hurricane Evacuation Behavior of New Orleans Residents Before Hurricane Katrina

Randolph Burnside  
*Southern Illinois University-Carbondale*

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*Public officials and the media are important facets in the evacuation process because of their central and unique role in disseminating information and communicating risk to the residents of a community. This study argues that not only are public officials and the media important in this process, but their credibility and reliability as sources of information is more complex than previous research has suggested. My investigation employs a direct effects logit model to determine the impact of the “crying wolf” hypothesis and the black empowerment hypothesis on the hypothetical evacuation of New Orleans residents. The findings indicate that both hypotheses may impact the evacuation of residents and warrant further study by those doing evacuation behavior research.*

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Hurricane evacuations are becoming increasingly problematic for the Southeastern United States. However, the city of New Orleans is arguably one of the most vulnerable cities in the United States. This is based on a multitude of factors which include: most of New Orleans sits below sea level, and the Mississippi River and Lake Ponchartrain surround the city creating a topography that resembles a bowl which limits the number of evacuation routes out of the city. Thus, these factors provide a heightened sense of awareness and vulnerability in reference to hurricanes for most of its residents. This sense of awareness and vulnerability is bolstered by the fact that some of the deadliest hurricanes to ever hit the United States have struck in or near the city. This includes Hurricanes Andrew in 1992; Camille in 1969; Betsy in 1965; and Audrey in 1957, all of which had substantial impacts on the city and surrounding area.

The need to understand the evacuation behavior of New Orleans residents given the uniqueness of their position is important for public officials and administrators in planning future evacuation efforts. The central research question asks: what role does information, public officials and risk perception play in shaping evacuation behavior. This article examines the factors believed to be commonly associated with evacuation behavior. It seeks to understand the psychological, sociological and demographic components commonly associated with risk perception and evacuation behavior. Further,

this article attempts to test the applicability of the “crying wolf” and black empowerment theses on the evacuation of a largely African American city.

### **Extant Literature**

In a study of twelve of hurricanes occurring between 1961 and 1989, Baker (1991) found that one of the major psychological factors involving evacuation is how residents obtain risk information (See also Dynes and Tierney 1994). Even more important is their view of emergency management officials and local authorities. He found that the recommendations or orders by government officials, and the language and method of dissemination, effect evacuation rates more than any other factor. Riad et al. (1999) found that risk perception, access to resources and social influence were the most important components of evacuation decisions. They further noted that the greater the perceived risk of the individual the more likely they are to evacuate. Burby and Wagner (1996) also find that the greater the perceived risk the more likely individuals are to respond to warning messages. They note that the more information an individual has about the event the more likely they are to respond. Another important component of risk perception is the “crying wolf” hypothesis. This hypothesis argues that individuals who have repeatedly experienced predictions of disasters that did not come to fruition will begin to discount the validity of future warnings (Atwood and Major 1998; Dow and Cutter 1998; Breznitz 1984).

The views and perceptions of public officials by citizens are relevant to evacuation behavior. The degree to which citizens perceive the officials to be credible politically can have a substantial impact on their adherence to critical information about disaster evacuation. Bobo and Gilliam (1990, 379) hypothesize:

that where blacks hold more positions of authority, wield political power, and have done so for longer periods of time, greater numbers of blacks should see value in sociopolitical involvement... In areas of high black empowerment, blacks should participate at rates equal to or greater than whites (all other things being equal).

Bobo and Gilliam (1990) further posit that blacks living in empowered cities exhibit greater political knowledge, more political efficacy, and higher levels of trust in local government, than blacks that do not live in empowered communities. These findings are further supported by Gurin, Hatchett and Jackson (1989) who posit that, descriptive political representation is important to blacks because of the psychological benefits gained from black political leadership. This in turn, could translate into greater levels of political participation in these areas by blacks. If one was to extrapolate from their findings, you could hypothesize that blacks would put more credibility in local officials’ warnings, hence making them a significant component of their evacuation decision making process. This could potentially close the gap between African American and white evacuation behavior since previous studies have found that whites are more likely to evacuate than are blacks (Perry and Mushkatel 1984; Perry 1985; Gladwin and Peacock 1997). This in conjunction with findings in the existing literature on disasters which concludes that ethnic minorities are less likely to perceive white authorities as credible information sources (Perry and Mushkatel 1984; Perry, Gillespie and Mileti 1974) provides us with a unique research opportunity.

Theoretically, one would expect messages from black officials in Orleans Parish to play a significant role in the evacuation behavior of residents because Orleans Parish is 67% black and has a black mayor as well as majority black city council. However, Dow and Cutter (1998) note that, precautionary evacuations by local emergency management officials, often decreases their credibility as sources for evacuation information. This however, may also enhance a concept known as “disaster subculture.” This disaster subculture creates citizens who may be cognizant of the perceived threat but who refuse to evacuate. According to Davenport (1978), protective actions taken by high-risk communities may give residents a false level of security and may discourage them from evacuating in the future. Forrest (1979) points out that the residents of New Orleans have developed a disaster subculture because of repeated threats and the lack of community mobilization in reaction to the threat. This is supported by a study entitled “Planning for the Evacuation of New Orleans” by the Institute for Transportation Engineers (2002) which suggested that the New Orleans levee system and the lack of a major hurricane with direct impact for the last 35 years has caused complacency among many of the residents of the city. Thus, a combination of countervailing factors makes New Orleans an intriguing case study.

Baker (1991) points to the media as being an avenue that public officials can use to convey evacuation information to the public. Gladwin and Peacock (1997) agree and assert that the role of the media cannot be overemphasized because an overwhelming majority of the people in their study indicated that television was their most important source of preparation information. Sorensen and Mileti (1988) suggest that the media is significant in events that have long lead times, however, in fast moving events people tend to depend on a mix of sources in determining their actions. This mix according to Sorensen and Mileti (1988) includes emergency officials, friends and neighbors or relatives and the mass media. This suggests that social networks play a large role in the evacuation behavior of people. Perry’s (1985) research supports Sorensen and Mileti’s findings (1988) and suggests that kinship tends to play an important role in warning dissemination and eventual evacuation, however, he suggests caution when using mass media to deliver evacuation information. This is based on what he considers the editorial style or sensationalism that the media uses in reporting which can produce confusion for potential evacuees.

There are a multitude of factors that could conceivably affect the evacuation of residents from threatened areas. Age is often suggested to be a critical variable because of the mobility restrictions of some older populations. However, according to Baker (1991) most studies have failed to find a connection between age and response to evacuation messages. Bateman and Edwards (2002) posit that there is no significant relationship between age, education and responding to warning messages. However, Perry (1985) findings contradicts part of Bateman and Edwards findings in that he suggests that as age goes up the likelihood to evacuate goes up slightly. Bateman and Edwards (2002) also found that women are more likely to respond to warning messages than are their male counterparts. Existing research seems to suggest that family and social networks are responsible for the elderly evacuating at about the same rate as other age groups. It would seem that socioeconomic status might present a barrier for those with lower levels to evacuate. Perry and Mushkatel (1984) agree and suggest that “there are likely to be interactive effects of ethnicity with socioeconomic status” (36). They further suggest that social class may have a more direct impact on understanding and complying to

evacuation warnings. Gladwin and Peacock (1997) assert that black, low socioeconomic households are less likely to comply with evacuation orders than any other group noting that transportation and affordable places of refuge may be the cause. However, Baker (1991) suggests that there is no correlation between socioeconomic status and evacuation. Baker further notes that individual level variables including demographic factors are rarely or at best weakly related to evacuation.

According to Perry (1985), “while there have been very few studies dealing with risk assessments among ethnic minorities faced with disaster, there is some general evidence that American minority groups define danger from the environment in different ways” (84). Perry concludes that there is relatively greater cohesion among blacks than among whites and that blacks tend to have extensive extended family networks. This could potentially lead to blacks facing greater challenges in evacuating in a timely manner, because of the complexity associated with adding more people to the evacuation decision making process.

### **Methods and Measurement**

This article uses data from a RDD telephone survey of 400 residents of Orleans Parish, Louisiana. Survey interviews were administered as part of the Twelve Parish Survey conducted by the University of New Orleans Survey Research Center in collaboration with the Center for Hazards Assessment, Response and Technology between March 30 and May 16, 2004.

A logit model is used to analyze the survey data because the dependent variable, hypothetical evacuation, is dichotomous. Given the difficulty in interpreting logit coefficients substantively, predicted probabilities are estimated to provide us with a more detailed measurement of the impact of the independent variables on hypothetical evacuation.

The research objective is to explain factors affecting evacuation behavior of Orleans Parish residents. The dependent variable is based on a hypothetical evacuation scenario. Respondents were asked: If public officials in Orleans Parish recommended an evacuation because of the threat of a hurricane this year, what would you most likely do: definitely evacuate, probably evacuate, probably not evacuate, or definitely not evacuate? The responses were then grouped into two categories: people who would evacuate and people who would not. The independent and demographic variable descriptions used in the model of evacuation behavior can be found in Appendix A.

According to Perry et. al (1981, 151) there are three factors that are significant in the decision-making process: “(1) the definition of the threat as real... (2) the level of the perceived risk... and (3) the presence of an adaptive plan.” However, there are two other factors that should be taken into account because of the unique nature of New Orleans. They are the “crying wolf” hypothesis mentioned earlier in the text and the black empowerment hypothesis. These hypotheses could play a significant role in determining whether residents of New Orleans would decide to evacuate or weather the storm.

The following is hypothesized:

1. The presence of black elected officials will close the gap between African American and white evacuation rates rendering race insignificant as a causal factor in evacuation behavior.

2. Residents who evacuated during the last recommended evacuation will be less likely to evacuate than those who did not evacuate due to the “crying wolf” hypothesis.
3. Residents who have a definite evacuation plan will be more likely to evacuate than those who do not.
4. Residents who use the media as an important source of information will be more likely to evacuate.
5. Residents who use public officials as an important source of information are more likely to evacuate.
6. Residents who do not feel safe in a category three hurricane will be more likely to evacuate than those who feel safe.

**Findings**

The model tested is a direct effects model which examines the direct effects of the independent and demographic variables on hypothetical evacuation. Figure 1 provides an illustration of hypothesized relationships between risk perception, informational and preparation variables, demographic characteristics and hypothetical evacuation behavior.

**Figure 1: Direct Effects Model of Hypothetical Evacuation**

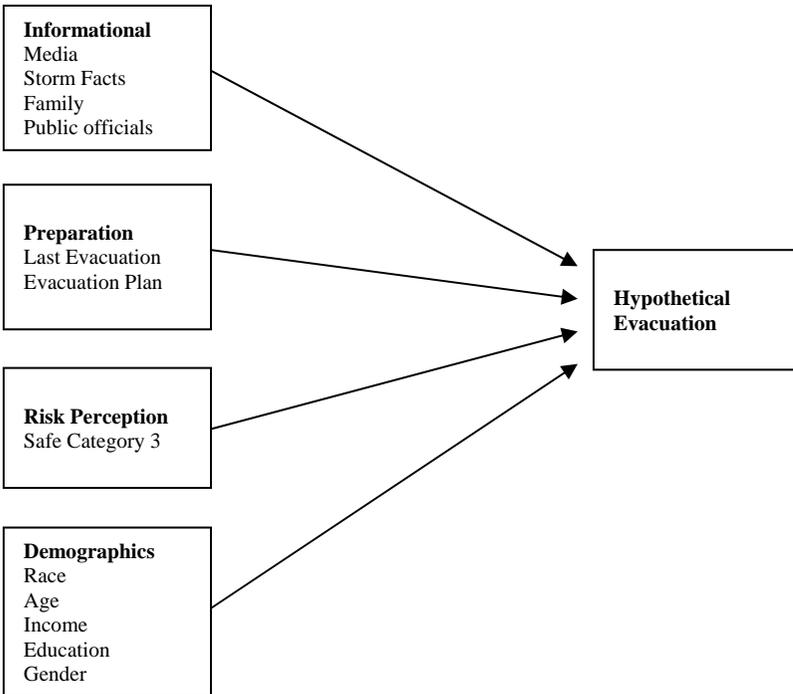


Table 1 presents the direct effects of the independent and demographic variables on hypothetical evacuation. A portion of the research focus for this article was to determine if the black empowerment hypothesis was applicable to evacuation behavior. The race variable is insignificant, which suggest that there is no substantive difference in the evacuation of blacks and whites in New Orleans. This finding upholds hypothesis one which partially tests the black empowerment thesis. The extant literature suggests that there are differences in evacuation based on race with minorities evacuating at lower levels than whites. The research further notes that socioeconomic status may interact with race to produce these findings. However, the income variable does not attain significance. Thus, this research refutes their findings. The lack of a significant finding in the race and income variables suggests that something else is in effect driving the evacuation of New Orleans residents.

**Table 1 Direct Effects Model of Hypothetical Evacuation Behavior**

	Coefficient	SE
<i>Evacuation Variables</i>		
Public Officials	4.504***	.885
Storm Specifics	3.868***	.653
Media	9.767	10317.8
Family	1.273	1.018
Last Evacuation	2.632***	.681
Evacuation Plan	.302	.415
Perceived Risk	1.501**	.561
<i>Demographic Variables</i>		
Education	.074	.204
Age	.020	.128
Gender	-.054	.410
Family Income	.067	.113
Race	.323	1.075
Constant	-4.857**	1.371

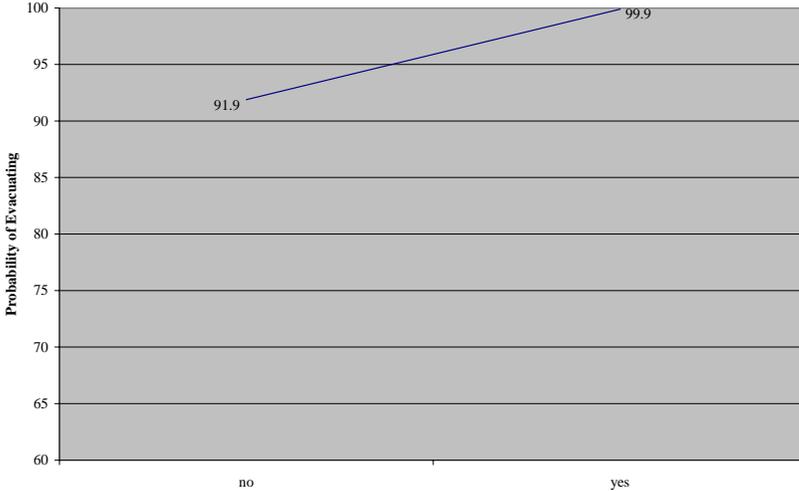
Chi Square = 146.921 \*\*\*p< .001, \*\*p< .01, \*p< .05, N= 261

% predicted correctly = 86.5 -2 Log likelihood = 159.789; Pseudo R<sup>2</sup>= .625

The public official variable does attain significance in this model at the .001 level. This upholds hypothesis 5 which posits that residents who use public officials as important sources of information are more likely to evacuate. This finding is important for several reasons: First, it indirectly supports the black hypothesis thesis in that people who noted public officials as being their most important source of information were significantly more likely to evacuate. This finding also supports the black hypothesis thesis in that a majority of public officials in the city of New Orleans are African Americans. This coupled with a 67% black population and a lack of significance in the race variable suggests support for the black hypothesis thesis. Additionally, the finding is important because it supports the previous literature that posits the importance of public official warning messages (see also Baker 1991 and Gladwin and Peacock 1997). The impact of public officials as information sources for evacuation can be seen in Figure 2.

The results suggest an 8% difference between residents who would evacuate and those who would not evacuate.

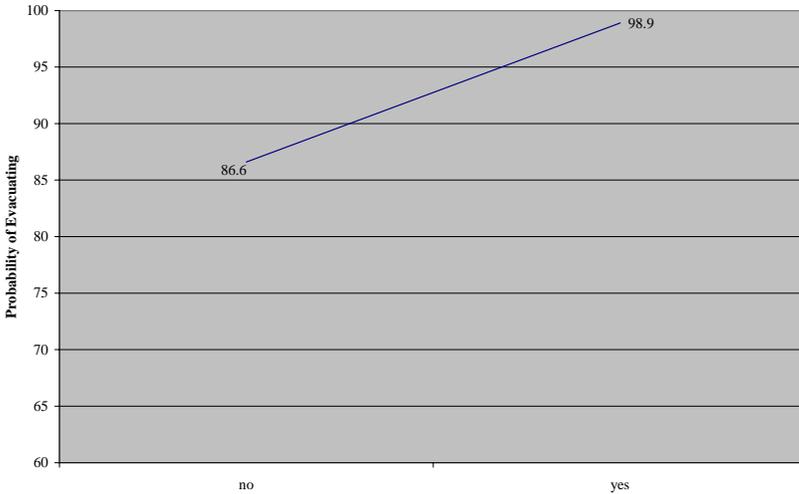
Figure 2: Predicted Probabilities of Public Officials as Most Important Source of Information



Hypothesis 2, which tests the “crying wolf” hypothesis, is not supported. In fact if you look at the last evacuation variable in Table 1, it is significant at the .001 level and positive which indicates that citizens who evacuated for the last voluntary evacuation are more likely to evacuate if asked to do so again. Thus, previous findings, which suggests that a hurricane subculture exists in New Orleans predicated on the “crying wolf” hypothesis is not initially upheld. If you look at Figure 3 you will see that citizens who evacuated during the last voluntary evacuation were 13.3% more likely to evacuate for the hypothetical evacuation.

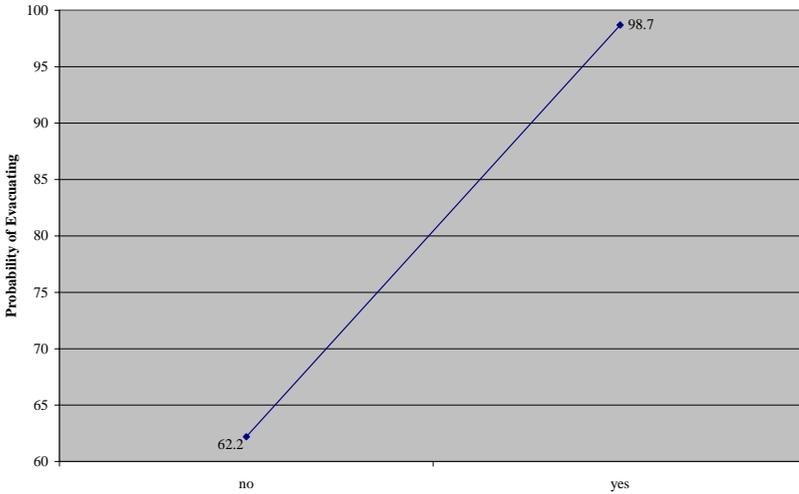
However, upon closer examination one can see that the evacuation plan variable is not significant. Therefore hypothesis 3 is not supported. The finding indicates that there are no substantive differences in evacuation behavior for those that have an evacuation plan and those who do not. This could be viewed as support for the “crying wolf” hypothesis in that the previous literature overwhelmingly indicates that those who have an evacuation plan are far more likely to evacuate than those who do not (Perry 1985; Baker 1991). The lack of significance in this study is confounding and suggestive of the fact that even though New Orleans residents may have plans they are hesitant to evacuate.

Figure 3: Predicted Probabilities of Evacuation for Last Voluntary Evacuation



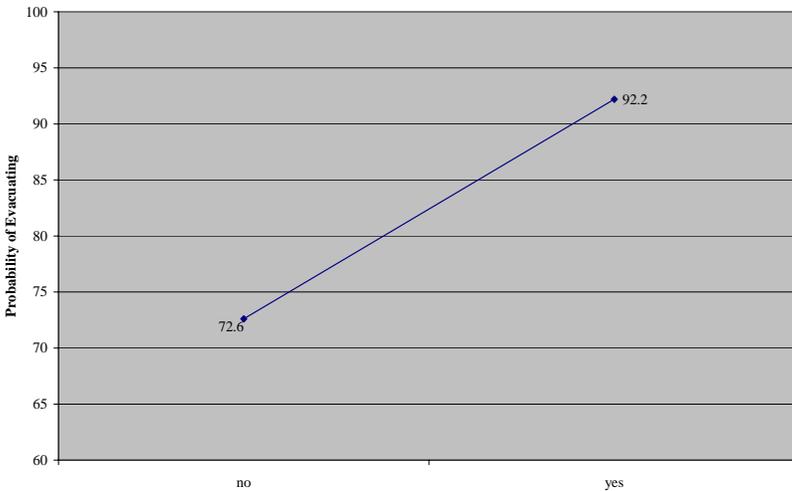
Turning to the media effects on the evacuation behavior of residents, the findings indicate that the media has no substantive impact on evacuation behavior (see Table 1). Thus, hypothesis 4, which states that residents who use the media as an important source of information will be more likely to evacuate is not upheld. Initially, this finding is puzzling because much of the current literature suggests that the media plays an important role in structuring the evacuation behavior of individuals (Baker 1991; Sorensen and Mileti 1988). However, if you return to Table 1 you find that the storm specific variable is significant at the .001 level. This finding indicates that residents who use storm specific facts as an important source of information are more likely to evacuate. A more detailed estimate of the use of storm specific facts can be seen in Figure 4. Individuals who used storm specific facts as their most important source of information when making evacuation decisions were 36.5% more likely to evacuate than their counterparts. This finding is important because one could argue that most citizens receive their storm specific facts via the media. Hence, storm specific facts could be serving as a proxy for the media. It is important to note however, that if this is the case then it underscores the importance not only of media but also the information that they provide. This is based on the fact that storm specifics, which are based on factors concerning storm severity, direction and flood potential, were the most important factors in determining whether or not New Orleans residents would evacuate the city.

Figure 4: Predicted Probabilities of Storm Specifics as Most Important Source of Information



The literature on evacuation behavior consistently finds that the perception of risk on the behalf of citizens is one of the most significant factors in determining whether they evacuate. The data in Table 1 shows the perceived risk variable is significant at the .01 level. This finding upholds hypothesis 6 which indicates those who perceive greater risk in a category three hurricane are more likely to evacuate. Figure 5 provides us with a better substantive understanding of the impact of risk perception on the evacuation behavior of New Orleans residents. Residents who perceived more danger in a category three hurricane were 19.6% more likely to evacuate than those who did not.

Figure 5 : Predicted Probability of Feeling Safe in a Category 3 Hurricane



None of the demographic variables in Table 1 were statistically significant. This finding is contradictory to a number of hurricane evacuation studies which found gender and socioeconomic factors closely associated with evacuation (Perry and Mushkatel 1984; Bateman and Edwards 2002). However, the findings from this research support Baker's (1991) study where he posited that individual demographic variables have a marginal impact, at best, on evacuation behavior. Further, he finds that public officials and the message they present are important factors in determining who evacuates. This research comes to the same basic conclusions, which are residents' views of public officials, the content of warning messages and their perceived risk are the most important factors affecting evacuation.

## Conclusions

This analysis shows the importance of a number of factors that impact the hurricane evacuation behavior of New Orleans residents. The presence of black officials in a majority black city seems to produce higher evacuation rates for black residents. This is important because this type of information can provide city officials and administrators with a more effective strategy to get minority populations to heed evacuation warnings. This study provides a baseline for other studies to use race of the public officials as a mitigating factor in evacuation studies and or efforts in the future. Hence, not only does the warning message play an important role in the evacuation of minority population, it is evident that the race of the messenger is important as well.

Further, the findings of this analysis suggest that storm specific facts were the most important consideration in the evacuation decision-making process. Thus, public officials and the media should be more cognizant of the information they are giving residents and should coordinate their efforts better to ensure residents are receiving clear and accurate information regardless of who or what they perceive as the most important information source.

Finally, while no clear evidence was found to support the "crying wolf" hypothesis it is important to reiterate that there were no substantive differences in evacuation behavior for those who had a definite evacuation plan and those who did not. This suggests that even those residents with evacuation plans are hesitant to evacuate. This presents a problem for public officials because a large portion of the education process for disaster evacuation has been focused on individuals having evacuation plans. Therefore, it is important for public officials to find a better way to convince residents to use these plans when advised by them to evacuate.

By testing a model that examined the determinants of evacuation behavior of New Orleans residents I was able to confirm important relationships that exist in the previous literature on evacuation behavior as well as provide some provocative new information that opens up new avenues for the study of minority populations and the impact that public officials have on their evacuation behavior.

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## Appendix A Variable Descriptions

### Dependent Variable:

Variable Name: *Hypothetical Evacuation*

Question: If public officials in Orleans Parish recommended an evacuation because of the threat of a hurricane this year, what would you most likely do: definitely evacuate, probably evacuate, probably not evacuate, or definitely not evacuate?

The categories were then reduced to create a dichotomous variable coded as:

0= Those who would not evacuate

1= Those who would evacuate

### Independent Variables:

Variable Name: *Perceived Risk*

Question: How safe do you think you would be in your home if a Category 3 hurricane came near your area -- very safe, somewhat safe, or not very safe?

0= Safe

1= Not safe

Variable Name: *Evacuation Plan*

Question: Do you and your family currently have a definite plan for deciding whether to evacuate, where to go, and how to get there if a hurricane threatened?

0= No

1 = Yes

Variable Name: *Last Evacuation*

Question: Did you leave your home because of the threat created by Hurricane Georges in 1998?

0= No

1= Yes

Other Variable Names:

*Public Officials* include the following: (1) advice or ordered by public official, (2) advice or order from police officer or firefighter.

*Storm Facts* include the following: (1) concern about the severity or category of the storm, (2) storm increased in strength, (3) concern storm would cause home to flood, (4) concern flooding would cut off roads, (5) concern about direction of storm, (6) heard probability (odds) of hit, (7) concern about the speed of the storm.

*Media* include the following: (1) advice from the weather service, (2) advice from media.

*Family* includes the following: (1) advice from friend or relative, (2) concern regarding family.

Question: If a hurricane were threatening southeastern Louisiana, what is the most likely factor that would convince you to leave your home and go someplace else?

\*Respondents were asked this question as an open ended question and were allowed to give more than one response. These responses were then listed in rank order. The four variables listed above were created using the factors given by the respondents.

Demographic Variables:

Variable Name: *Race*

Question: Which race or ethnic background best describes you?

0= White

1= African-American

Variable Name: *Education*

Question: How many years of school have you completed?

1= Some High School

2= High School Graduate

3= Some College or Technical school Graduate

4= College Graduate(four year college)

5= Post Graduate work

Variable Name: *Income*

1 = \$9,999 and less

2= \$10-\$14,999

3= \$15-\$24,999

4= \$25-\$34,999

5= \$35-\$49,999

6= \$50-\$74,999

7= \$75-\$99,999

8= Over \$100,000

Variable Name: *Gender*

0= Female

1= Male

Variable Name: *Age*

1= 18-24

2= 25-36

3= 37-46

4= 47-56

5= 57-64

6= 65 and older