

4-29-2013

# Who Says I Should Leave? Factors Determining the Decision to Leave Home During Disasters

Vondragas J. Smalley

*Southern Illinois University Carbondale*, [vonsmalley@gmail.com](mailto:vonsmalley@gmail.com)

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## Recommended Citation

Smalley, Vondragas J., "Who Says I Should Leave? Factors Determining the Decision to Leave Home During Disasters" (2013). *Honors Theses*. Paper 356.

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**Who Says I Should Leave?  
Factors Determining the Decision to Leave Home During Disasters**

Von'Dragas Smalley  
*Southern Illinois University Carbondale*

*A thesis submitted to the University Honors Program*

*in partial fulfillment of the requirements for the*

*Honors Degree*

**Abstract:**

*In an effort to minimize casualties during natural catastrophes, specifically hurricanes, researchers have found that risk perception, socioeconomic status, and past evacuation experience are important determinants in evacuation behavior. This study argues that these factors as well as race are important determinants in the decision of individuals to evacuate in the face of natural disasters. My investigation employs chi-square analysis and cross tabulation to determine the importance of these factors. The findings indicate that these hypotheses may impact the decision of residents to evacuate in the face of natural disasters and warrant further study by those doing evacuation behavior research.*

**Introduction:**

The United States has experienced thirteen major hurricanes since the year 2000 (National Hurricane Center 2012). Hurricanes are becoming increasingly problematic for the Southeastern United States (Burnside 2006). Hurricane Katrina was responsible for over 2,200 deaths and 75 billion dollars worth of damage in southeastern Louisiana and southern Mississippi (National Hurricane Center 2012). The devastating impact of Katrina destroyed over 300,000 homes and 150,000 businesses and affecting about 90,000 square miles of land (Peek and Erickson 2007). These catastrophic natural disasters have resulted in hundreds of billions of dollars in damage. It is even more alarming that over 3000 American citizens have lost their lives due to these hurricanes (National Hurricane Center 2012). In an effort to minimize casualties during these natural catastrophes, researchers have attempted to analyze mass evacuation behavior on an individual basis. The most perplexing question concerning evacuation behavior during disasters is: what factors affect an individual's decision to evacuate or **not** during a natural disaster? This question is a major concern for most researchers and has recently begun to become integral in decision-making research for planning evacuations. The significance of this project is that it intends to give the public a better understanding of the decision making process for people evacuating in the wake of natural disasters. This project aims

to educate the public about the social and psychological factors involved with evacuation behavior.

### **Literature Review:**

This project combines two different genres of behavioral science. These genres are disaster and hazard research. Both genres directly aim to minimize human casualties during natural disasters. Disaster research deals with conducting field and survey research on individual and group threat perception and behavior. The Disaster Research Center (2012) hopes that their research can advance and communicate knowledge on the social and political dynamics that guide organizational and community preparation for, response to, and recovery from natural and technological disasters. The Center for Natural Hazards (2011) research postulates that *hazard research* "focuses on hurricane, tornado, flooding and erosion hazards as they affect different regions of the United States". The leading researchers at The Center for Natural Hazards, Kruse and Brown, research primarily looks at "the financial impacts of hurricanes and floods, the effectiveness of warning systems, how policy-makers should handle evacuations, and how households can protect themselves from natural hazards"(Kruse and Brown 2011). Both intend to "promote research and analysis that ultimately reduces the harm caused by forces of nature to life, communities and the environment" (Kruse and Brown 2011).

Carnes, Copenhaver, Sorensen, and Sodstrom suggest that research for human responses to environmental hazards and risks has been limited in scope. The premise for their argument is that "traditional research focuses on either individual response to the risks of an ongoing or future threat (hazards research), or group and organizational response to a specific disaster event (disaster research). Carnes, Copenhaver, Sorensen, and Sodstrom (1987) have expanded on the

limitations of traditional research by discussing the behavioral "differences in the...systems of beliefs associated with differing perceptions and ... positions between groups, even though they may have shared the same physical experience, is understandable if not always predictable". The divergent positions between groups are specifically identified in an attempt to explain the social psychological factors that affect the decision of an individual to evacuate (Riad, Norris, and Rubac 1999). To gain a more concrete understanding of the dynamics of mass evacuation, individual behavior must be first delved into to make collective generalizations. Riad, Norris, and Ruback (1999) understand that an individual's decision to evacuate can result from three social psychological factors: (1) risk perception, (2) social influence, and (3) access to resources.

Risk perception can be devalued by the source of the information being disseminated. Literature on risk assessment and evacuation notes that individuals must trust the source of information in order to act accordingly in any decision-making process (Newcomer 1991). Burnside (2006) concluded that source of the information being disseminated to a minority community is important because city officials and administrators can develop more effective strategies to get minority populations to heed evacuation warning. It is perceived that the risk of losing contact family members and children evokes more concern in an individual than the threat of harm that the disaster might bring. According to Skipp (2008), "two thirds of people with children would not comply with official orders to evacuate until and unless they were able to retrieve their children from school or daycare. Drabeck and Stephenson (1971) suggest that having family separated at the time of an evacuation is a major constraint in an individuals desire to leave in a timely manner during imminent danger. "The perceived risk is either heightened or minimized by the storm specific facts that are given to residents from the media. Risk perception is the most important factor when understanding an individual's desire to evacuate. However, the

social influences of community leaders coupled with socio-demographics also play a vital role in the decision-making process.

Fothergill and Peek (2003) reference a study to the response problems of Hurricane Hugo 1990 and these researchers “discovered that many of the victims had special need because of extreme poverty, high illiteracy rates, physical isolation in rural communities, fear and distrust of government officials, and lack of electronic media for weeks following the storm”. This led to representatives of service agencies reporting that it was unusually difficult to provide assistance to the rural poor following the storm. Thus, this type of dysfunctional dynamic of assistance with access to resources disconnects the relationship between public officials and community residents. This disconnection is virtually displayed by a lack of policies, which shows a lack of understanding of the demographic characteristics involved in with information dissemination and public behavior. According to Lindell, Lu, and Prater (2005) “it is noteworthy that those who were closer to the coast, rivers, or lakes were more likely to rely local authorities because this finding is consistent with recent finding by Zhang et al. (2004) and Wilmot and Mei (2004), but it is important to be aware of the caution by Baker (1991) that those high-risk areas receive more attention from authorities.” Thus, high-risk areas that receive more attention by public and local officials are not being helped properly when these officials are oblivious of the demographic barriers that allow individuals to perceive the threat of risk differently. Burnside, Miller, Rivera (2007) address the issue of the “crying wolf” in their discussion to suggest this as a reason many people in high risk areas do not evacuate in the face of natural disaster. In their article, Burnside et al explore the hypothetical behaviors of residents from the greater New Orleans area. Their argument puts forth that “individuals who have repeatedly experienced predictions of disaster did not come to fruition begin discount the validity of future warnings” (Burnside, Miller, Rivera

2007). Furthermore, these socio-psychological factors that affect the trust a resident has for the source of information concerning a possible evacuation when facing a natural disaster.

“As the size and scope of Hurricane Katrina become more apparent, issues of race, class, and segregation began to take on increasing significance in the national media and scholarly literature” (Zamore 2009). Burnside (2006) and Perry and Nelson (1991) posit that differences in demographic characteristics like race, ethnicity, and gender can affect how people respond to risk information. These different demographic variables can make it difficult for researchers to make definitive conclusions while attempting to influence a wide range of people to evacuate in the wake of disasters. According to Lindell and Perry (2003), ethnicity and culture can affect behavior when interpreting the importance of adhering to disaster information. It has been argued that individual level variables such as demographic factors are weakly related to evacuation (Burnside 2006). Burnside (2006) found that the social influence of black officials in majority black cities produced higher evacuation rates for black residents. It has been concluded that policy makers must "recognize the legitimacy of these divergent positions by allowing participation of the various interest groups...to ensure that the decision strategy is responsive to local concerns, thereby increasing the likelihood of acceptance of the ultimate decision and thus producing a publicly acceptable level of risk"(Carnes, Copenhaver, Sorensen, and Soderstrom 1987). Even if an individual understands the imperative nature of the perceived risk and has been socially influenced to adhere with the disaster evacuation plan, access to resources can be a hindrance.

Access to resources is very important in the decision making process to evacuate in the face of disaster. Financial power is arguably the most directly related factor to the access of resources. “Poor people around the world suffer the greatest disaster losses and have the most

limited access to public and private recovery assets, both in developing societies as well as wealthy industrialized nations like the United States” (Fothergill and Peek 2003). Looking at access to resources in terms of risk perception, Fothergill and Peek (2003) cite Palp and Carroll (1998) who “found that lower income groups tended to worry more about the loss of their homes to earthquakes than higher income groups.” Based upon the research of Gladwin and Peacock (1997), Burnside noted that these researchers “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” (Burnside 2006). “As many as 112,000 residents of New Orleans did not have their own vehicle at the time of the storm” (Zamore 2007). Many minorities stayed in low-income areas in New Orleans, as many as 27% of total residents did not own a vehicle in 2000 (Greater New Orleans Community Data Center 2011). 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” (Burnside 2006). Sorenson (1991) suggest that not having vehicle and lacking a place to evacuate are important constraints often overlooked when evaluating an individual's decision to leave in the face of imminent danger resulting from natural disasters. Poverty rates in New Orleans following Hurricane Katrina decreased from “18 percent in 1999 to 16 percent in 2009” (Plyer and Ortiz 2011). Although poverty rates have declined, “the number of individuals in poverty has grown since 2006” (Plyer and Ortiz 2011). While African-Americans only make 12% of the total national population, 38.2% of black children in America that are under the age of 18 live in poverty according to the 2010 U.S. Census (Humes, Jones, and Ramirez 2011). Nonetheless, with all these statistics it is still widely debated amongst research that socioeconomic factors play a role in risk perception.



Responsibility should be directed toward state and local governments to effectively disseminate information and create hazard mitigation policy to increase the ability and efficiency of citizens to evacuate in the face of disaster. Public officials and administrators in New Orleans can effectively plan future evacuation efforts by understanding the socio-psychological factors involved in the decision making process to evacuate. The purpose of this project is to use a wider range of data to understand the decision making process for evacuating New Orleans citizens in the face of future natural disasters.

### **Methodology and Procedure:**

This project will use data obtained from a survey of the evacuation behaviors of 12 Southeast Louisiana Parishes. This survey obtained usable responses from 4928 residents in 12 parishes that make up Southern Louisiana. The University of New Orleans Survey Research Center in collaboration with the Center for Hazards Assessment, Response, and Technology administered the survey. Data was collected using the random digit dialing (RDD) telephone survey that began March 30, 2004 and concluded on May 16, 2004.

Respondents were asked to answer questions concerning a hypothetical recommended evacuation. Questions were formulated to evaluate respondents' behavior depending on who disseminated the evacuation information, how much trust the respondent had for the information source, past evacuation experience, risk perception, and demographics. This survey was used to gather information on the decision making process of respondents in relation to their demographic identity.

This study uses descriptive statistics provided by survey respondents to identify and measure the factors that affect resident evacuation behavior. A cross-table descriptive statistics

method including chi-square will be used to analyze the survey data. Cross tabulations determine the existence of a relationship between variables. Using cross-table descriptive statistics allows a researcher to simply describe how the variables in a data set are related. Statistical software, SPSS, was used to conduct crosstabs bivariate analysis to compare the relationship between independent and dependent variables. Although the crosstab analysis will tell whether a relationship exist between two or more variables, a statistical test is still needed to determine if the relationship between variables is significant. Pearson Chi-square, which is the most commonly used test, will be used in this research to determine if the relationship is significant between variables. A cluster bar chart will be used as visual representations of these relationships.

According to Riad, Norris, and Ruback (1999) an individual's decision to evacuate can result from three socio-psychological factors: (1) risk perception, (2) social influence, and (3) access to resources. These factors in conjunction with demographic statistics can play a significant role in determining whether residents of New Orleans would decide to evacuate or not in the face of a natural disaster. Gladwin and Peacock (1997) concluded that when the risk perception variable is isolated, race would be a significant indicator of evacuation behavior. Their results suggest that non-white residents were less likely to evacuate during a hurricane or disaster. The research objective is to explain the social and psychological factors affecting evacuation behavior of residents in 12 parishes that make up Southern Louisiana.

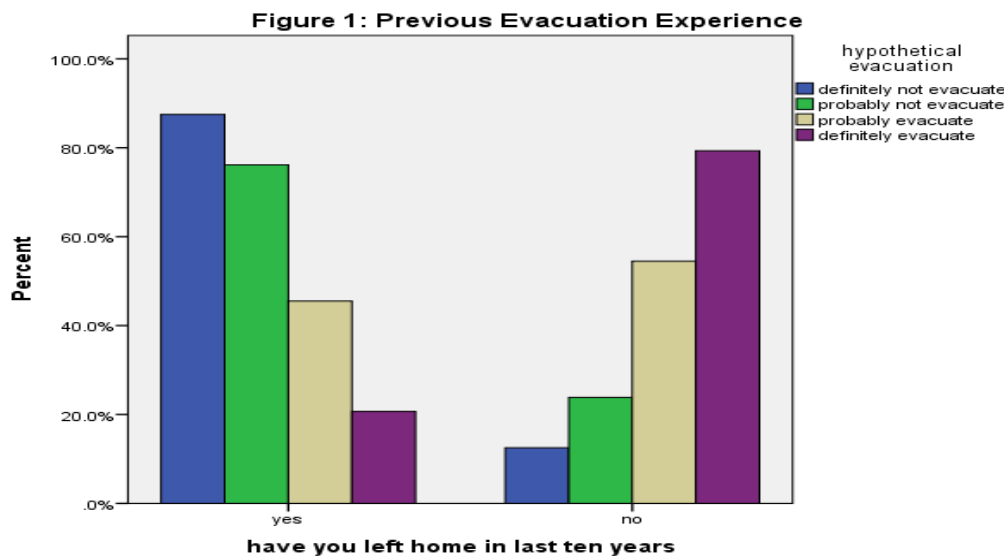
The following is hypothesized:

1. Residents who have left their home with the threat of previous disasters are less likely to evacuate in the face of a natural disaster.
2. Residents who perceive a higher level of risk to their safety during a Category 3 Hurricane are more likely to evacuate than those who do not.

3. Residents who have an evacuation plan are more likely to evacuate than those who do not.
4. Residents that are African American are less likely to evacuate in the face of a natural disaster than Caucasians.
5. Residents that are higher in socio-economic status are more likely to evacuate in the face of a natural disaster.

## Results:

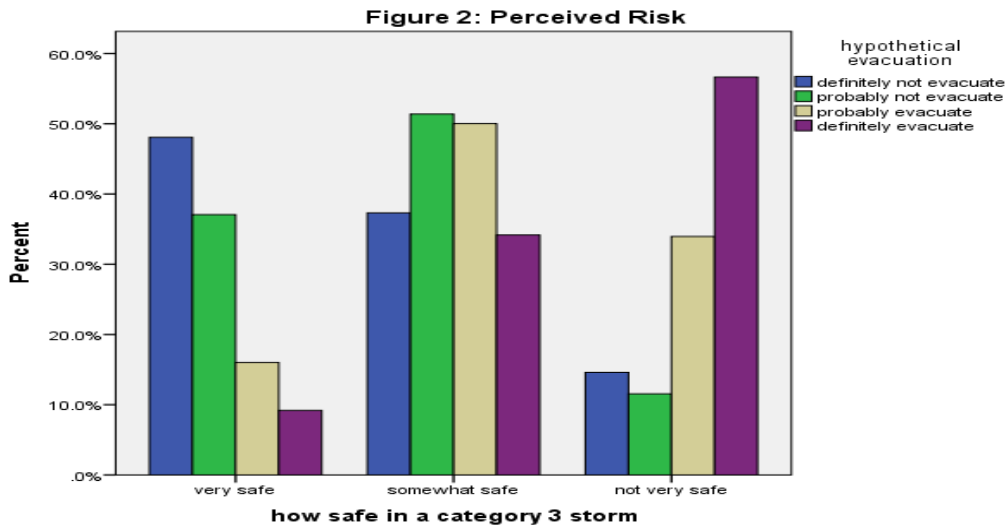
Turning to the first hypothesis tested, findings indicate that Hypothesis 1 was upheld. The “crying wolf” hypothesis put forth by Burnside et al (2007) is warranted by the data. Residents who have evacuated with the perceived threat of danger in the face of natural disaster that did not have damaging results are less likely to “definitely evacuate” than those who have not. Over 80% of respondents who have left in a previous evacuation said that they would “definitely not” evacuate. Inversely, about 75% of respondents who have never left in the face of natural disaster would “definitely evacuate” in the face of natural disaster.



Hypothesis 1: Pearson Chi-Square Asymptotic Significance = 0.00

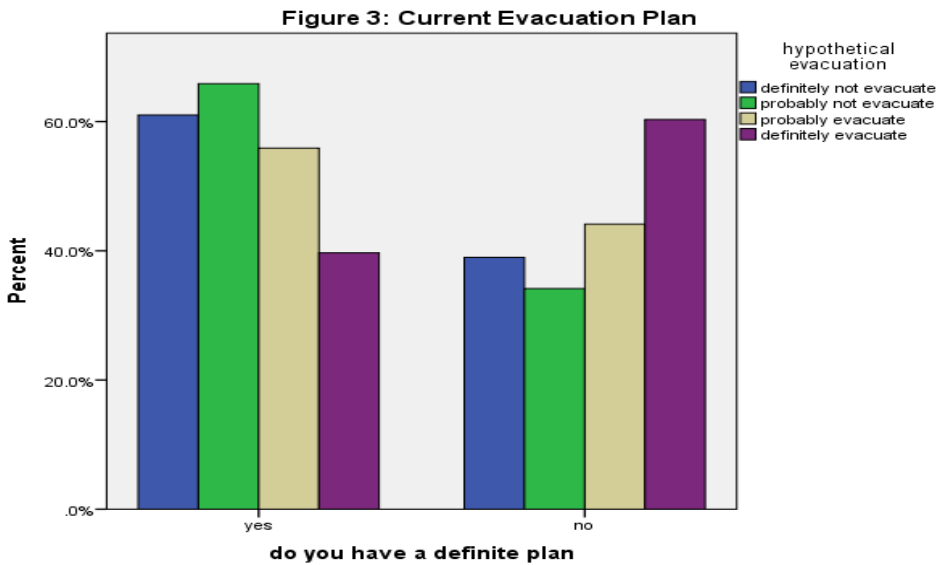
After conducting the test to prove the second hypothesis, findings indicate that Hypothesis 2 was upheld. Residents that feel very safe in category 3 hurricanes are more likely to not evacuate than residents that do not feel very safe. Over 50% of residents who said that they would feel very safe in category 3 hurricanes said that they would definitely not evacuate, while less than 10% that responded that they would “definitely evacuate” even if they felt safe. However, 60% of respondents who said that they do would “not feel very safe” would “definitely evacuate”. Literature suggests that it is generally perceived that the risk of losing contact family members and children evokes more concern in an individual than the threat of harm that the disaster might

bring. Thus, if an individual believes the threat of the disaster could harm them selves and their loved ones, individuals are more likely to evacuate.



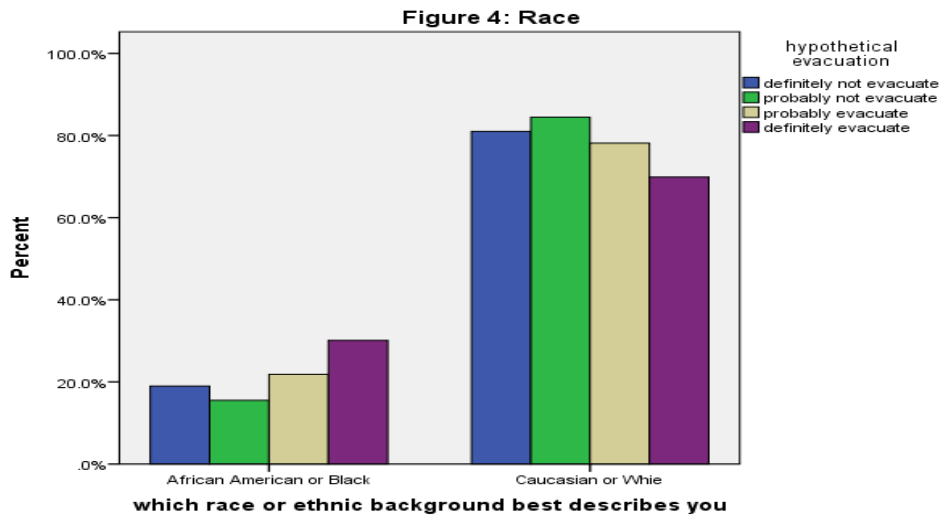
Hypothesis 2: Pearson Chi-Square Asymptotic Significance Value = 0.00

When testing the third hypothesis, findings indicate that my Hypothesis 3 was not upheld. Ironically, residents with a definite evacuation plan are actually less likely to definitely evacuate than residents without a plan. Approximately 60% of respondents who said that they would “definitely evacuate” do not have an evacuation plan. However, 60% of the respondents who said that they would “definitely not evacuate” currently have an evacuation plan.



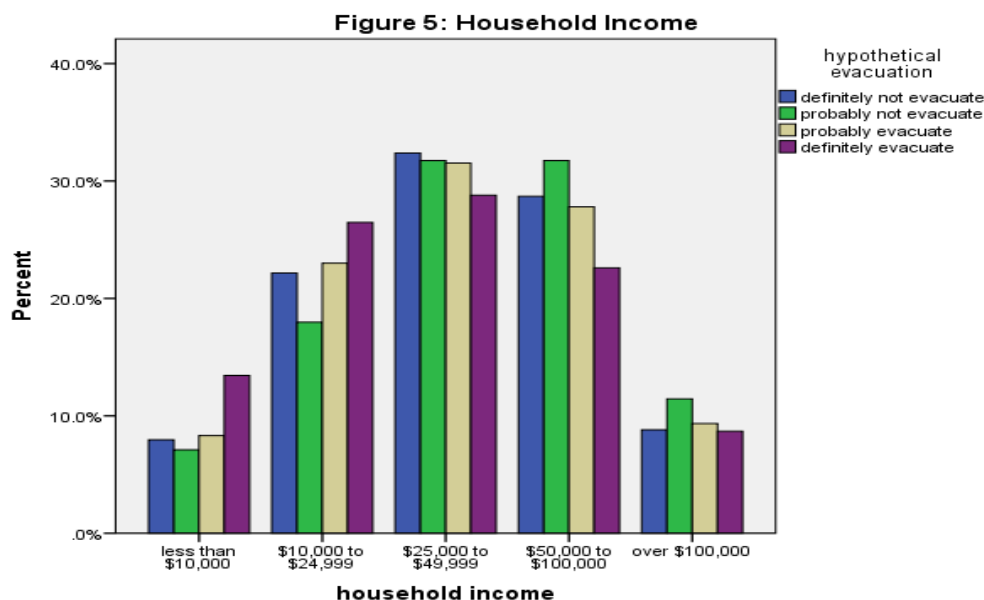
Hypothesis 3: Pearson Chi-Square Asymptotic Significance = 0.00

Findings indicate that Hypothesis 4 was upheld. African Americans are consistently more likely to evacuate than whites in the face natural disaster as well. Burnside (2006) and Perry and Nelson (1991) posit that differences in demographic characteristics like race, ethnicity, and gender can affect how people respond to risk information. Of the respondents who answered that they would “definitely not evacuate” 80% were Caucasian as opposed to the 20% that were African American. Researchers have argued that individual level variables such as demographic factors are weakly related to evacuation, however, the data implies a different view that supports Burnside et al (2006) theory.



Hypothesis 4: Pearson Chi-Square Asymptotic Significance = 0.00

After testing my last hypothesis, I found that Hypothesis 5 was not upheld. Residents that make \$25,000 and more are less likely to definitely evacuate in the face of natural disaster. More residents in the lowest income bracket said that they would definitely evacuate than residents in the highest income bracket. In each income bracket above \$25,000 respondents generally more inclined to either “definitely not evacuate” or “probably not evacuate”. Thus, it is interesting that individuals with more access to resources are less likely to evacuate.



Hypothesis 5: Pearson Chi-Square Asymptotic Significance = 0.00

### Conclusion:

Literature suggests the individuals past experience perceived risk of threat would inevitably affect the decision of an individual to evacuate in the face of danger. Both of the hypotheses that were formulated based on these decision-making factors were thus proven correct. There has been much debate amongst researcher as to the relationship between demographics and the decision to evacuate. However, this research shows there is a significant relationship between the decisions of residents to evacuate based on race and income. Findings indicate that more effort needs to be put forth in motivating African Americans and residents that are not in considered financially middle-class. Furthermore, researchers can probe more and find out why residents in higher income brackets with more access resources are less likely to evacuate. The data contradicts seemingly linear logic and supported extrapolations that state that individuals with more access resources are more likely to evacuate in the face of major hurricane.

A shortcoming of this research is that it does not account for the advancements in technology. Technology, such as smartphones and laptops, has made access to publicly disseminated information irrevocably easy. “Sources of information, including The Weather Channel and numerous private and governmental web sites, provide forecasts as well detailed current and background information around the clock” (Dow and Cutter 2001). Further scholarship can be conducted to test the effectiveness of emergency wireless notification systems as well as the public’s trust for these new and efficient sources of information. Burnside et al (2007) concluded that the effectiveness of disseminating information by public officials who act as information sources and the perception of risk are factors that improve the likelihood of individual’s decision to evacuate. This research could give public officials and other researchers the opportunity to measure how much trust the public has for disaster information that is disseminated using technology, specifically cell phones and laptops.

This survey was administered a year before Hurricane Katrina. It would be very interesting to see how residents’ opinions have changed following Hurricane Katrina. This survey is problematic because it allows participants to remain on the fence and indecisive with answer that include “probably”. This indicates that maybe there are other factors that can come into play when residents are making decisions on whether to evacuate or not in the face of natural disaster. As researchers we need to ask respondents more probing questions to get more concrete and definitive answers on what factors affect an individual’s decision to evacuate or **not** during a natural disaster.

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