Homeowner Behavioral Intent to Evacuate After Flood Risk Warnings

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ABSTRACT

The purpose was to create a model for improving resident attitudes toward flood evacuation warnings. Survivors of Hurricane Sandy in New York City were surveyed to test hypotheses based on a behavioral intent construct developed from the social-psychology literature. Expectancy Theory and Theory of Reasoned Action served as the basis for the personal attitude and social norm factors. Near disaster experience was derived from natural disaster studies to form a moderator of personal attitude. Credibility of the evacuation message source was engineered from Balance Theory in the consumer behavior literature as a modifier for social norms. A statistically significant model was developed using correlation, stepwise regression, ordinary least squares regression, and logistic regression. Only two composite factors were needed to capture 55.4% of the variance for behavioral intent to evacuate. The model predicted 43.9% of the evacuation decisions, with 13.3% undecided, leaving 42.8 incorrectly classified, using an ex post facto design (N=405).

Keywords: Balance Theory, Behavioral Intention Model, Disaster Planning, Expectancy Theory, Flood Risk, Home Owners, Hurricane, Theory of Reasoned Action

INTRODUCTION

Tragically over 8,000 people died in the Galveston Hurricane on the Texas Gulf Coast during the summer of 1900 (Rappaport, 1997). In 1972, even after several days knowledge of an ensuing natural disaster, Hurricane Agnes killed 122 people along the Atlantic coast (Porter, 2013). In 2005, after five days of warnings, unfortunately 1,833 people died at the hands of Hurricane Katrina near the northern Gulf of Mexico coast (AP, 2012b; Knabb, Rhome & Brown, 2006). In 2008, Hurricane Ike claimed 100 lives from the Galveston area despite evacuation orders (Berg, 2009). In 2012, seven years after Katrina had destroyed New Orleans, Hurricane Isaac killed seven people across five states (Anderson, 2012; AP, 2012a; Bojorquez, 2012; Menon & O’Grady, 2012). Notwithstanding modern early warning systems, National Oceanic and Atmospheric Administration (NOAA) reported that 72 people died later in 2012 from Hurricane Sandy which struck the New York and New Jersey Atlantic coasts (Porter, 2013).

These hurricanes were representative examples of the hundreds of natural disasters that have killed people in USA despite ad-
vance warnings. Natural disasters have been equally as devastating around the world, such as the earthquake-tsunami which struck Japan in 2011 (Menon & O’Grady, 2012). These deaths could have been prevented if the residents had evacuated. More research is needed about how to motivate people to evacuate before natural disasters occur (Cigler, 2009; Horney, PiawD.M. MacDonald, Willigen, Berke & Kaufman, 2010; Kim & Kang, 2010; Lee, Meyer & Bradlow, 2009).

The importance of planning for natural disasters can also be highlighted from an economic basis. Although life insurance claims account for only a fraction of the costs stemming from disasters, the large financial losses associated with property damage illustrates the significance of these catastrophic events (Basora, 2012). Property reinsurance companies such as Munich (the largest in the world) claimed a three-decade trend shows a steady global increase in weather and climate related disasters (Basora, 2012). According to Munich, weather-related natural disasters in 2011 exerted the costliest toll in history, amounting to $380 billion worth of losses from earthquakes, floods, tornadoes, hurricanes, wildfires, and tsunamis (Naismith, 2012). “A new tally shows New York City has been working overtime on Superstorm Sandy recovery – more than $150 million of it” (Rice, 2013, p. 1).

Research Problem

An important root cause of natural disaster risk response planning asserted in existing studies was that many residents were not taking action after evacuation warnings had been issued (Dillon, Tinsley, & Cronin, 2012; Lonfati, Boissonsade, & Muirwood, 2007; Venette, 2008). When people do not evacuate, this increases costs for paramedics, firefighters, police and other resources, not to mention putting residents at a higher risk for injury or death (Naismith, 2012, para 1).

Furthermore, the worst is yet to come because storms are getting stronger due to higher offshore intensification rates. “There is evidence of upward trends in the intensity of the strongest hurricanes” (Malmstadt, Elsner, & Jagger, 2012, p. 2131). This increase in natural disaster occurrence, combined with socio-economic tolls, and the lack of evacuations, are justification for more research into risk planning (Ge, Peacock, & Lindell, 2011).

The purpose of this study was to identify which factors could motivate homeowners to evacuate after evacuation warnings. The goal of this study was to develop a statistically significant model that can be used for planning stakeholder messages in advance of an approaching life-threatening natural disaster.

The underlying problem was that numerous studies indicated residents did not evacuate despite advance warnings of an impending disaster (Comfort, Oh, & Ertan, 2009; Dillon, Tinsley, & Cronin, 2011; Lonfati et al., 2007; Venette, 2008). According to several case studies of hurricanes, citizens with prior disaster experience often chose to stay in their homes, disregarding evacuation orders (Horney et al., 2010; Stein, Duenas-Osorio, & Subramanian, 2010). Research indicated it was even more likely that inexperienced home owners would ignore evacuation announcements (Comfort et al., 2009; Horney et al., 2010; Lonfati et al., 2007; Stein et al., 2010).

The population of interest for this study were New York home owners that may hesitate to evacuate when faced with the risk of flooding, which in turn could result in their death, or incrementally increase the costs associated with ongoing emergency response and medical aid. Tenants of rental properties, and others staying in public facilities were by definition of the problem beyond the scope of this study.

Theoretically, this research was situated within the planning phase of the risk management model described by Goodwin and Strang (2012) since evacuation warnings are given after an approaching disaster event has been identified and assessed. The method chosen to study this problem was to use behavioral models to guide item construction, surveys to collect data, and descriptive as well as inferential statistical techniques to test hypotheses.
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