

HOW NEWS BREAKS: TRACKING THE USE OF VISUAL MEDIA CUES TO MAKE EVACUATION DECISIONS AFTER HURRICANE MICHAEL

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*By Cory L. Armstrong, Jue Hou and Nathan Towery
University of Alabama*

1. INTRODUCTION

This study sought to measure risk perception and behavioral intention coastal counties in southern Alabama and northern Florida in areas affected by Hurricane Michael in October 2018. The aim was to examine individual responses to impending disasters in areas that were recently touched by Hurricane Michael. We developed an experiment testing how visual cues and media messages surrounding an impending hypothetical hurricane were interpreted by residents and their reported influence on an individual's risk perception and decision-making in the situation.

Researchers have found that most weather-related graphics in the United States give too much attention to describing the hurricane, while failing to contain vital information for the public to make appropriate decisions. The lack of information tends to include the estimated landfall time, procedure and moment to take action, as well as other critical problems, such as inconsistency between sources and forecasting error (Radford, Senkbeil, & Rockman, 2013; Sattler & Marshall, 2002). This study attempts to address those issues, using an experimental design to test the effectiveness of television news graphics and video in helping to share urgent weather issues.

Collectively, research suggests that individual decision-making when dealing with severe weather situations is based on a variety of factors, including prior exposure to severe weather, information gathered from friends, neighbors, authorities and the media, as well as on-site evaluation (Lindell & Perry, 2004; Perry, Lindell, & Tierney, 2001).

Even though the effectiveness of these factors might not be questionable, the magnitude of their influence on people's actual choices when severe weather hit tended to be exaggerated (Baker, 1991). For instance, Ruch and Schumann (1997) predicted an 89% evacuation rate in the Texas area based on their survey result. Yet, when Hurricane Bret actually struck Texas in 1999, only 29% of the population complied after receiving evacuation advice (Prater, Wenger, & Grady, 2000).

2. THEORETICAL FRAMEWORK

This research will build upon existing theory in risk, disaster, communication and message design literature to examine how social and mediated influences inform and motivate individual evacuation decision-making. The theoretical framework employed for this analysis is focusing on the risk information seeking and processing (RISP) model (Griffin, Dunwoody, & Neuwirth, 1999) and theory of planned behavior (TPB; Azjen, 1985). These two theories help to identify and explain factors that contribute to and influence how individuals make decisions related to preparing for severe weather. Significant research has applied and tested these theories in health and environmental contexts. For example, Kellens, Zaalberg, and De Maeye (2012) examined residents living on flood plains in Belgium, while Yang, Seo, Rickard, and Harrison (2015), explored views and knowledge on climate change.

Despite myriad studies of the two theories, we believe this will be the first to apply this framework to hurricane-related research. It will build on details from Riad, Norris and Ruback (1999), who found that three basic reasons that individuals choose not to evacuate: overall risk perception; social influence from others; and access to resources, both in their community or evacuation area. In perhaps the closest studies to date, a group of researchers attempted to understand how past experience with hurricanes can influence their current and future view of risk perception (see Morss et al.,

* *Corresponding author address:* Cory L. Armstrong, University of Alabama, College of Communication and Information Sciences, Box 870172, Tuscaloosa, AL 35487 email: cory.l.armstrong@ua.edu

2016; DeMuth et al., 2016). The authors have investigated how past hurricane survivors process various forecast and warning message strategies to determine their intentions to evacuate during a hurricane. One of their studies found that factors such as prior financial loss and property damage can combine with emotional distress to influence behavior intention (DeMuth et al., 2016).

3. RESEARCH QUESTIONS AND METHODS

The specific research questions include: What visual elements on the broadcast screen are most effective in increasing an individual's likelihood to take shelter from immediate or predicted danger? How do social vulnerability factors, including location, race, education and gender contribute to the effectiveness of the message? In December 2018, respondents were selected from counties along the northern Florida and Alabama coastline, with about 40 percent from areas within the path of Hurricane Michael. The respondents were randomly placed into one of three conditions, each of which described a hypothetical "Hurricane Farrah," which was 24-to-48 hours from landfall nearby. Each condition contained a different graphic: 1) a hurricane cone of uncertainty, 2) live video of hurricane-like conditions or 3) a text-only statement from the National Weather Service.

4. RESULTS AND DISCUSSION

Data were collected on 567 respondents within and near the path of Hurricane Michael. Analyses determined that the live video was most likely to motivate respondents to prepare activities for the storms, when compared with the other conditions, while none of the models had significant influence on respondents' likelihood to seek more information. Women, nonwhites, less educated and those in rural areas were more likely to engage in preparatory activities for the storms. In terms of information gathering about the event, female, white and less-educated respondents were higher information seekers, along with those who received damage during Hurricane Michael.

Prior research has indicated that certain vulnerable populations, including the less-educated and minority populations, are less likely to evacuate most areas, despite threats of imminent danger (e.g., Dash & Gladwin, 2007). It follows then that these populations would likely

seek additional information when being told of potential severe weather, so that they can make informed decisions. Conversely, those who are less socially vulnerable, are less in need of additional information to make their decisions.

The reliance on live video for decision making makes intuitive sense, as when individuals are considering whether to take precautionary activities, they generally want to know where the storms are headed and conditions outside. These findings can help broadcasters better target their messages moving forward.

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Table 1: ANCOVA for Likelihood to take action after viewing stimuli

Variable	<i>M</i>	<i>F(df)</i>	<i>p</i>	Mean Square
Urban or Rural		4.54(1)	.03*	280.08
Urban	37.85			
Rural	39.42			
Length of Time		.94(1)	.33	57.70
< 9 Years	38.96			
> 9 Years	38.10			
Frequent Search		17.60(1)	.01**	1086.19
Stimuli Group		2.88(2)	.06	177.48
Computer Model	37.85			
Live Shot	39.82			
Writing Notice	38.25			
Race		3.48(1)	.06	214.11
Minority	39.48			
White	37.79			
Gender		5.01(1)	.03*	309.11
Male	37.84			
Female	39.44			
College Degree		4.48(1)	.03*	276.41
College	37.92			
No College	39.35			
Damage from Michael		1.18(1)	.28	72.90
Yes	38.27			
No	39.01			
Error		(557)		61.70
Total		(567)		

* $p < .05$, ** $p < .01$
N = 567

Caption: This table demonstrates the analysis of co-variance on an individual's likelihood to take preparatory action during a major hurricane outbreak after viewing one of three broadcast simulations (Stimuli group).

Table 2: ANOVA for Post-Test Information Search Hurricane

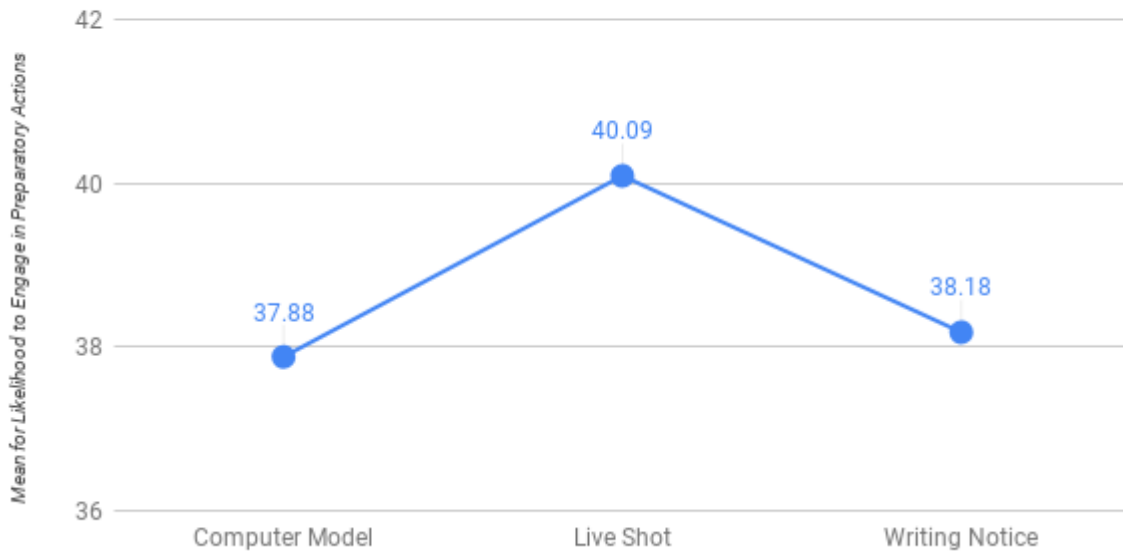
Variable	<i>M</i>	<i>F(df)</i>	<i>p</i>	Mean Square
Urban or Rural		.49(1)	.49	118.31
Urban	57.66			
Rural	58.71			
Michael Damage		5.31(1)	.028*	1267.60
Yes	56.38			
No	59.99			
Length of Time		2.14(1)	.14	511.81
< 9 Years	59.2			
> 9 Years	57.18			
Stimuli Group		.77(2)	.46	184.74
Computer Model	57.08			
Live Shot	59.14			
Writing Notice	58.06			
Race		9.52(1)	.01**	2273.30
White	55.36			
Minority	51.02			
Gender		15.76(1)	.01**	3763.91
Male	55.46			
Female	60.92			
College Degree		11.03 (1)	.01**	2634.69
No College	60.45			
College	55.93			
Error		(558)		238.76
Total		(567)		

* $p < .05$, ** $p < .01$

N = 567

Caption: This table demonstrates the analysis of variance on an individual's likelihood to search for more information on a specific hurricane after viewing one of three broadcast simulations (Stimuli group).

Fig. 1: Likelihood to Engage in Preparatory Activities after Viewing Media Message



Caption: This figure demonstrates the mean likelihood for an individual to take preparatory action during a major hurricane outbreak by the individual broadcast simulations each person viewed.

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