Studying the influence of housing conditions on hurricane and flooding evacuation intentions in Florida

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1. Background

Literature regarding risk perception has been growing; however, there is generally a paucity of research on how risk perception is shaped in a disaster context, and there is even less research on how housing conditions influence risk perception in the context of severe weather hazards. The few disaster studies that looked into housing conditions mainly focused on one type of housing, such as mobile homes or manufactured housing, and considered a small range of housing characteristics, mostly represented by housing size, age, and location. To our knowledge, no studies have yet been conducted to explore in-depth the relationship between housing conditions and risk perception, and how that relationship influences hurricane and flooding evacuation decisions. Correspondingly, this study aims to fill this research gap by answering the following question: "How can housing conditions influence people's hurricane and flooding evacuation intentions?" Evacuation planning in Florida is a crucial component of disaster preparedness, especially in light of the frequent hurricanes and flooding that affect the state. The significance of evacuation is highlighted by the fact that every county in Florida faces the potential impact of hurricanes and flooding.

2. Planning and Process

A quantitative approach was utilized in this study, involving a questionnaire filled by participants (N=816) in five cities in Florida: Miami, Tallahassee, Jacksonville, Gainesville, and Ocala (see Figure 1). The questionnaire was initially constructed based on the review of critical literature. To ensure the questionnaire addresses the study's aim, eight scholars from various research backgrounds (human behavior, disaster studies, construction management, and interior design) participated in Subject Matter Expert's Validation and Questionnaire Face Validity. The questionnaire pretesting was conducted on eleven participants, while the pilot-testing was conducted on 42 participants. To ensure an adequate sample size, a confidence level of 95% and a confidence interval of 5 were taken into consideration in determining the sample size. Using Excel, DataTab, and SPSS software package, different statistical approaches were used to uncover patterns and quantify variables in a way that can quantify behaviors and attitudes. The Cronbach's Alpha (CA) and Split Half Reliability (SHR) tests were used to check internal consistency for the responses gathered.

Figure 1. Research locations for data collection in Florida

#	Independent variable	Threat Possibility	Threat Severity
		VSF	VSF
1	Age (in years)	0.38	0.50
2	University/College	0.75	0.63
3	Role/Occupation	N/A	0.88
4	Required Dwelling Repairs	0.50	0.01
5	Is Dwelling on Ground Floor?	0.38	N/A
6	Hurricane Past Experience	0.38	0.50

-VSF (Variance Significance Factor): Very weak (0,0 < 0,1), Weak (0,1 < 0,3), Medium (0,3 < 0,5), Strong (0,5 < 0,7), Very strong (0,7 < 1)

-VSF is only calculated for the variables with a p<0.01 (Kruskal-Wallis / Mann-Whitney U-Test).

-VSF is a value between 1 and 0, where 1 means that the variance significantly affects the other significant variances and is not being significantly affected by any of them, and 0 means that the variance doesn't significantly affect the other significant variances, but it is being significantly affected by all of them.

Table 1: Variance Analysis (Risk perception)

3. Solutions & Results

Based on the analysis, statistically significant variance in risk perception was only found in two housing characteristics: 1) Required Dwelling Repairs, & 2) Whether the Dwelling is on the Ground Floor or not (see Table 1). Moreover, risk perception had an insignificant impact on evacuation intentions based on the logistic regression analysis. Nevertheless, efficacy and social norms (see Table 2). The data was collected during the hurricane season, but there wasn't an approaching storm; however, if there was an approaching storm, the risk perception could've had a significant impact on people's intention to prepare for that particular storm. Consequently, if we want to motivate people to prepare for the hurricane season at the beginning of the season and without having any detected storm on the radar, the emergency communication should not significantly highlight the danger that a storm can cause or trigger a sense of danger among people because their risk perception doesn't have a significant impact on their intentions to prepare at the point. At the same time, if there is a storm approaching, emergency communication needs to change, and risk perception needs to be considered in the communication. Either way, using the same unified emergency communication for the entire hurricane season will not be as effective because people perceive the same communication differently based on whether or not a storm is approaching.

On the other hand, it might be complicated to define the role of risk perception in adopting disaster protective behaviors, but efficacy and social norms seem to have a significant impact on people's intentions to take any disaster-related behavior in any context (see Table 2), and that is why our emergency communication should always fully cover these components by clearly explaining how to prepare and how preparing can make a big difference in case of an actual hurricane. Also, here, generalization of the communication can harm the process; it is true that we always want to trigger and build high efficacy among people, but that could mean different things to different groups, and the message needs to be personalized enough for them to take it seriously. In addition, authorities can emphasize community behavior and collective action. Emergency communication should highlight how many residents are evacuating to create a sense of urgency and social proof. Utilizing social media can amplify this effect by encouraging community members to share their evacuation plans and experiences, reinforcing the norm of leaving.

Model	Coefficient B	Standard error	z	p	Odds Ratio	95% conf. interval
Threat Possibility	0.8	1.07	0.75	0.455	2.23	0.27 - 18.23
Threat Severity	0.62	1.12	0.55	0.582	1.85	0.21 - 16.74
Self-Efficacy	4.17	0.63	6.63	<.001	64.74	18.86 - 222.27
Response Efficacy	4.55	0.71	6.36	<.001	94.2	23.22 - 382.19
Subjective Norms	5.98	0.78	7.62	<.001	396.31	85.15 - 1844.47
Responsibility	2.06	0.76	2.7	0.007	7.81	1.76 - 34.69
Constant	-9.91	0.94	10.58	<.001	-	-
Chi2	df	p	-2 Log-Likelihood		Adjusted R^2 (Nagelkerke R^2)	
322.24	4	<.001	391.29		0.62	

Table 2: Logistic Regression (Dependent Variable is "Intention to Prepare an Evaluation Plan")

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