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To cite this article: Kenneth A. Lachlan, James DiCairano & Christine Gilbert (23 Nov 2023): Examining the Links Between Information Sufficiency, News Preferences, and Protective Behavior During Hurricane Ian, Communication Studies, DOI: [10.1080/10510974.2023.2285968](https://doi.org/10.1080/10510974.2023.2285968)

To link to this article: <https://doi.org/10.1080/10510974.2023.2285968>



Published online: 23 Nov 2023.



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Examining the Links Between Information Sufficiency, News Preferences, and Protective Behavior During Hurricane Ian

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ABSTRACT

Natural disasters such as floods and hurricanes are global occurrences affecting countries, counties, and communities. These extreme weather events can cause feelings of uncertainty and produce a range of high consequence outcomes. As a result, individuals can be expected to seek out information to further understand how they will be impacted. With Hurricane Ian as the focus, this study examined the impact of source preferences on protective behaviors, while evaluating their relationship with information sufficiency. Florida residents living in counties impacted by Hurricane Ian completed an online survey in the weeks following landfall. Source preference assessed reliance on various news outlets and yielded three factors: high reliability, low reliability, and traditional media. While none predicted the likelihood of mitigation, overall reliance on all three correlated with likelihood of evacuation. Furthermore, residents who expressed information insufficiency spent more time seeking information and were more reliant on traditional media. The findings contribute to our understanding of news use and preferences before a natural disaster, along with their impact on likelihood of evacuation and mitigation.

KEYWORDS

Crisis communication; risk communication; media dependency; natural disasters

Hurricane Ian, which made landfall in southwest Florida as a category four storm on September 23, 2022, has been declared the deadliest hurricane to hit Florida since 1935 and is the third-most expensive weather disaster globally (Masters, 2022; Masters & Henson, 2023). It was initially forecast to be a direct hit to the Tampa Bay area, but its trajectory changed shortly before landfall (Finch, 2022). Estimates suggest that the storm surge reached levels of 10–15 feet, which resulted in catastrophic damage to low-lying barrier islands and structures, as well as destruction in areas previously unimpacted by flooding events (Masters, 2022). In total, 149 deaths have been attributed to Hurricane Ian, with the majority coming from Lee County (72); this likely reflects the particular impact of the storm on Fort Myers, a populous city on the southwest coast of Florida (Florida Department of Law Enforcement, 2023). In addition to the storm's strength, criticism has been levied against public officials, notably in Lee County, that evacuation orders were delayed, possibly elevating the high death toll (Finch, 2022; Robles et al., 2022).

Access to reliable and timely information, including evacuation or shelter-in-place orders, is critical during extreme weather events such as hurricanes or floods.

Understanding where, how, and to what extent Florida residents obtained information during Hurricane Ian can provide insight into how communication can be improved for future storms and how the ever changing media environment (e.g., the role of social media) impacts at-risk audiences in times of extreme uncertainty. This study, focused on residents in counties impacted by Hurricane Ian, builds on previous research concerning information seeking behavior, sufficiency thresholds, and what channels people turn to for information in moments of crisis.

Information Needs During Disasters

By definition, disasters are non-routine events that generate high degrees of uncertainty, disrupt routine activities, and compel individuals to take protective and/or remedial measures. A key component of this process is the acquisition of information, which can be used to drive behavioral change, efforts to mitigate harm, and even spontaneous relief and rescue activity (Kendra & Wachtendorf, 2003; Palen & Liu, 2007; Perry et al., 2001). Despite the apparent effectiveness of individual level learning and behavior processes, policies addressing disaster relief often ignore individual actions, focusing instead on state or federal level management, depending on the specifics of the disaster in question (Sutton et al., 2008).

Much of this behavioral modification can be traced to information sought and acquired. In the timeframes leading up to and following natural disasters, these risk messages are typically assigned to one of two categories: pre-event (educating, warning, and preparing), and post-event (recovery and rebuilding). While a substantive body of research has investigated messaging strategies and speculated about their relative effectiveness, less is known about how information is used in sensemaking, how it drives pre-disaster preparations, what sources people are likely to turn to for this information, and the manner in which processing this information may influence mitigation efforts. Therefore, a useful framework for the exploration of these processes is Media Dependency Theory.

Media Dependency Theory (see DeFleur & Ball-Rokeach, 1989) posits that individuals are prone to develop trust and expectations regarding specific information sources, and when satisfied with the consumption of this information, they are likely to return to familiar sources that have met their needs in the past. Further, when audiences are presented with highly uncertain or threatening circumstances, these dependencies are likely to intensify, and this reliance on trusted sources may become even stronger. Unsurprisingly, a long history of research on disasters and media reliance has concluded that mediated information may be effective in motivating preferred audience responses (see Hindman & Coyle, 1999; Lowrey, 2004).

Much has been made of the link between political orientation and news preferences; indeed, there is some evidence to support the notion that perceived political alignment of risk information sources may impact reliance. A recent systematic review suggests that existing belief structures surrounding health and safety behaviors may impact the interpretation of the information presented, along with subsequent willingness to engage in recommended protective actions (Olson et al., 2020). This politicization is particularly concerning when considered alongside evidence that selective exposure based on perceived political alignment will serve to drive attitudinal polarization (Garrett et al., 2019; Jones, 2002; Stroud, 2007, 2008, 2010).

In addition to political identity, recent research (Gilbert & Lachlan, 2023; Lachlan & Gilbert, 2023) argues that these media dependencies concerning health and risk contexts may involve numerous other factors. While a significant body of literature supports the notion that risk information may be seen through a political lens, Lachlan and Gilbert (2023) found evidence that other forces may be driving preferences for specific news sources when seeking such information. This particular study found factor analytic evidence that preferred sources for health risk information may not be dependent on political consistency but may be more likely to cluster around level of information reliability and motivated seeking. Highly regarded news outlets such as the Wall Street Journal and The New York Times clustered together as “high reliability” outlets, while news outlets such as BuzzFeed and Breitbart, organizations perceived as less reliable and often more politically biased, clustered together as “low reliability” outlets. A third factor, titled “legacy media,” included the outlets CBS, ABC, NBC, and CNN. It should be noted that this study did not ask participants to indicate *how* they obtained information from these channels – such as a New York Times physical newspaper or their Twitter feed – it was the media organization that was most of interest in considering the acquisition of risk information. In other words, audiences may experience a range of perception in terms of the severity of the crisis and/or the amount of information they believe they need to make informed decisions; this sense of information sufficiency may motivate information seeking from sources with greater or lesser reliability.

While not directly tested, these studies offer a potential explanation for these dependency patterns concerning environmental risks. It may be a function of motivation to acquire information, as impacted individuals who believe they need more information in order to make decisions may seek out a more accurate and nuanced understanding of the risk. Furthermore, they may seek a wider range of sources and engage in motivated consumption of more reliable content containing specific details and information on behavioral remedies (see Chen, 2018; Dvir-Gvirsman, 2015; Jung et al., 2020; Wei et al., 2007, 2010, 2015). This argument is consistent with past research in dual-process models of information processing, which argue that individuals will continue to seek and actively process information until they believe they have enough information to confidently make an informed decision (Eagly & Chaiken, 1993). If this *sufficiency threshold* is met, the individual will believe they can make a good decision and will likely stop scanning, but if the threshold is not met, they will continue to scan until they have the information that they need (Thompson et al., 1994).

Using a similar logic, recent research explicating the Risk Information Seeking and Processing Model (RISP; Griffin et al., 1999) posits that *information insufficiency* will drive information seeking, as impacted individuals will continue to monitor until they think they have enough knowledge to make quality decisions (Yang et al., 2011). The RISP literature also dovetails with the media dependency arguments outlined above; it identifies *channel beliefs* as an important consideration in risk information seeking, as motivated information seeking is likely to drive individuals toward information sources they already find trustworthy (Griffin et al., 2002; Yang & Liu, 2020). While much of this research has focused on general patterns of information seeking (see Griffin et al., 2002; Yang & Liu, 2020; Yang et al., 2022), a smaller number of studies have considered whether these channel beliefs and sufficiency thresholds motivate differential source preferences (see Hwang & Jeong, 2020; Jin & Lane, 2023). These studies suggest that information seeking may be a function of both motivating factors and beliefs concerning specific sources.

The logic outlined above suggests that the motivated processing that can be expected from high-consequence events such as natural disasters likely drives individuals toward sources that align with the degree of information quality they believe necessary. Scant recent studies in other disaster contexts have posited that these media dependencies may emerge as a product of desired reliability of information and/or occur as a consequence of motivated processing (Gilbert & Lachlan, 2023; Lachlan & Gilbert, 2023); however, a link between this process and sufficiency thresholds has not been established, nor has one between sufficiency thresholds and mitigation behaviors. The three-factor model of dependencies has been tested in the context of COVID-19 (Lachlan & Gilbert, 2023) and climate change risk perception (Gilbert & Lachlan, 2023), but has not been tested on an acute natural disaster with a specific timeframe and geographic impact. Using the natural laboratory of 2022's Hurricane Ian in coastal Florida, the current study aims to replicate the three-factor structure of risk information media dependencies, examine the impact of information sufficiency on preferences for risk information of varying degrees of reliability, and the link between these content preferences and protective actions. To that end, the following hypothesis and research questions are proposed:

H1: Source preferences for information concerning Hurricane Ian will fall into one of three factors: high reliability, low reliability, or traditional media.

RQ1: Will information insufficiency predict reliance on high reliability, low reliability, or traditional media?

RQ2: Will information insufficiency predict time spent seeking information?

RQ3: Will reliance on high reliability, low reliability, or traditional media predict the likelihood of mitigating against Hurricane Ian?

RQ4: Will reliance on high reliability, low reliability, or traditional media predict the likelihood of evacuating ahead of landfall?

The analytic plan to address these hypothesis and research questions consists of three parts. First, a Confirmatory Factor Analysis was performed in AMOS to verify the proposed factor structure of the source dependency measure (see below). Next, a series of regression analyses examined the research questions. For research questions one and two, a series of hierarchical regression analyses entered demographic variables on the first step, with the addition of key predictors on the second. Similarly, for research questions three and four, logistic regression analyses were used first to examine the impact of demographic variables on mitigation and evacuation, followed by analyses that included source preferences in the model.

Methods

Data were collected through Qualtrics, between the dates of October 26, 2022, and November 28, 2022. The sample consisted of 1,030 participants living in Florida counties

that were directly impacted by Hurricane Ian. Participants were compensated with \$3.00 for a fully completed and usable survey. As part of the Qualtrics panel service, data were screened for straight-lining, gibberish answers, and irregular completion times. Funding for the study was provided by the National Science Foundation, grant number (redacted).

Participant Eligibility

The sampling frame for the study included residents of central Florida counties that were directly impacted by high winds, torrential rain, and/or flooding brought on by Hurricane Ian. Counties included in the sampling frame were drawn from publicly available lists of school closures and cancellations (see Table 1 for specific counties). Participants were excluded if they did not reside in one of the identified counties. They were also excluded if they took less than 1/3 of the median time to complete the survey, indicated evidence of straight-lining, or provided nonsensical responses to open-ended items collected for use in a different study. All identifying information was removed from the data, ensuring that the identities of individuals could not be linked to specific sets of responses. The data, code-book, and associated documents are publicly available on the Open Science Framework at osf.io/atuq6.

Procedure

Participants were provided a web link that was compatible with both personal computers and mobile devices. This link led to an information sheet detailing the nature of the study and the risks involved. If the participant chose to continue, they were asked basic

Table 1. Florida counties included in sample.

Charlotte
Citrus
Collier (includes Naples)
DeSoto
Dixie
Gilchrist
Glades
Hardee
Hernando
Hillsborough
Lake County
Lee County (includes Ft. Myers metro)
Levy County
Manatee County
Marion County
Monroe County
Okeechobee
Orange (includes Orlando)
Osceola (includes Kissimmee)
Pasco (Tampa metro)
Pinellas (includes Tampa/St. Petersburg)
Polk
Putnam
Sarasota (includes city of Sarasota)
Sumter

demographic questions. If the participant indicated that they were under 18 years of age, or that they did not reside in one of the target counties, they were dismissed from the survey.

Measurement

Instrumentation was mostly adapted from the work of Lachlan and Gilbert (2023; NSF 2029258). Participants were first asked basic demographic information questions regarding their age, sex (male, female, other), ethnicity (White, Black, American Indian, Asian, Native Hawaiian, other), the state in which they reside, and their zip code.

Mitigation and Evacuation

Participants were asked what steps (if any) they took to mitigate their homes, and whether or not they were forced to evacuate. If forced to evacuate, respondents were asked to indicate what specific steps they took to protect their homes as they evacuated. Items are adapted from Spence et al. (2007).

Source Preference for Information

Again adapted from Lachlan and Gilbert (2023), a series of items asked participants to evaluate their degree of dependency on specific outlets for information about Hurricane Ian, with instructions to consider their use of these sources across all media platforms. Response options included 25 different news outlets drawn from a broad range of political inclination and reliability (see adfontesmedia.com). Participants were asked to respond on a seven-point Likert scale ranging from “not at all reliant” to “very reliant” (full instrument available at DOI: 10.17605/osf.io/atuq6). As in prior research (Lachlan & Gilbert, 2023), the factor structure of the scale clustered around high reliability ($\omega = .94$), low reliability ($\omega = .96$), and traditional sources ($\omega = .88$), $\chi^2(306) = 2679.72$, $p < .001$, CMIN/df = 8.76, CFI = .92, RMSEA = .09 (see Table 2).

Information Sufficiency

The measure of information sufficiency was adapted from prior research by Kahlor et al. (2006). The following prompt was used: “We would like you to estimate how much knowledge you needed in order to understand how to best respond to Hurricane Ian. Of course, you may feel that you need the same, more, or possibly even less information about this topic. Using a scale of zero to 100, how much information would be sufficient for you, that is, good enough for your purposes?” Sufficiency was thus evaluated on a continuous 100-point scalar, consistent with past research in the area (see also Griffin et al., 2004; Yang et al., 2011).

Time Spent Seeking Information

Participants were asked to consider their preferred media sources for information concerning Hurricane Ian in the days leading up to landfall, and to estimate their time spent seeking information on the hurricane. They were asked to estimate the number of hours they spend on a typical weekday, Saturday, and Sunday. This was then transformed mathematically into an estimate of weekly hours spent seeking information. This technique for estimating weekly use has been proven reliable in prior media research (Lachlan & Gilbert, 2023; Sherry et al., 2006).

Table 2. CFA standardized regression coefficients.

Channel	Factor	Coefficient
CBS	Legacy	.93
ABC	Legacy	.87
NBC	Legacy	.88
Local TV	Legacy	.42
$\omega = .88$		
NPR	High Reliability	.59
BBC	High Reliability	.80
AP	High Reliability	.80
Reuters	High Reliability	.85
NYT	High Reliability	.88
WashPo	High Reliability	.89
WSJ	High Reliability	.90
MSNBC	High Reliability	.74
CNN	High Reliability	.68
Huffington Post	High Reliability	.86
$\omega = .94$		
Fox	Low Reliability	.39
Infowars	Low Reliability	.89
Blaze	Low Reliability	.86
OANN	Low Reliability	.87
Breitbart	Low Reliability	.86
NewsMax	Low Reliability	.80
Daily Caller	Low Reliability	.92
Daily Kos	Low Reliability	.94
Buzzfeed	Low Reliability	.83
Mother Jones	Low Reliability	.90
Slate	Low Reliability	.81
New Republic	Low Reliability	.93
Local Newspaper	Low Reliability	.56
$\omega = .96$		

CFI = .92, RMSEA = .09.

Finally, participants were brought to a second series of demographic questions regarding the county they live in, their highest level of education (less than high school, high school graduate, Bachelor’s degree, Master’s degree, Advanced graduate degree, prefer not to answer), and household income (less than \$24,999, \$25,000–\$49,999, \$50,000–\$74,999, \$75,000–\$99,999, over \$100,000, prefer not to answer).

Results

As stated above, the factor analysis supported the three-factor structure for source preference proposed by Lachlan and Gilbert (2023). It should be noted that while Fox News fell out of the analysis in the previous study, it loaded onto the lower reliability factor herein (albeit with a comparatively low factor loading). Hypothesis one is supported.

Analyses then went on to examine the power of information insufficiency in predicting reliance on these source preferences, along with the aggregate amount of time spent seeking information about Hurricane Ian. For low reliability sources, the initial predictor block produced a significant model, $F(5, 1020) = 13.94, p < .001, R^2 = .06$. Age, sex, and income emerged as significant predictors of preference for low reliability sources, with younger ($\beta = -.21, p < .001$), male ($\beta = -.08, p < .01$), and higher income ($\beta = .08, p < .01$) respondents indicating higher reliance on these information outlets. Adding information insufficiency

Table 3. Hierarchical regression model for low reliability sources.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.253	.064	.059	1.48972	.064	13.941	5	1020	<.001
2	.255	.065	.059	1.48979	.001	.901	1	1019	.343

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	154.696	5	30.939	13.941	<.001
	Residual	2263.659	1020	2.219		
	Total	2418.354	1025			
2	Regression	156.696	6	26.116	11.767	<.001
	Residual	2261.658	1019	2.219		
	Total	2418.354	1025			

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	3.468	.241		14.402	<.001
	Age	-.018	.003	-.211	-6.796	<.001
	Sex	-.235	.092	-.078	-2.550	.011
	Ethnicity	.050	.024	.063	2.037	.042
	Education	.004	.020	.006	.181	.857
	Income	.086	.032	.082	2.688	.007
2	(Constant)	3.364	.264		12.737	<.001
	Age	-.018	.003	-.217	-6.837	<.001
	Sex	-.239	.092	-.080	-2.594	.010
	Ethnicity	.049	.024	.062	2.013	.044
	Education	.003	.020	.005	.170	.865
	Income	.082	.032	.078	2.529	.012
	Information Insufficiency	.002	.002	.030	.949	.343

on the second predictor block did not significantly improve the model, $F(1, 1019) = .901$, n.s. (see Table 3)

Similar results were detected for reliance on high reliability sources. Once again, a significant model was detected for the first predictor block, $F(5, 1020) = 19.23$, $p < .001$, $R^2 = .09$. While statistically significant, the addition of information insufficiency on the second block accounted for a trivial proportion of the variance, $F(1, 1019) = 6.81$, $p < .01$, $\Delta R^2 = .006$. Once again, younger ($\beta = -.24$, $p < .001$) and higher income ($\beta = .09$, $p < .01$) respondents reported greater reliance on these sources (see Table 4)

A different pattern emerged in the data for reliance on traditional media, with the addition of information insufficiency to the model accounting for a significant change in variance. The initial predictor block was found significant at $F(5, 1020) = 3.02$, $p < .01$, $R^2 = .02$. Adding information insufficiency on the second step

Table 4. Hierarchical regression model for high reliability sources.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.294	.086	.082	1.55950	.086	19.237	5	1020	<.001
2	.304	.092	.087	1.55507	.006	6.817	1	1019	.009

ANOVA					
Model		Sum of Squares	df	Mean Square	Sig.
1	Regression	233.926	5	46.785	19.237
	Residual	2480.668	1020	2.432	
	Total	2714.594	1025		
2	Regression	250.410	6	41.735	17.258
	Residual	2464.184	1019	2.418	
	Total	2714.594	1025		

Coefficients					
Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	3.891	.252		15.438
	Age	-.021	.003	-.238	-7.770
	Sex	-.206	.096	-.065	-2.135
	Ethnicity	.088	.025	.106	3.470
	Education	-.001	.021	-.002	-.070
	Income	.095	.033	.086	2.837
2	(Constant)	3.595	.276		13.039
	Age	-.023	.003	-.256	-8.177
	Sex	-.218	.096	-.069	-2.268
	Ethnicity	.087	.025	.104	3.414
	Education	-.002	.021	-.003	-.099
	Income	.083	.034	.075	2.453
	Information Insufficiency	.006	.002	.081	2.611

significantly improved the model, $F(1, 1019) = 9.71$, $p < .001$, $\Delta R^2 = .04$. Unlike the prior models, demographic items did not emerge as predictive of reliance on traditional media, while insufficiency did ($\beta = .21$, $p < .001$). In summation, the data suggests that information insufficiency was predictive of neither the high nor low reliability source factors, but was substantively predictive of reliance on traditional media (see Table 5).

Similarly, the analyses for aggregate time spent seeking information suggest that information insufficiency may be an important consideration. The initial model did not account for a significant amount of variance in time spent seeking information about Hurricane Ian, $F(5, 1020) = 0.99$, n.s. Perhaps unsurprisingly, the addition of information insufficiency to the model had a sizable impact on the variance accounted for, $F(1, 1019) = 68.95$, $p < .001$, Δ

Table 5. Hierarchical regression model for traditional sources.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.121	.015	.010	1.65495	.015	3.016	5	1020	.010
2	.233	.054	.049	1.62222	.040	42.578	1	1019	<.001

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.299	5	8.260	3.016	.010
	Residual	2793.647	1020	2.739		
	Total	2834.946	1025			
2	Regression	153.347	6	25.558	9.712	<.001
	Residual	2681.599	1019	2.632		
	Total	2834.946	1025			

Coefficients					
Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	3.826	.267		14.306
	Age	.007	.003	.081	2.545
	Sex	.070	.102	.022	.685
	Ethnicity	.059	.027	.069	2.189
	Education	-.036	.022	-.051	-1.623
	Income	.071	.035	.062	1.989
2	(Constant)	3.055	.288		10.620
	Age	.003	.003	.035	1.092
	Sex	.037	.100	.012	.372
	Ethnicity	.055	.026	.064	2.071
	Education	-.037	.022	-.053	-1.729
	Income	.039	.035	.034	1.100
	Information Insufficiency	.016	.002	.206	6.525

$R^2 = .06$, ($\beta = .26$, $p < .001$). No demographic variables were found predictive of total spent seeking information (see Table 6).

The analyses then went on to examine research questions three and four. As household mitigation was a yes/no question, the data were subject to logistic regression analyses. For all analyses concerning the mitigation, the first predictor block was found significant, $\chi^2(5) = 20.85$, $p < .001$, Nagelkerke $R^2 = .03$. Age and income were predictive of mitigation, with older respondents, $\text{Exp}(B) = .99$, $p < .006$, and higher income respondents, $\text{Exp}(B) = .86$, $p < .001$ more likely to indicate that they had mitigated their homes. Across all three analyses, source dependency failed to significantly predict whether or not respondents mitigated, as did aggregate information seeking.

A slightly different picture emerged in terms of evacuation. Once again, the model containing only demographic variables was significant, $\chi^2(5) = 15.29$, $p < .01$, Nagelkerke $R^2 = .02$. However, only age emerged as a significant predictor in the first block, with older

Table 6. Hierarchical regression model for information seeking.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.069	.005	.000	47.59761	.005	.989	5	1020	.423
2	.261	.068	.062	46.08721	.063	68.952	1	1019	<.001

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11206.220	5	2241.244	.989	.423
	Residual	2310843.309	1020	2265.533		
	Total	2322049.528	1025			
2	Regression	157662.378	6	26277.063	12.371	<.001
	Residual	2164387.150	1019	2124.031		
	Total	2322049.528	1025			

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	61.998	7.693		8.060	<.001
	Age	-.039	.084	-.015	-.458	.647
	Sex	3.237	2.942	.035	1.100	.271
	Ethnicity	1.214	.777	.050	1.564	.118
	Education	.190	.635	.009	.299	.765
	Income	-.497	1.021	-.015	-.487	.626
2	(Constant)	34.095	8.171		4.173	<.001
	Age	-.192	.084	-.073	-2.294	.022
	Sex	2.057	2.852	.022	.721	.471
	Ethnicity	1.059	.752	.043	1.409	.159
	Education	.132	.615	.007	.215	.830
	Income	-1.652	.998	-.051	-1.655	.098
	Information Insufficiency	.565	.068	.260	8.304	<.001

respondents *less* likely to evacuate, $\text{Exp}(B) = 1.02$, $p < .001$. In subsequent analyses, the addition of any one of the source preference focal variables produced a significant model that accounted for a greater proportion of estimated variance. Those indicating more reliance on low reliability, $\text{Exp}(B) = .81$, $p < .001$, high reliability, $\text{Exp}(B) = .77$, $p < .001$, and traditional media, $\text{Exp}(B) = .81$, $p < .001$, were all more likely to evacuate. By way of comparison, aggregate time spent seeking information was not predictive of likelihood of evacuation.

Discussion

The purpose of this study was to investigate the amount of information sufficiency individuals needed to better understand the risks associated with a natural disaster,

specifically Hurricane Ian. In addition, the relationship between source dependency and time spent seeking information was explored and their subsequent impact on evacuation and mitigation. This study asked participants to consider their dependency on an array of outlets for information related to Hurricane Ian. A three-factor structure was obtained and confirmed the scale proposed by Lachlan and Gilbert (2023). For the high reliability factor, the outlets are highly regarded, have limited bias, and some (New York Times, Wall Street Journal) have been in existence for over a century. With the low reliability factor (Breitbart, Mother Jones), these outlets can be seen as less detailed, and higher in editorial bias (Lachlan & Gilbert, 2023). Outlets in the traditional media factor (ABC, CBS) represent legacy media, and at one point in time were the only television options. However, contemporary media consumers live in a cluttered media landscape, and the confirmed factors suggest media dependency may be based on subtle preferences for news framing and delivery.

As more outlets disseminate information, individuals are afforded more opportunities to consume information. When examining the relationships between information insufficiency and source dependency, the only significant relationship to emerge was with traditional media. This suggests that individuals who needed more information about Hurricane Ian sought out media that would likely have greater awareness of the hurricane. If a natural disaster is about to hit a state, local ABC or CBS affiliates would probably have reporters in the field conducting live shots while carrying press conferences from emergency personnel. These stories would also be available on their corresponding websites and social media pages, providing likely near constant updates during the progression of the storm regardless of what medium residents were using to find information. For reliance on low and high reliability sources, two demographic factors emerged as significant predictors: age and income. Younger audiences were more reliant on *both* high and low reliability sources, perhaps suggesting that younger audiences simply spend more time-consuming information on the whole. The reason for those with higher incomes being more reliant on high and low reliability channels is less clear, although may reflect a higher threshold for information sufficiency or an elevated level of concern about how a storm will impact their economic investments such as their home or the broader economy. Dependence on traditional media, on the other hand, seems more closely related to interest driven by a perceived need for additional information. This is consistent with past research stressing the importance of elaboration on risk messaging (Westerman et al., 2014), and the need to use social media to generate enough interest to seek out more detailed information (Spence et al., 2016).

The *absence* of a relationship between information insufficiency and preference for high or low reliability sources is also worthy of consideration. While not directly tested in their previous studies, Lachlan and Gilbert (2023) suggested that information sufficiency may drive source preferences; at least in the case of the current data, it may drive a preference for traditional media, but not a delineation between the high and low reliability clusters. While all news outlets measured in both the high and low reliability factors have a strong online presence, it is noteworthy that the low reliability sources are perhaps more strongly geared toward social media and other short-form, easily accessible electronic sources (see Table 2). It may be the case that the preference for low or high reliability sources is based not on

political orientation (see Lachlan & Gilbert, 2023) nor on degree of information sufficiency, but simply on how people prefer to consume their news. This is, however, an empirical question, and these competing explanations should be tested in future research.

In the days leading up to Hurricane Ian, individuals could spend time checking a wide range of outlets for information, and the results revealed that information insufficiency was an important consideration. Information insufficiency was a significant predictor of aggregate time spent seeking information, which suggests that individuals were active and not passive media consumers. However, this also suggests that some outlets may not have provided the requisite information to satisfy individuals' needs, thus leading them to spend more time seeking information. Given the impact a natural disaster can make, time is of the essence, so residents should ideally spend less time searching and more time preparing.

As individuals consume media about an impending natural disaster, two considerations are more than likely at the forefront: mitigation and evacuation. While aggregate time spent seeking information was not a significant predictor of either, two demographic predictors emerged for mitigation and one for evacuation. With mitigation, higher income participants were likely to engage in this action, which suggests they possessed the necessary funds to protect their home. Furthermore, older individuals were likely to mitigate their homes, which suggests they may have greater experience dealing with hurricanes and possibly sustained damaged to their home in the past. Alternately, it could be the case that older audiences have fewer resources to evacuate or are more likely to be limited in their mobility, making staying in place and mitigating a more attractive option. This would also explain the negative relationship between age and likelihood of evacuation.

Further, media outlets can conceivably cover an event differently, which may influence one's decision to evacuate. In this instance, all three source dependency factors produced a significant model, thus indicating participants who relied more on these sources were more likely to evacuate. These results are encouraging, and suggest that Hurricane Ian messaging was comparably effective, regardless of media information reliability. By way of comparison to prior studies examining COVID-19 and climate change (Gilbert & Lachlan, 2023; Lachlan & Gilbert, 2023), the messaging surrounding a hurricane is not complex or subtle – a hurricane is coming, mitigate or evacuate. It may be the case that differences in reliability of coverage are really more relevant to risks that beget complex behavioral decisions or recommendations, delayed gratification, or consequences that are more difficult to understand. Future studies in this area should consider comparative analyses across risks and crises with varying degrees of complexity in their recommended remedial actions.

Through a sample of central Florida residents, this research identified the significance of information insufficiency in relation to Hurricane Ian and its impact on source dependency. As Ian was approaching Florida, residents in need of information sought out traditional media, which demonstrates the need for local coverage of a natural disaster. These outlets (e.g., CBS) would possess greater knowledge of the cities and counties that may be affected as opposed to national outlets like CNN or MSNBC. In addition, this research illuminates the effect source dependency has on evacuation and mitigation. While the results for evacuation are promising, all three source dependency factors failed to significantly predict mitigation. This is an important consideration, because residents are leaving the impacted area but may not be taking the necessary steps to protect their homes. Therefore, these outlets may need to go a step further in their coverage of a natural disaster. In addition to

evacuation procedures, residents should learn the best ways to mitigate their home because some may lack the knowledge to perform the necessary steps. Understanding how citizens consume and process information related to natural disasters is critical because it will enable governments at every level (federal, state, and local) to better inform their constituents about the impending disaster and how to stay safe.

It should also be noted that the findings reported herein were detected specifically within the parameters of a coastal storm. There are myriad threats and environmental dangers that may present unique circumstances in terms of source reliance and information sufficiency. For example, slow moving crises such as climate change are potentially far more destructive, but take place over long periods of time and are less likely to spike onto the news agenda. Future research should also examine the role of the source preferences and sufficiency thresholds in risk assessment and response to threats that are slower moving, and/or present a different set of parameters and mitigation responses.

Implications

This study offers multiple practical and theoretical implications. From a theoretical standpoint, this study supports the three-factor structure for news preference proposed by Lachlan and Gilbert (2023), demonstrating its utility as a psychometric instrument. In today's world, we are inundated with information from a variety of sources; therefore, it is beneficial to understand which outlets individuals are most dependent upon. Another theoretical implication involves support for Media Dependency Theory processes in the context of a natural disaster. Like all weather events, Hurricane Ian was unpredictable and posed a significant threat to Florida residents. In order to learn more about the impending hurricane, residents turned to the media for updates and possibly lessened their level of uncertainty. In this study, individuals who indicated a need for more knowledge on how to respond to Hurricane Ian spent more time seeking information about Hurricane Ian, thus suggesting that uncertainty drove increasingly stronger dependencies.

Modern media consumption is characterized by personal choice, including a range of social media platforms (Fletcher & Nielsen, 2018). Furthermore, individuals have access to a multitude of cable channels and websites, so the first practical implication involves the media and emergency managers. When a natural disaster like Hurricane Ian is imminent, residents need to be informed on both its severity and the best way to respond. This is where the media come in as emergency managers can utilize them to help disseminate their information. Since content can come from multiple sources, it would behoove emergency managers to learn which outlets are most optimal for a natural disaster, and the ways in which audiences experiencing various risk factors are likely to seek information. In this study, the importance of traditional media (e.g., ABC, local television) was clear, as it predicted the likelihood of evacuating, and was predicted by information insufficiency. Therefore, it will be important for emergency managers to continue to prioritize legacy media outlets, rather than only focusing on the newest social media platform. The second practical implication revolves around the likelihood of evacuation and media dependency. Results indicated all three types of news preferences predicted likelihood to evacuate ahead of Hurricane Ian, which is encouraging because residents were protecting themselves and moving to a safer place. This

suggests that government officials can utilize a range of outlets to encourage residents to evacuate ahead of a natural disaster. Furthermore, they may not be beholden to a specific medium, as the three types of news preferences included outlets with a presence across multiple platforms.

Finally, no lone source preference was predictive of mitigation. This could mean outlets did not discuss mitigation efforts or did not amplify the severity of Hurricane Ian or may reflect the reality that data was collected following Hurricane Ian's landfall, when the coverage had shifted from mitigation to evacuation. Outlets can however address this potential gap by spending more time on mitigation efforts and offer concrete steps residents can take to reduce property damage. A baseline understanding of information needs and their likely impact on specific source preferences may also be useful in determining the ideal placement for these messages. Furthermore, news outlets need to refine (or develop) their mitigation content, appealing to the likely processing patterns of their audience base so that residents are compelled to enact the necessary safeguards before a natural disaster occurs.

There are a few limitations that should be acknowledged concerning the data collection, particularly concerning the sample. A recurring challenge in crisis and risk communication field research is the speed at which one can gather data (Lin et al., 2017); given that this data was collected around a month after landfall, some memory deterioration or information loss is certainly a possibility amongst respondents. Further, there may be respondents who experienced more adverse consequences of the storm who were simply unreachable, due to continued power loss or displacement from their homes.

Conclusion

This study takes an initial look into the effect of information sufficiency on source preferences for risk information, and how said preferences influence two protective actions: evacuation and mitigation. In a world of ever-growing content, traditional media may still be important and can be valuable resources when disseminating information about natural disasters, particularly for those who perceive themselves as needing extensive and/or detailed information. Furthermore, the results suggest that media use on the whole may be predictive of behavioral responses, in this case evacuation. Given the level of uncertainty associated with natural disasters, the media are in a unique position to help individuals prepare for them and reduce their impact. While every outlet is different, each one can make a difference in their community, as the next natural disaster may be right around the corner.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The work was supported by the National Science Foundation [NSF 2303097].

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