Introduction

Throughout the United States and world, extreme weather events are increasing in frequency and intensity (Ebi et al., 2021). Within nearly a six-month period, two extreme weather-related disasters occurred in the U.S.: Oregon wildfires and Winter Storm Uri in Texas. In September of 2020, multiple record-breaking fires began burning in Oregon. The intense nature of these fires was due to multiple days with high winds, hot temperatures, and prolonged dry conditions (Oregon Office of Emergency Management, 2022). As a result, five megafires (fires greater than 100,000 acres) engulfed parts of Oregon (Rasmussen et al., 2021). Consequently, over one million acres burned, more than 40,000 residents evacuated from their homes, more than 6,000 homes and structures were destroyed, greater than half a million people were given evacuation warnings, and at least nine people died due to the fires (Oregon Office of Emergency Management, 2022; Rasmussen et al., 2021; Rosbach, 2022).

In addition, much of the state's population was at risk for health issues from toxic wildfire smoke exposure (Navarro & Vaidyanathan, 2020). People in rural communities reported they experienced behavioral and mental health concerns as well as environmental concerns related to water and air quality after the wildfires (Braverman et al., 2025). The agricultural industry was also impacted. Livestock producers in western United States reported direct impact to their farms and ranches in terms of crop and pasture loss, and declines in animal health (O'Hara et al., 2021). While this extreme event has passed, the potential for risk remains. With many of Oregon's communities intermingled in forestland and wilderness areas, the threat of future wildfires will remain a significant risk (Profita, 2022).

Six months later and at the other end of the weather spectrum, millions were left without power in February 2021 when Texas' electrical grid lost power supply due to Winter Storm Uri (Randall, 2022). The Texas electrical grid could withstand the more common hot summers but were not equipped to respond to freezing weather (Norton, 2021). Sixty-nine percent of Texas residents lost power during the storm and nearly half lost water service (Donald, 2021). Many Texas residents were not prepared for the uncharacteristically cold weather and storm (Ahmed, 2021; Li et al., 2023). Although meteorologists shared warnings about the severe nature of Winter Storm Uri, it is unclear if residents acted on the warnings or had the financial resources to prepare for the storm's impacts (Ahmed 2021; Li et al., 2023). Winter Storm Uri resulted in 246 deaths throughout Texas, with most attributed to hypothermia (Svitek, 2022). Losses in agriculture totaled more than $600 million (Schattenberg, 2021). After the storm, the Texas Legislature ordered electricity regulators to winterize their plants following federal guidance to mitigate future crises (Cai et al., 2022). However, lawmakers did not require the Texas Railroad Commission, which regulates natural gas, to adhere to any weatherization standards (Cai et al., 2022), leaving Texas residents vulnerable to a similar disaster in the future (Douglas, 2022).

These two extreme weather-related disasters prompted many to seek information about how to respond. Exploring these behaviors can help researchers better understand how people process information surrounding extreme weather-related events and help prepare for future and inevitable disasters. Effective communication during a disaster can help save lives, mitigate injuries, protect property, connect communities to resources, and reunite families (Federal Emergency Management Agency, 2014), and understanding how people process information and the types of information sought are essential. As such, the purpose of this study was to explore and compare risk information seeking and processing behaviors during two different extreme weather events in differing states.

Conceptual Framework

Risk Information Seeking and Processing

In an effort to better understand individual characteristics that may influence and predispose persons to seek and process information about risk, Griffin et al. (1999) proposed the Risk Information Seeking and Processing (RISP) model. Rooted in the Theory of Planned Behavior (Ajzen, 1988) and the Heuristic Systematic model (Eagly & Chaiken, 1993), the RISP model assumes the complex nature of risk and potential for serious consequences require the conditions that influence how information is processed to be understood (Griffin et al., 2013). The RISP model seeks to capture the relationship between information processing goals and beliefs and attempts to measure the impacts of risk information seeking and processing capacities (Griffin et al., 2013).

Seven factors are suggested as predictive influences on individuals' information seeking and processing behaviors (Griffin et al., 1999). These include 1) individual characteristics, 2) perceived hazard characteristics, 3) affective response to risk, 4) social pressures to obtain relevant information, 5) information sufficiency, 6) personal capacity to learn, and 7) beliefs about the usefulness of information in various channels (Griffin et al., 1999). The variety of factors offer ample opportunity to explore risk information seeking and processing in a variety of contexts. Previous studies have applied the RISP model to explore information sources used during extreme weather (Armstrong & Usery, 2022), examine predictors information sufficiency (Lachlan et al., 2024), and to determine predictors of risk perception (Armstrong, 2024; Lakew & Olausson, 2023; Yang & Zuhang, 2020). However, in a study that investigated influences on support for climate change mitigation policy, Yang et al. (2014b) found systematic processing was positively related to support for policy, while heuristic processing was not a significant predictor. No studies have used the RISP model to specifically explore the relationships between information seeking behavior, types of information, information sufficiency threshold, and information processing, which are key variables of inquiry in this study.

When presented with a perceived need to gather information related to risk and ambiguity, an individual may need to dedicate more cognitive effort and seek nonroutine channels of information (Griffin et al., 1999). A function of information gathering, the information sufficiency threshold refers to one's perception of being in command of enough information to reach a desired conclusion or outcome (Griffin et al., 1999). Reaching an information sufficiency threshold is impacted by the individual's capacity to gather the information needed, along with one's self-efficacy of perceived behavioral control to find and process needed information (Griffin et al., 1999). Information gathering capacity has been shown to predict motivation to seek information during some extreme weather events (Yang & Zhuang, 2020).

As sufficient information is gathered, information processing unfolds and occurs through a systematic or heuristic route. When individuals process information systematically, careful and analytical thinking are applied (Yang et al., 2014a). On the other hand, heuristic processing involves less mental effort overall and more reliance on mental cues or cognitive shortcuts (Yang et al., 2014b). These could include the provider of the message, method of communication, characteristics of message, and provider (Rose et al., 2017). Heuristic processing can present some benefit as it holds the advantage of speed (Gigerenzer & Goldstein, 1996; Gigerenzer, 2000), but systematic processing tends to result in better decision making (Griffin et al., 2013).

In-depth systematic information processing typically yields longer-lasting attitudes (Eagly & Chaiken, 1993), which are helpful for encouraging individuals to engage in and adopt behaviors and beliefs related to health, safety, and the environment (Ajzen & Manstead, 2007).

Previous studies have shown individuals navigating different weather-related events sought to gather similar, yet varying types of information. For instance, before Superstorm Sandy, at-risk individuals sought information about safety, health risks, and evacuation routes (Burger et al., 2013; Demuth et al., 2018). During a tornado event in southern Canada, residents sought information on how to safely shelter from the storm (Silvert & Andrey, 2019). During hurricanes, south Florida residents reported they sought information on a storm's intensity and location of landfall (Bostrum et al., 2018).

Risk information seeking through various media channels might not always provide all necessary information needed during a weather-related disaster. For instance, Southeastern U.S. residents reported that the message to take shelter was consistent but not informative regarding the type of shelter or how long to stay in sheltered location during a tornado event (Silvert & Andrey, 2019). Similarly, Fischer et al. (2022) found when testing tornado messages, messaging related to key calls to action were missing and should be included to help with the immediate and future threats of tornados. In Texas, Li et al. (2023) found some residents during Winter Storm Uri followed television and radio for information about the storm, but messaging related to how to prepare for the storm's impact was missing (e.g., power outages, water supply), leaving residents ill-informed.

As extreme weather events increase putting communities, people, agriculture, and systems at risk (Yuan, 2024), it is crucial for those impacted to have the information needed to navigate the risks and potential effects. From a perspective of message content, Mileti and Sorensen (1990) suggested five content types should be included in effective warning messages: 1) general information about the hazard itself such as impact, severity, and consequences, 2) guidance for protective action from the threat, 3) threat location and who could be impacted, 4) time available to take action in response to the threat, and 5) the source or organization of the message. These messages must be clear in communicating what to do and how to do it to ensure the greatest chance of maximizing health and safety (Sutton et al., 2021). It is also important to note the role of the information source in effectively communicating a message. When situations are accompanied with risk and uncertainty, understanding the sources relied upon must be paid attention. In agriculture and beyond, the nature of risk requires communicators to balance a variety of uncertainties (Leiss, 2004).

The nature of agricultural and natural resources communication and Extension outreach calls for enhanced risk communication strategies and approaches, as those professionals are called upon to help stakeholders prepare for and respond to risk (Rosen et al., 2022). Communities often seek local organizations, such as Cooperative Extension, when disasters occur (Koundinya et al., 2020). Extension services can help with both preparing for extreme weather-related events, such as wildfire, as well as post-disaster recovery (Braverman et al., 2025). Extension and its programming are tasked to meet the needs of communities and need specific and tailored communication to each audience (Mattox et al., 2025). In addition to Extension serving as a communication source, there is need for more partnerships between agricultural and natural resources practitioners and disaster agencies (Orton et al., 2025a). Those involved in risk communication should strive to encourage a reasoned stakeholder dialogue about the nature of the risk and risk management strategies (Leiss, 2004). The use of participatory approaches when creating risk messaging is recommended, specifically that focus on the resources of a community not its deficiencies (Jit et al., 2024). Although effective risk communication during extreme weather events remains challenging (Bostrum et al., 2018), studies are needed to understand how individuals seek and process information to make decisions amidst a disaster (Coughlan et al., 2022).

Purpose and Research Questions

As communities throughout the U.S. continue to experience increased and recent severe weather-related events and disasters, understanding the factors involved with risk information seeking and processing is paramount to lessening negative impacts. This study was guided by the following research questions:

1. Did risk information seeking behavior and information sufficiency thresholds differ by the type of extreme weather event?
2. Did participants' risk information seeking behavior and information sufficiency thresholds vary together?
3. What were the most common types of information Oregon and Texas residents sought during the 2020 wildfire season and Winter Storm Uri?
4. Did the type of the information sought during extreme weather relate to systematic or heuristic information processing routes?

Methods

Data for this study were collected as part of a larger study using researcher-developed quantitative instruments to determine perceptions and experiences of Oregon residents during the 2020 Oregon wildfire season and Texas residents during Winter Storm Uri. The Institutional Review Boards at both researchers' universities granted approval to conduct the studies. Data were collected independently from Oregon and Texas residents in November and December of 2021, a little more than one year after the 2020 Oregon wildfire season and about nine months after Winter Storm Uri impacted Texas. Additional manuscripts from the same dataset have been published including a climate change audience segmentation study (Orton et al., 2025b), an analysis of information sources and predictors of information seeking behaviors (Lawson et al., 2024), an exploration of risk experience and personal values on support for climate change policies (Lawson et al., 2023), and an examination of disaster experience and climate change risk perceptions on support for climate mitigation policy (Orton et al., 2022b).

In order to compare information seeking and processing behaviors between different states and different extreme weather events, two populations were the focus of this study. The first population was Oregon residents who lived in Oregon during the 2020 wildfire season. The second population was Texas residents who lived in Texas during Winter Storm Uri. Non-probability samples were obtained for both state populations by Qualtrics, a third-party company, that recruited participants and administered each survey instrument at a rate of $6.31 per response in Oregon and $5.25 in Texas. To ensure representation most similar to the population of Oregon, researchers set a quota to collect responses from 65% suburban/urban residents (Oregon Office of Rural Health, 2021), and approximately 50% females and 50% males. Partial responses were not recorded, yielding a final sample of 384. Participants from Texas were also matched to census demographic data (United States Census Bureau, n.d.) for gender (approximately 50% male, 50% female), but community type was slightly adjusted for additional variance (33% rural, 66% urban/suburban). A final sample of 436 complete responses were collected from Texas residents.

The items presented to participants in both survey instruments were the same except for extreme weather context. When weather event specificity was required, the items in some measures were customized to indicate the weather event under investigation. For Oregon residents, the contextual setting was for the 2020 wildfires, and for Texas residents, the context was for Winter Storm Uri. Example statements to illustrate the item differences are included below. Reliability for each measure was achieved *a priori* in separate pilot tests conducted in both Oregon and Texas populations. Each pilot test sample had 50 responses.

Measures

Risk Information Seeking Behavior

To measure risk information seeking behaviors, participants in Oregon and Texas selected their levels of agreement with four items adapted from Griffin et al. (2008). Each statement was measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability for this measure achieved in the Oregon pilot test ($\alpha = .80$) and Texas pilot test ($\alpha = .73$). Example statements in this measure included, “When [state weather event] risk information comes up, I go out of my way to avoid learning more about it,” and “Gathering a lot of information about the risks of [state weather event] is a waste of time.”

Information Sufficiency Threshold

Information sufficiency threshold was reported using a one-item, sliding scale with scale points ranging from 0 (*I need to know nothing)* to 100 (*I need to know everything possible)*, per Yang et al. (2014b). The prompt requested participants used the scale described above to respond to the following statement, “Please estimate how much you think you need to know about the risks of [state weather event].”

Heuristic Processing

Participant application of heuristic processing routes during the extreme weather events was measured through participant ratings of three items. The items in this scale were adapted from Yang et al. (2014b). Each of the statements were measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability for this measure was confirmed *a priori* in pilot tests for Oregon sample ($\alpha = .86$) and Texas sample ($\alpha = .86$). Example items in this measure included, “When I see information about [weather event] risks, I rarely spend much time thinking about it,” and “There is far more information on [weather event] risks than I personally need.”

Systematic Processing

Participants rated four items to indicate their levels of systematic processing during the respective extreme weather events. Items used in this measure were also adapted from Yang et al. (2014b). Each of the statements were measured on a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Reliability was achieved *a priori* in both Oregon and Texas pilot tests, respectively (α = .84, α = .80). Example statements from this measure included, "After I encounter information about [weather event] risks, I am likely to stop and think about it," and "When I encounter information about [weather events], I read or listen to most of it, even though I may not agree with the perspective."

Information Type

Eleven items were used to determine the types of information participants sought during each extreme weather event. Participants were asked to rate each item using a five-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Items were created based upon a review of risk information seeking literature (Lachlan et al., 2014; Ryan, 2013). Acceptable levels of reliability were confirmed *a priori* in pilot tests for both Oregon (α = .86) and Texas (α = .85) samples. Participants were prompted to rate their levels of agreement regarding the types of information sought during the extreme weather events. Example information types included extreme weather location, how to keep pets and livestock safe, safety of individuals, friends, family, and policy and emergency orders.

Procedure

Participants received information about the respective extreme weather study and granted consent to participate before starting the survey. Next, participants were prompted to provide their gender and community type to ensure the established quotas were met. In each sample, participants were prompted to read a short description of the effects of the extreme weather event in their state and asked to rate items regarding their experience during their state's extreme weather event. The following descriptions were used to prompt participants.

Oregon prompt: "In the summer of 2020, Oregon wildfires threatened multiple cities, destroyed more than 4,000 homes, killed 11 people, filled the air with smoke for days and burned more than 1 million acres. This was the second-highest one-year total of wildfires in one season in the state's history. The following questions deal with your experience during the 2020 wildfire season. Please consider your experience with the 2020 wildfire season and respond to the following items based upon your experience. This experience may have happened to you personally, or you may have learned about the experiences of another person or people."

Texas prompt: "In February 2021, Winter Storm Uri contributed a severe cold wave that affected most of the United States, most notably with the 2021 Texas power crisis. Texas faced record-low, subzero temperatures during the weather event. At the height of the crisis, nearly 4.5 million Texas homes and businesses were without electricity. An estimated 57 people died due to hypothermia, and about 12 million people received 'boil notices' because of water quality issues."

Data Analysis

Data from both instruments were imported from Qualtrics to SPSS Version 28 for analysis. Descriptive and inferential statistics were employed to address the research questions. Each measure was tested and found to be reliable via Cronbach's alpha (Ary et al., 2018) and assumptions for each of the statistical tests were verified. Normality was assessed using a Shapiro-Wilk test and through a visual inspection of the Q-Q plot. Research questions one and two were assessed through independent samples t-tests (Field, 2018). Research questions three and five were assessed by Pearson correlations (Field, 2018). Descriptive statistics were applied to address research question four.

Findings

RQ1: Did risk information seeking behaviors and information sufficiency thresholds differ by the type of extreme weather event?

Research question one sought to determine if risk information seeking behaviors and information sufficiency thresholds differed by weather event. An independent samples t-test was applied to address this research question. Two outliers were present in the dataset. The low scores ($M = 1.25$; $M = 1.0$) were replaced with the next lowest value ($M = 2.0$). Normality was confirmed via inspection of Q-Q plots. Homogeneity of variance was violated, as assessed by Levene's test for equality of variances ($p = .01$).

Oregon participants reported higher levels of information seeking behaviors ($n = 384$, $M = 4.14$, $SD = .82$) than Texas participants ($n = 432$, $M = 3.92$, $SD = .89$). The mean information seeking behavior score for Oregon was .22, 95% CI [.10 to .34] higher than the mean information seeking behavior score for Texas participants. There was a significant difference in information seeking behaviors between state weather events $t(815.52) = 3.69$, $p < .05$, Cohen's $d = .26$, a relatively small effect.

An additional independent samples t-test revealed no significant differences in information sufficiency thresholds between state weather events $t(813.98) = .77$, $p = .44$. The information sufficiency thresholds for Oregon and Texas were moderately high (Oregon $M = 78.17$, $SD = 23.87$; Texas $M = 79.55$, $SD = 26.98$), which suggests the participants believed there was a need to seek out information about the disasters. However, the large standard deviations suggest a range of responses, showing diverse perspectives toward seeking out information.

RQ2: Did participants' risk information seeking behaviors and information sufficiency thresholds vary together?

The aim of research question two was to determine if participants' risk information seeking behaviors and information sufficiency thresholds varied together. Significant positive correlations were found in the cases of both extreme weather events. For the Oregon participants who experienced the 2020 wildfire season, a Pearson correlation revealed a significant positive correlation with a small effect (Cohen, 1988) between information gathering capacity and information sufficiency threshold ($r = .28$, $p < .05$). Similarly, an additional Pearson correlation revealed a significant positive correlation with a small effect (Cohen, 1988) between information gathering capacity and information sufficiency threshold ($r = .26$, $p < .05$) for participants who experienced Winter Storm Uri in Texas. These results indicate as risk information seeking behaviors increased, information gathering capacity also slightly increased.

RQ3: What were the most common types of information Oregon and Texas residents sought during the 2020 wildfire season and Winter Storm Uri?

In research question three, our objective was to determine the most sought information types during the 2020 Oregon wildfire season and 2021 winter storm Uri in Texas. As outlined in Table 1, residents living in Oregon during the 2020 wildfire season most sought information about location of the fires (M = 4.46, SD = .87), followed by severity of fire (M = 4.42, SD = .86), and fire impact and risk (M = 4.20, SD = .97). Residents living in Texas during Winter Storm Uri also sought information about storm severity most frequently (M = 4.40, SD = .87), as well as storm impact and risk (M = 4.28, SD = .90), but unlike Oregon residents, sought the time of storm impact (M = 4.28, SD = .95).

Table 1

Most Sought Information During Oregon Wildfire Season (N = 384) *and Winter Storm Uri in Texas* (N = 436)

	Wildfire Season		Winter Strom Uri	
Information Type	*M*	*SD*	*M*	*SD*
Location of fires	4.46	0.87	-	-
Severity of weather event	4.42	0.86	4.40	0.87
Weather event risk and impacts	4.20	0.97	4.28	0.90
Time of winter storm impact	-	-	4.28	0.95

RQ4: Did the type of the information sought during extreme weather relate to systematic or heuristic information processing routes?

Finally, research question four was to determine if the type of the information sought out during the extreme weather events related to systematic or heuristic information processing routes. Pearson correlations indicated moderate significant positive relationships (Cohen, 1988) between the three the most sought information types and systematic processing in both the Oregon and Texas samples (Table 2). This finding suggests as the need for key wildfire and winter storm information increased, so did the employment of systematic information processing. For Oregon and Texas residents who experienced wildfire risk and winter storm risks, the strongest correlation associated with systematic processing was observed with information about wildfire risk and impacts (r = .46, p < .05), and winter storm risks and impacts (r = .47, p = <.05).

On the other hand, Pearson correlations revealed small and moderate significant negative relationships (Cohen, 1988) between all of the information types most-frequently sought during both the 2020 wildfire season and 2021 winter storm and heuristic information processing (Table 2). This finding, opposite of the correlations between systematic information processing and information type seeking, suggests as the need for key information about extreme weather events increased, the use of heuristic processing routes decreased. The strongest relationship between heuristic processing and information type was observed with impacts and risks for both those seeking information about the wildfires ($r = -.31$, $p < .05$), and those who sought information about the winter storm ($r = -.24$, $p < .05$).

Table 2

Pearson Correlation Coefficients between Frequently Sought Information Types and Systematic and Heuristic Processing for Oregon (N = 384) *and Texas* (N = 436)

	Systematic Processing		*Heuristic Processing*	
Information Type by State	*r*	*p*	*r*	*p*
Oregon				
Risk and impacts of fires	.46	<.05	-.31	<.05
Location of wildfires	.46	<.05	-.21	<.05
Severity of wildfires	.45	<.05	-.23	<.05
Texas				
Risk and impacts of storm	.47	<.05	-.24	<.05
Severity of storm	.45	<.05	-.21	<.05
Impact time of storm	.43	<.05	-.18	<.05

Discussion and Recommendations

The findings in the study provide insight to information seeking and processing behaviors during two opposite extreme weather events – historic wildfires and an abnormal winter storm. As extreme weather risks continue to threaten communities and systems, including agriculture, in the United States and world (Yuan et al., 2024), we in agricultural and natural resources communication must work to understand information seeking and processing to create messages that will aid and educate the public as they prepare for weather disasters and provide crucial, sufficient information as disasters unfold (Coughlan et al., 2022). The weather events that served as the context of this study took place in different states and seasons and left those affected to deal with different impacts. However, as our findings suggested, despite the differences between the extreme weather events investigated, some of the information seeking and processing behaviors explored were consistent between those who experienced Winter Storm Uri in Texas and those who experienced the 2020 Oregon wildfires. At the same time, the findings of this study should not be generalized to other populations or contexts given the nature of the sampling procedures.

Our first finding revealed a significant difference between groups in regard to information seeking behaviors, but no significant difference in information sufficiency thresholds during the extreme weather events unique to each state. This finding suggests distinct elements of extreme weather events may influence information seeking and processing behaviors. In this study, we found individuals who experienced extreme weather risk appeared to share both similarities and differences in regard to cognitive resources to finding information they need to make decisions and navigate the risk at hand. Prior work indicates situations associated with risk and ambiguity may call for increased cognitive effort and the need to access nonroutine information channels (Griffin et al., 1999). While this study is limited in the fact that we cannot know the extent of cognitive effort applied to information seeking and the details associated with the perceived information sufficiency thresholds, we can conclude the participants in this study were able to find information sufficient to reach a desire outcome in regard to the extreme weather event they needed to navigate (Griffin et al., 1999). While there was no significant difference between states for information sufficiency thresholds, the descriptive statistics do shed some light on this variable. The standard deviation was large and may suggest diversity in opinion. It is possible that some participants may have thought they knew enough to navigate the extreme weather event, or that the extreme weather event was not going to directly impact them. This diversity may suggest the need for localized information.

In a similar vein, statistical analysis revealed as participant levels of information sufficiency increased, their risk information seeking behaviors also increased. While this finding is unsurprising given the role information gathering contributes to information sufficiency (Griffin et al., 1999), it is interesting to consider future studies that can explore the nuance of information gathering processes, and how individuals reach and define acceptable levels of information sufficiency. As information gathering capacity has been shown to be a significant predictor of information seeking behavior (Yang & Zhuang, 2020), future studies should also explore factors that contribute to self-efficacy of perceived control to find needed information (Griffin et al., 1999). Previous studies highlight the role of experience in making decisions about weather-related risk (Bostrum et al., 2018; Burger et al., 2013; Demuth et al., 2018; Lawson et al., 2023). It is possible the role of experience influenced information seeking behaviors and information sufficiency in this study due to the unique and largely unfamiliar nature of both the 2020 Oregon wildfires and Winter Storm Uri in Texas. While it is plausible that participants have likely experienced some form of weather related to the extreme weather events explored in this study, it is also reasonable to assume that given the extreme and unusual nature of both events participants had little to no experience that compared to the magnitude of the 2020 Oregon wildfires and Winter Storm Uri in Texas. This leads to the question, did the level of experience with similar weather events influence information seeking? Future studies should investigate this potential phenomenon. This assumption should also be tested in future studies as future extreme weather events take place.

Given the extreme weather contexts between groups assessed in this study and the variety of studies that explored information sought during other extreme weather events (Burger et al., 2013; Demuth et al., 2018; Silvert & Andrey, 2019), we sought to explore any potential distinction in the types of information sought during both the 2020 Oregon wildfires and Winter Storm Uri in Texas. Comparing this finding to other extreme weather events that have been explored in terms of information gathering and seeking in the past (Burger et al., 2013; Demuth et al., 2018; Silvert & Andrey, 2019), connections can be drawn to themes involving safety and extreme weather impacts. It is interesting that despite the differences in extreme weather events explored in this study, two of the three leading types of information sought were the same for both Oregon and Texas: risk and impacts, and the severity of the weather event. This finding aligns with the Miletti and Sorensen (1990) suggestions for effective warning message content. As communicators, this is a critical finding. Despite the differences, practitioners can work to craft messages that address similar needs and concerns, while remaining mindful of other contextual factors associated with a specific extreme weather event. However, there is also nuance in the type of information sought between the wildfire (i.e. – location) events and Winter Storm Uri (i.e. – time of impact) as indicated with some difference in the top types of information sought between groups. This finding specificity suggests the participants sought a variety of information, and it is likely certain audiences sought certain types of information key to individuals' unique situations, or locations, as related to the extreme weather event. Future studies should explore audience segmentation of groups impacted by extreme weather to more precisely describe the types of information different groups seek to find during these events. Similar to Li et al. (2023), we recommend using a dialogic and participatory approach to work with different communities to best understand messaging for segmentation.

Finally, in this study we sought to investigate any potential relationships between types of information sought and information processing routes. Although it has been argued heuristic processing can be helpful when time is limited (Gigerenzer & Goldstein, 1996; Gigerenzer, 2000), many agree systematic information processing leads to more positive impacts overall (Ajzen & Manstead, 2007; Eagly & Chaiken, 1993; Griffin et al., 2013). In this study, we found moderate significant positive relationships between highly sought types of information and the systematic processing route and significant moderate negative relationships between highly sought information types and heuristic processing. As communicators, the use of systematic processing routes during these two weather events is promising. However, practitioners must be careful to craft messages that respond to the information needs of those at risk. Agricultural communication practitioners are encouraged to share resources and templates used to communicate about extreme weather events given the similarities of information needed across events, but to also discuss nuance. We recommend practitioners to use a template (Sutton et al. 2025) to help craft both messages aimed to encourage systematic processing and messages to employ heuristic processing in order to be better prepared for extreme weather events in communities. As extreme weather events unfold in varying timeframes, future studies should more carefully explore the role of time in relation to systematic or heuristic processing routes. Both the wildfires and Winter Storm Uri unfolded more slowly than other extreme events (such as tornadoes and flash floods), which may have also provided enough time for participants to adequate seeking information, thereby contributing to the ability for participants to systematically process information.

As we conclude this study, it is important to discuss implications for teaching agricultural and natural resources communication. The country and world will continue to experience the effects of extreme weather events (Ebi et al., 2021), so it is therefore important that we prepare future communicators to create effective messages to help individuals to be educated and informed in order to navigate risk and crisis. Agricultural communication practitioners are encouraged to share resources and templates used to communicate about extreme weather events given the similarities of information needed across events, but to also discuss nuance.

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