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Consuming Hurricane-Related Media: The Protective Role of Perceived Trust

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Objective: We examined whether perceived trust in media was associated with post-Hurricane Harvey traumatic stress symptoms and tested whether it buffered the association between hurricane-related media exposure and post-Hurricane Harvey traumatic stress symptoms. ***Method:*** A probability-based, representative sample of Texas residents, drawn from the GfK KnowledgePanel, were surveyed online three times: 2 weeks ($N = 1{,}137$), 6 weeks ($N = 1{,}023$), and 14 months ($N = 748$) after Hurricane Harvey (a Category 4 storm) made landfall in 2017. Measures included traumatic stress symptoms, Hurricane Harvey-related media exposure, perceived trust in that media, Hurricane Harvey exposures, and demographics. Generalized estimating equations were used to evaluate longitudinal relationships. ***Results:*** Among participants reporting high perceived trust in the early Hurricane Harvey-related media they consumed, the relationship between average daily hours of hurricane-related media exposure (reported 2 weeks postlandfall) and traumatic stress symptoms (reported at each wave of data collection) was weaker than for those who perceived low trust in hurricane-related media at both 6 weeks ($\beta = -0.35$, 95% CI [−0.58, −0.13], $p = .002$) and 14 months ($\beta = -0.45$, 95% CI [−0.70, −0.19], $p = .001$) postlandfall. ***Conclusion:*** Findings suggest that perceived trust in media may protect against traumatic stress symptoms associated with early media exposure when disaster strikes. Longitudinally, we show that these findings are consistent over time: Trust in disaster-related media coverage was associated with lower traumatic stress symptoms up to 14 months later among Texans who consumed high daily amounts of Hurricane Harvey-related news.

Clinical Impact Statement

Findings highlight the value of educating the public to be cautious with disaster-related media consumption. While it is advisable to avoid excessive news intake, this research emphasizes the crucial importance of using trustworthy media sources to minimize traumatic stress symptoms over time. As climate change increases the frequency of severe natural disasters, health care practitioners and the public must be made aware of the benefit of using trusted media sources during a disaster. This underscores the need for clinicians to encourage people to identify and use trusted, verifiable news sources and for news outlets to provide balanced, factual information.

Keywords: traumatic stress, trust in media, media, hurricanes, natural disasters

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Advancements in technology in the 21st century have revolutionized the way people gather information about natural disasters and other collective traumas, providing people with minute-by-minute updates and live blogs before, during, and after the disaster (Tanaka, 2021). These advancements allow people to receive news about a disaster through multiple formats (i.e., traditional media, internet news, and social media) simultaneously, potentially increasing the amount of media a person is exposed to in a given time frame, as people often use several information sources to remain current on natural disasters (Simon et al., 2015). After Hurricane Ike in 2008, television and interpersonal exchanges were the most commonly used sources for hurricane-related information for people who evacuated (Burke et al., 2010). Since then, exploding social media use has significantly expanded access to news with unfiltered stories available 24/7 to millions of people who use it for news about events occurring in their communities. This media access creates a direct line of communication between the public and emergency management personnel, allowing valuable information about disasters to be disseminated to the public before, during, and after the event. When this communication is effective and is trusted by the consumer, it can strengthen mitigation efforts, enhance early warning systems, and promote timely evacuations (Monahan & Ettinger, 2018).

A small but growing body of research suggests that institutional trust, specifically trust in social and traditional media, may be psychologically protective during traumatic events that are filled with uncertainty (Lee, 2022; Patwary et al., 2021), like a natural disaster. More broadly, trust in institutions is a potential protective factor that mitigates traumatic stress responses. The relationship between institutional trust and traumatic stress symptoms has recently centered around the COVID-19 pandemic, during which changes in institutional trust were mixed. While trust in many institutions decreased (Kennedy et al., 2022), trust in other institutions retroactively increased after, for example, seeing the health benefits of lockdown measures (Bol et al., 2021). Moreover, studies consistently showed that when there was higher trust in institutions (e.g., the government), that trust was associated with lower negative affect as well as higher subjective well-being during the pandemic (Li et al., 2022; Roccato et al., 2021). While most research has concentrated on the pandemic and its aftermath, prior studies have also addressed institutional trust in the context of mass violence. Gelkopf et al. (2012) found that confidence in the army and government among people who were repeatedly bombed in Israel was associated with lower traumatic stress symptoms and global distress, such that participants who exhibited more confidence in these institutions reported better psychological outcomes. These findings collectively underscore the potential that institutional trust may buffer against traumatic stress symptoms after events characterized by uncertainty (e.g., war, terrorism, natural disasters).

The media is one of the most important American institutions. During crises, people turn to it to learn about the current disaster and the predicted trajectories of events (Silverblatt, 2004) and to establish order (Houston et al., 2012). Best practices in disaster psychology routinely note the importance of obtaining information during a disaster for maintaining physical well-being and mental health (Garfin et al., 2023). Yet such information may only protect against psychological distress if the individuals receiving it believe it to be trustworthy. Although there is no universally agreed-upon definition of trust in media in the communications literature, it is often defined as a combination of several factors including medium, source, and message credibility (Fisher, 2018; Van Der Meer et al., 2023). However, most prior literature on trust in the media seeks to objectively define trustworthiness, rather than evaluating respondents' subjective perceptions of trust (Knudsen et al., 2022). Considering trust in media from this person-based perspective—as an individual's *perceived trust* in media independent of the objective media trustworthiness or credibility—could contribute to our understanding of the relationship between trust in media as an institution and traumatic stress symptoms.

While our modern technology-driven information network transmits urgent updates (e.g., evacuation orders) during crises, a robust body of research also demonstrates a positive association between postdisaster traumatic stress symptoms and increased media consumption about a disaster (Pfefferbaum et al., 2014; Thompson, Jones, et al., 2019). Indeed, in a representative sample collected in the immediate aftermath of the Boston Marathon bombings, extensive disaster-related media exposure was associated with *higher* early traumatic stress symptoms than was direct exposure (Holman et al., 2014). Similarly, media exposure to news about the COVID-19 pandemic also exacerbated stress responses, especially when it involved conflicting information (Holman et al., 2020). Moreover, a meta-analysis revealed that media exposure to disasters and other large-scale violence events was strongly linked to subsequent poor short-term psychological outcomes, possibly through sensitization to media-based exposure in communities that have experienced a similar threat (Hopwood & Schutte, 2017). Prolonged exposure to media coverage of trauma may amplify anxiety and fear (Holman et al., 2014), which, in turn, could activate attentional bias and make it difficult for people to disengage (Fox et al., 2001).

During a crisis, exposure to media that contains rumors (Jones et al., 2017) or conflicting information (Holman et al., 2020) is associated with more distress. In this scenario, trust in the media may be important because if people do not trust the media they consume, they may lack the knowledge necessary to prepare for, adapt to, and mitigate the threat, which could exacerbate stress responses. Indeed, a hallmark of effective disaster-related mental health intervention involves ensuring those affected have the information they need to make the decisions to stay safe during a crisis and recover in its aftermath (Garfin et al., 2023). This may create a sense of adaptive control and efficacy (Henselmans et al., 2010) or promote problem-focused coping (Park & Folkman, 1997), both of which can alleviate stress and increase well-being during difficult circumstances such as natural disasters (Guo et al., 2013). Together these studies show that while the media plays a crucial role in information dissemination, viewing extensive coverage of a disaster is often correlated with poor mental health in a variety of disaster contexts.

Yet it may be counterproductive to simply advise against media exposure during a disaster, such as a hurricane, as the media is a conduit by which people access critical updates, such as storm trajectories and evacuation orders (Ball-Rokeach & DeFleur, 1976; Jung, 2017). For example, traditional media (e.g., cable or online news) exposure during prior public health crises, such as COVID-19 (Garfin et al., 2021) and in response to hurricanes (Garfin et al., 2022), has been associated with health protective and preparation behaviors, respectively. Trust in the media may also serve to mitigate anxiety, fostering confidence in the information being shared. Thus, it is critical to examine whether the individual-level features of media exposure and media trust are differentially associated with distress, so that disaster-related updates can be conveyed in a manner that minimizes the potential for psychological distress.

The Present Study

According to the National Weather Service (Metz, 2017), Hurricane Harvey formed in the Gulf on August 18, 2017, and, like many hurricanes, caused uncertainty about where it would make landfall, how strong it would be, and how quickly it would dissipate. On August 21, long-range model guidance clarified that it would make landfall in Texas, a substantial change from the original mapping suggesting the hurricane would largely miss the United States. The hurricane intensified to a Category 4 hurricane on August 24 at 6 p.m. central daylight time with maximum sustained winds of 130 mph (215 km/m) before making landfall on August 25, 2017, along the Middle Texas Coast near Corpus Christi and Port Aransas. This was the first major hurricane (Category 3 or above on the Saffir–Simpson Hurricane Wind Scale; National Hurricane Center and Central Pacific Hurricane Center, n.d.) to make landfall on the Middle Texas Coast since 1961 and the first major hurricane to hit the United States since 2005 (Hurricane Research Division, 2023). The storm then stalled over Texas for 4 days, dropping historic amounts of rainfall of more than 60 inches over southeastern Texas, flooding an estimated 155,000 structures (Metz, 2017). The devastation and disruption were extensive between the quick rise from a tropical storm to a Category 4 hurricane and the relentless rainfall.

Here, based on the aforementioned evidence, we explored the relationship between hours of media exposure and perceived trust in that media and traumatic stress responses in a representative sample of 1,137 Texas residents, assessed in the early aftermath of Hurricane Harvey and followed over time. We measured a common outcome of hurricane exposure: traumatic stress symptoms (Galea et al., 2007; Thompson, Holman, & Silver, 2019). We controlled for factors commonly associated with postdisaster distress: demographic factors that are commonly associated with postdisaster outcomes (see Galea et al., 2005) and amount of Hurricane Harvey-related exposure (e.g., disaster-related loss and injury; Garfin et al., 2023). We had three hypotheses:

1. The amount of Hurricane Harvey-related media exposure during and following the hurricane would be positively associated with traumatic stress symptoms;
2. Individuals' perceived trust in their media sources regarding information about the hurricane would be negatively associated with traumatic stress symptoms;
3. Perceived trust in media sources would buffer the negative effect of media exposure on traumatic stress symptoms.

Method

Participants were drawn from the GfK (now Ipsos) KnowledgePanel. GfK used address-based probability sampling methods to randomly recruit individuals into their research panel, which was designed to be representative of the United States. Households without an internet connection were provided with a web-enabled device and free internet services. Panelists were then invited to complete confidential surveys online in exchange for compensation or points for merchandise. Selected KnowledgePanel panelists were assigned to the sample for our study and notified electronically of the opportunity to take part in each wave of data collection through an email link or their online panel member page.

Our Wave 1 survey was fielded to all GfK panelists living in Texas (N = 3,067) starting at 5 p.m. central daylight time on September 8, 2017, 2 weeks after Hurricane Harvey made landfall in Texas. The survey was closed to new participants 15 hr later after reaching the prearranged target sample size; participants who had already begun the survey were allowed to finish it within the 3-day fielding period, during which N = 1,137 participants completed the survey. The Wave 2 survey was fielded October 12, 2017, to October 29, 2017, and 1,023 completed it (90.00% retention rate). The Wave 3 survey was fielded from October 22, 2018, to November 6, 2018; the final sample size was 748 participants (65.79% participation rate). Participants received a cash equivalent of $15–$20 for completing the surveys. The Institutional Review Board at the University of California, Irvine, approved all procedures. Informed consent was obtained upon entry into the GfK panel.

All descriptive and inferential statistics were weighted using poststratification weights (provided by GfK) specific to the Texas population, unless otherwise specified. These weights were calculated to adjust the final sample to the demographic composition of Texas for adults 18 and older based on several demographics including gender, age, race/ethnicity, household income, metro/nonmetro areas, and education. Weights also account for survey nonresponse and attrition over time, allowing for population-based inferences at each wave and over time.

Measures

Traumatic Stress Symptoms

Respondents reported hurricane-related traumatic stress symptoms at Waves 1, 2, and 3 using a modified version of the Primary Care PTSD Scale, a five item-measure validated in primary care settings as a screener for posttraumatic stress disorder (Calhoun et al., 2010; Prins et al., 2016). Items contained questions such as "Have you had nightmares about the hurricane or thought about it when you did not want to?" Response options included a 5-point scale from 1 = *never* to 5 = *all the time*. Items were averaged for an early traumatic stress score at Wave 1 (α = .84) and a traumatic stress symptoms score at Waves 2 (α = .87) and 3 (α = .78).

Hurricane Harvey-Related Media Exposure

At Wave 1, participants were asked "In the days during and following Hurricane Harvey, how many hours per day, on average, did you spend watching and/or listening to media coverage about it?" for each of three media source groups: (1) television, radio, and print; (2) online news sources (CNN, Yahoo, https://www.nytimes.com/); and (3) social media (e.g., Facebook, Twitter, Reddit) in the days during and following Hurricane Harvey. Responses were summed for a total daily amount of media exposure score. Since it is possible for participants to have used two or three of the media source groups at one time, the daily average score can be higher than the 24 hr in a day with the final range of media exposure scores being 0–33 hr of media consumption per day.

Perceived Trust in Media for Hurricane Harvey-Related Information ("Trust in Media")

At Wave 1, immediately after being asked about media exposure, participants were asked "How much do you trust the news you have been receiving regarding Hurricane Harvey?" to assess individual-level perceived trust in media (referred to here as "trust in media"). Respondents used a 5-point scale from 1 = *strongly distrust* to 5 = *strongly trust* to answer the question. Due to skewness and low numbers of respondents in the lowest groups ($n_{weighted}$ = 32 for Response Option 1 and $n_{weighted}$ = 97 for Response Option 2), the variable was dichotomized into low trust (1–3) and high trust (4–5). (All analyses were also conducted with the continuous variable. All results were consistent with those reported in this article using the dichotomized variable.)

Exposure to Hurricane Harvey-Related Loss or Injury

Respondents reported the degree to which they experienced injury or loss due to Hurricane Harvey. There were six possible exposures that included losing property, the participant's home being destroyed, losing a pet, sustaining personal injury, and knowing someone who was injured or killed in the hurricane or its aftermath. Exposures were summed and ranged from 0 to 6.

Demographics

Demographics were collected by GfK upon entry into the KnowledgePanel and updated regularly. Education was dichotomized (less than a bachelor's degree = 0; bachelor's degree or higher = 1). Age was continuous and ranged from 18 to 90 years old. Gender was dichotomized (male = 0; female = 1). Ethnicity was categorized into four categories: White/non-Hispanic, Black/non-Hispanic, other/non-Hispanic or 2+ races, and Hispanic, with White as the reference group. Income was measured as a continuous variable, grouped into 21 bins and further grouped into six categories: less than $10,000, $10,000–$24,999, $25,000–$49,999, $50,000–$74,999, $75,000–$99,999, and $100,000+.

Analytic Strategy

All statistics were conducted in Stata 18.0 (StataCorp, 2023) using generalized estimating equations (GEE; Ballinger, 2004), a repeated measures approach. GEE coefficients represent the average population-level effect of predictors on outcome variables over time, accounting for the correlation between observations at different time points. Robust standard errors were estimated as appropriate for complex survey data. We conducted one GEE with Waves 1 and 2, and a second GEE with Waves 1, 2, and 3. Both analyses were conducted using an identical analytic strategy. In Model 1, we examined the relationship between hours of hurricane-related media exposure and trust in that media and traumatic stress symptoms over time. In Model 2, we added an interaction term (Hours of Media Exposure × Trust in Media Exposure). All analyses were controlled for demographic covariates, exposure to Hurricane Harvey, and time. Continuous variables were standardized to provide comparable effect sizes across predictors.

Results

See Supplemental Table 1 for all weighted descriptive statistics.

Adjusting for time, demographics, and Hurricane Harvey-related exposure to loss and injury, both hours of hurricane-related media exposure and trust in that media exposure were associated with traumatic stress responses (see Table 1, Model 1) over Waves 1 and 2. The interaction term between frequency of hurricane-related media exposure and trust in the media was a statistically significant predictor of traumatic stress symptoms (β = −0.35, 95% CI [−0.58, −0.13], p = .002; see Table 1, Model 2), suggesting that trust in media exposure moderates the association between hours of media exposure

Table 1

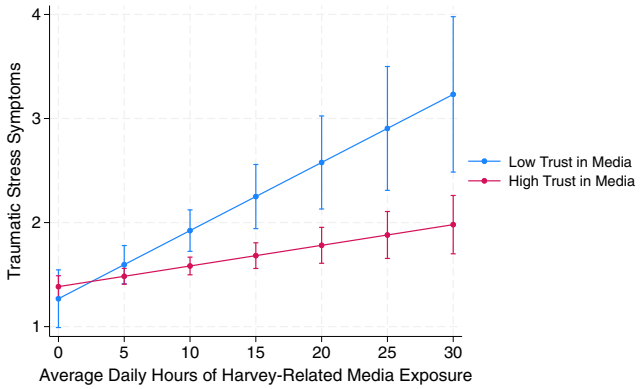
Standardized Generalized Estimating Equation Coefficients Examining the Relation Between Hours of Media Exposure and Trust in Hurricane-Related Media Exposure and Traumatic Stress Symptoms, Waves 1 and 2 (N = 1,005)

	Model 1				Model 2			
Variable	β	*SE*	*p*	95% CI	β	*SE*	*p*	95% CI
Media exposure	0.34	0.06	.000	[0.23, 0.45]	0.59	0.11	.000	[0.37, 0.82]
Trust in media[a]	−0.21	0.10	.035	[−0.40, −0.01]	−0.20	0.09	.027	[−0.37, −0.02]
Media Exposure × Trust in Media[a]					−0.35	0.12	.002	[−0.58, −0.13]
Harvey-based loss and injury	0.32	0.04	.000	[0.24, 0.40]	0.30	0.04	.000	[0.22, 0.39]
Education[b]	−0.04	0.08	.633	[−0.19, 0.12]	−0.04	0.08	.580	[−0.19, 0.11]
Age	0.01	0.04	.836	[−0.06, 0.08]	0.01	0.04	.880	[−0.07, 0.08]
Income[c]	−0.05	0.04	.242	[−0.14, 0.03]	−0.06	0.04	.113	[−0.14, 0.01]
Gender[d]	0.09	0.08	.293	[−0.08, 0.25]	0.10	0.08	.206	[−0.06, 0.26]
Race/ethnicity								
Black, non-Hispanic	0.03	0.12	.787	[−0.20, 0.27]	0.05	0.12	.677	[−0.18, 0.28]
Other, non-Hispanic, 2+ races	0.38	0.27	.163	[−0.15, 0.90]	0.37	0.27	.181	[−0.17, 0.90]
Hispanic	0.17	0.10	.075	[−0.02, 0.36]	0.15	0.09	.120	[−0.04, 0.33]
Time	0.00	0.04	.985	[−0.09, 0.09]	0.00	0.04	.985	[−0.09, 0.09]
Constant	0.08	0.34	.821	[−0.59, 0.75]	0.08	0.34	.812	[−0.59, 0.75]
Model statistics	Wald $\chi^2(11) = 225.65$; $p < .001$				Wald $\chi^2(12) = 283.92$; $p < .001$			

Note. *SE* = standard error; CI = confidence interval.
[a] Low trust in media = 0, high trust in media = 1. [b] Reference group = less than a college degree. [c] Reference group = male. [d] Reference group = White, non-Hispanic. For graphing purposes, trust in media was dichotomized, but the interaction was also significant when conducted with trust in media as a continuous variable from 1 to 5.

Figure 1

Association Between Amount of Hurricane Harvey-Related Media Exposure and Traumatic Stress Symptoms as Moderated by Perceived Trust in Media Sources at 2 and 6 Weeks After Hurricane Harvey Made Landfall (N = 1,005)



Note. See the online article for the color version of this figure.

and traumatic stress symptoms. As the amount of media exposure increased, respondents with higher trust in the media reported fewer traumatic stress symptoms than respondents reporting low trust in the media (see Figure 1). At the lowest level of media exposure, trust did not appear to explain variability in the relationship between hours of hurricane-related media exposure and traumatic stress symptoms.

To test if the pattern remained over time, we extended the GEE analyses to include the Wave 3 data (14 months after Hurricane Harvey's landfall, $N = 743$). These results replicated the early response findings and similarly adjusted for time, demographics, and Hurricane Harvey-related loss and injury. Both Wave 1 hours of hurricane-related media exposure and trust in that media exposure were associated with traumatic stress symptoms (see Table 2, Model 1) over time. The interaction between the amount of media exposure and trust in media on traumatic stress symptoms was also statistically significant ($\beta = -0.45$, 95% CI [−0.70, −0.19], $p = .001$; see Table 2, Model 2). These results indicate that the association between the amount of media exposure and traumatic stress symptoms is stronger when trust in the media is low, even when assessing traumatic stress symptoms as far out as 14 months postdisaster event (see Figure 2).

Discussion

Using a representative sample of Texas residents first assessed in the early aftermath of Hurricane Harvey, we document the relationship between disaster-related media exposure, trust in that media exposure, and traumatic stress responses over time. These findings expand prior work on media exposure following disasters by highlighting the potentially protective role that perceived trust in media may play by buffering the association between disaster-related media exposure and traumatic stress symptoms. For participants with high trust in the Hurricane Harvey-related media they consumed, the relation between average daily hours of Hurricane Harvey-related media exposure and traumatic stress symptoms was weaker than for those who reported low trust in their Hurricane Harvey-related media. These relationships were evident in the early aftermath of Hurricane Harvey and have persisted over time. This suggests that in the context of coping with a disaster, both the amount (i.e., hours per day), as well as how much one trusts the media being consumed, are important considerations.

Understanding how to effectively communicate with the populace during natural disasters like hurricanes is critical, particularly in the context of the escalating climate crisis. Not only have hurricanes been increasing in frequency, intensity, and duration since the 1980s, but hurricane-associated storm intensity and rainfall rates are anticipated to continue increasing in the future (Ting et al., 2019; Walsh et al., 2014), exposing people to more potentially traumatic events yearly. The rise in hurricane frequency may lead to repeated exposure to multiple hurricanes over time, raising concerns about their

Table 2

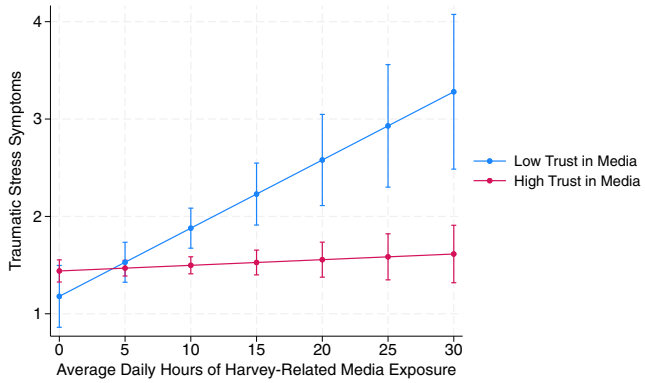
Standardized Generalized Estimating Equation Coefficients Examining the Relationship Between Hours of Media Exposure and Trust in Hurricane-Related Media Exposure and Traumatic Stress Symptoms, Waves 1, 2, and 3 (N = 743)

	Model 1				Model 2			
Variable	β	*SE*	*p*	95% CI	β	*SE*	*p*	95% CI
Media exposure	0.30	0.08	.000	[0.15, 0.45]	0.60	0.14	.000	[0.33, 0.86]
Trust in media[a]	−0.25	0.12	.035	[−0.48, −0.02]	−0.22	0.10	.035	[−0.42, −0.02]
Media Exposure × Trust in Media[a]					−0.45	0.13	.001	[−0.70, −0.19]
Harvey-based loss and injury	0.33	0.05	.000	[0.23, 0.42]	0.31	0.05	.000	[0.21, 0.40]
Education[b]	−0.10	0.08	.191	[−0.26, 0.05]	−0.12	0.07	.121	[−0.26, 0.03]
Age	−0.03	0.05	.510	[−0.12, 0.06]	−0.03	0.04	.452	[−0.12, 0.05]
Income[c]	−0.11	0.05	.040	[−0.22, −0.01]	−0.13	0.04	.005	[−0.21, −0.04]
Gender[d]	0.04	0.10	.696	[−0.15, 0.23]	0.09	0.09	.328	[−0.09, 0.26]
Race/ethnicity								
Black, non-Hispanic	0.00	0.13	.988	[−0.26, 0.26]	0.03	0.13	.842	[−0.23, 0.28]
Other, non-Hispanic, 2+ races	0.16	0.18	.379	[−0.19, 0.51]	0.15	0.17	.387	[−0.19, 0.49]
Hispanic	0.11	0.12	.344	[−0.12, 0.34]	0.07	0.11	.511	[−0.15, 0.29]
Time	0.03	0.03	.279	[−0.03, 0.10]	0.03	0.03	.277	[−0.03, 0.10]
Constant	−0.07	0.28	.814	[−0.62, 0.48]	−0.11	0.27	.697	[−0.64, 0.43]
Model statistics	Wald $\chi^2(11) = 160.62$; $p < .001$				Wald $\chi^2(12) = 261.16$; $p < .001$			

Note. *SE* = standard error; CI = confidence interval.
[a] Low trust in media = 0, high trust in media = 1. [b] Reference group = less than a college degree. [c] Reference group = male. [d] Reference group = White, non-Hispanic. For graphing purposes, trust in media was dichotomized, but the interaction was also significant when conducted with trust in media as a continuous variable from 1 to 5.

Figure 2

Association Between Amount of Hurricane Harvey-Related Media Exposure and Traumatic Stress Symptoms as Moderated by Perceived Trust in Media Sources at 2 Weeks, 6 Weeks, and 14 Months After Hurricane Harvey Made Landfall (N = 743)



Note. See the online article for the color version of this figure.

cumulative effects. Cumulative direct and indirect (i.e., through the media) exposure to prior collective traumas, including mass violence and natural disaster events, is associated with stronger early traumatic stress symptoms after a subsequent collective trauma (Garfin et al., 2015). It is possible that cumulative exposure to major hurricanes either multiple times within one hurricane season or over multiple seasons could follow a similar pattern such that experiencing multiple hurricanes may sensitize an individual to react more negatively to future hurricanes. How to communicate with the populace during these crises without instilling panic or increasing distress has been an increasing topic of interest in the public health sphere (Garfin et al., 2020).

Hurricane Harvey, like many major hurricanes, also created significant uncertainty for those in Texas. This may explain the relatively high average hours of media exposure (8.43 hr) reported by our sample at Wave 1. In the days prior to landfall, the probability of Hurricane Harvey hitting Texas went from low to near certain, and the category of the hurricane intensified to a Category 4 the evening before landfall (Metz, 2017). Even after the hurricane made landfall, it stalled over Texas, leading to relentless rains for days. In the context of disaster events where the situation often rapidly evolves, staying apprised of the disaster and its aftermath requires attention to the media. Thus, while limiting the amount of news consumed about a single event is typically a good idea (Holman et al., 2014; Hopwood & Schutte, 2017; Pfefferbaum et al., 2014), in the face of a severe hurricane and flooding, limiting news consumption is difficult and potentially dangerous. As previously demonstrated in other contexts and shown in this study, trust in media may serve a psychologically protective function (Lee, 2022; Patwary et al., 2021). In cases like this, it is vital that any news that is consumed, regardless of the amount, can be strongly trusted by the individual. This study demonstrated that the trust an individual places in their news may be protective against traumatic stress symptoms; the emphasis in this study is on the individual trust, not the objective trustworthiness of the news source. However, guiding people toward validated and credible news sources that are trustworthy not only ensures their access to accurate, corroborated information but also promotes a sense of individual trust in their media in the midst of uncertainty and crisis. Prior research shows that when people are given honest, accurate information about their risk levels, even if the information is worrying, people can understand their risk well (Fischhoff et al., 2018). Within the framework of rapidly updated information and a changing risk landscape, these results suggest that trust in the information that is being given, even if it is at a high frequency, may be protective long term and may therefore be a key factor to preventing sustained psychological distress well after the event.

To increase people's trust in their disaster-related news, there needs to be an emphasis placed on trustworthy and verified news online. Trust in media has declined in the past 2 decades, with social media being reported as one of the lowest trusted institutions among a nationally representative sample even before the pandemic (Kavanagh et al., 2020). The inundation of mis- and disinformation, particularly within the online news sphere and on social media, has reached unprecedented levels during the COVID-19 pandemic (Chowdhury et al., 2023). Misinformation has specifically been shown to be an issue during and immediately after disasters on social media. Several factors seem to be associated with misinformation during a disaster, including anxiety in the absence of reliable information or an overload of information at one time (Muhammed & Mathew, 2022). To address this issue during a natural disaster, it is vital to emphasize the availability of reliable and verified news content.

In addition to highlighting reliable news sources, it is equally vital to educate the public on how to discern trustworthy sources for disaster-related information and identify mis- and disinformation for themselves. There has been a renewed interest in increasing media literacy, or the ability to critically analyze information from the media to determine its credibility, since the 2016 election in the United States (Bulger & Davison, 2018; Hobbs, 2019) and the rise of deepfakes (i.e., hyperrealistic videos that use artificial intelligence to show someone saying or doing things that never happened; Westerlund, 2019). Drawing inspiration from the success of some northern European countries in teaching their citizens to navigate the complexities of information credibility online and, thus, increase media literacy (Bulger & Davison, 2018; Lessenski, 2019), it is apparent that this approach could empower individuals to make more informed choices when seeking information about a disaster. Not only would increasing media literacy and fostering trust in news sources contribute to a better informed public in general, but it would likely help reduce traumatic stress symptoms following disasters, as indicated by the present study. Investing in media literacy, promoting trust in credible news sources, and empowering individuals to recognize misinformation during natural disasters are crucial steps toward protecting against traumatic stress in the face of increasing rates of disaster events.

Limitations and Future Directions

Although this study has many strengths, notably its longitudinal design and representative sample, it is not without potential limitations. One limitation is that our perceived trust in media variable is a single-item measure. Though the pattern of this single-item's relation with traumatic stress symptoms holds in our longitudinal analyses, future research should use a more robust assessment of trust in the media. This would allow future research to focus on the nuances of trust in media to understand how trust in distinct types of media (e.g., social

media, television, radio) may impact psychological distress following a disaster. Moreover, future research should also assess the accuracy of the information being given about an event to quantify the objective trustworthiness of the media source, as objective trustworthiness could be differentially associated with traumatic stress symptoms when compared to subjective trustworthiness. As highlighted previously, this study focused on American media with an ostensibly free press, and therefore, the results may not be relevant in the context of countries with different media operating conditions and regulatory environments. Future research outside the U.S. context might further investigate this issue. Additionally, this study utilized survey data over time and therefore cannot make any causal inferences. Studies extending these findings using experimental designs for causal inference could be another fruitful area for future research.

Conclusion

This study highlights that perceived trust in the disaster-related media moderates the relationship between media exposure and disaster-related traumatic stress symptoms in the short term and over a year later. These findings suggest that trusting the media sources one uses may help to mitigate the potential negative consequences of high-frequency media exposure to a natural disaster. Therefore, it is important to promote objectively trustworthy media sources by increasing media literacy and the ability to recognize misinformation to protect individuals from long-lasting psychological distress as natural disasters, such as hurricanes, become increasingly frequent and destructive.

References

Ballinger, G. A. (2004). Using generalized estimating equations for longitudinal data analysis. *Organizational Research Methods*, *7*(2), 127–150. https://doi.org/10.1177/1094428104263672

Ball-Rokeach, S. J., & DeFleur, M. L. (1976). A dependency model of mass-media effects. *Communication Research*, *3*(1), 3–21. https://doi.org/10.1177/009365027600300101

Bol, D., Giani, M., Blais, A., & Loewen, P. J. (2021). The effect of COVID-19 lockdowns on political support: Some good news for democracy? *European Journal of Political Research*, *60*(2), 497–505. https://doi.org/10.1111/1475-6765.12401

Bulger, M., & Davison, P. (2018). The promises, challenges, and futures of media literacy. *The Journal of Media Literacy Education*, *10*(1), 1–21. https://doi.org/10.23860/JMLE-2018-10-1-1

Burke, J. A., Spence, P. R., & Lachlan, K. A. (2010). Crisis preparation, media use, and information seeking during Hurricane Ike: Lessons learned for emergency communication. *Journal of Emergency Management*, *8*(5), 27–37. https://doi.org/10.5055/jem.2010.0030

Calhoun, P. S., McDonald, S. D., Guerra, V. S., Eggleston, A. M., Beckham, J. C., Straits-Troster, K., & the VA Mid-Atlantic Mental Illness Research, Education and Clinical Center Operation Enduring Freedom/Operation Iraqi Freedom Registry Workgroup. (2010). Clinical utility of the primary care—PTSD screen among U.S. veterans who served since September 11, 2001. *Psychiatry Research*, *178*(2), 330–335. https://doi.org/10.1016/j.psychres.2009.11.009

Chowdhury, N., Khalid, A., & Turin, T. C. (2023). Understanding misinformation infodemic during public health emergencies due to large-scale disease outbreaks: A rapid review. *Journal of Public Health*, *31*(4), 553–573. https://doi.org/10.1007/s10389-021-01565-3

Fischhoff, B., Wong-Parodi, G., Garfin, D. R., Holman, E. A., & Silver, R. C. (2018). Public understanding of Ebola risks: Mastering an unfamiliar threat. *Risk Analysis*, *38*(1), 71–83. https://doi.org/10.1111/risa.12794

Fisher, C. (2018). What is meant by "trust" in news media? In K. Otto & A. Köhler (Eds.), *Trust in media and journalism* (pp. 19–38). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-20765-6_2

Fox, E., Russo, R., Bowles, R., & Dutton, K. (2001). Do threatening stimuli draw or hold visual attention in subclinical anxiety? *Journal of Experimental Psychology: General*, *130*(4), 681–700. https://doi.org/10.1037/0096-3445.130.4.681

Galea, S., Brewin, C. R., Gruber, M., Jones, R. T., King, D. W., King, L. A., McNally, R. J., Ursano, R. J., Petukhova, M., & Kessler, R. C. (2007). Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. *Archives of General Psychiatry*, *64*(12), 1427–1434. https://doi.org/10.1001/archpsyc.64.12.1427

Galea, S., Nandi, A., & Vlahov, D. (2005). The epidemiology of post-traumatic stress disorder after disasters. *Epidemiologic Reviews*, *27*(1), 78–91. https://doi.org/10.1093/epirev/mxi003

Garfin, D. R., Fischhoff, B., Holman, E. A., & Silver, R. C. (2021). Risk perceptions and health behaviors as COVID-19 emerged in the United States: Results from a probability-based nationally representative sample. *Journal of Experimental Psychology: Applied*, *27*(4), 584–598. https://doi.org/10.1037/xap0000374

Garfin, D. R., Holman, E. A., & Silver, R. C. (2015). Cumulative exposure to prior collective trauma and acute stress responses to the Boston Marathon bombings. *Psychological Science*, *26*(6), 675–683. https://doi.org/10.1177/0956797614561043

Garfin, D. R., Ramos, D., & Silver, R. C. (2023). Responses to natural disasters. In H. S. Friedman & C. H. Markey (Eds.), *Encyclopedia of mental health* (3rd ed., Vol. 3, pp. 44–57). Elsevier, Academic Press. https://doi.org/10.1016/B978-0-323-91497-0.00205-8

Garfin, D. R., Silver, R. C., & Holman, E. A. (2020). The novel coronavirus (COVID-2019) outbreak: Amplification of public health consequences by media exposure. *Health Psychology*, *39*(5), 355–357. https://doi.org/10.1037/hea0000875

Garfin, D. R., Thompson, R. R., Holman, E. A., Wong-Parodi, G., & Silver, R. C. (2022). Association between repeated exposure to hurricanes and mental health in a representative sample of Florida residents. *JAMA Network Open*, *5*(6), Article e2217251. https://doi.org/10.1001/jamanetworkopen.2022.17251

Gelkopf, M., Berger, R., Bleich, A., & Silver, R. C. (2012). Protective factors and predictors of vulnerability to chronic stress: A comparative study of 4 communities after 7 years of continuous rocket fire. *Social Science & Medicine*, *74*(5), 757–766. https://doi.org/10.1016/j.socscimed.2011.10.022

Guo, M., Gan, Y., & Tong, J. (2013). The role of meaning-focused coping in significant loss. *Anxiety, Stress, & Coping*, *26*(1), 87–102. https://doi.org/10.1080/10615806.2011.627507

Henselmans, I., Fleer, J., de Vries, J., Baas, P. C., Sanderman, R., & Ranchor, A. V. (2010). The adaptive effect of personal control when facing breast cancer: Cognitive and behavioural mediators. *Psychology & Health*, *25*(9), 1023–1040. https://doi.org/10.1080/08870440902935921

Hobbs, R. (2019). Media literacy foundations. In R. Hobbs & P. Mihailidis (Eds.), *The international encyclopedia of media literacy* (1st ed., pp. 1–19). Wiley. https://doi.org/10.1002/9781118978238.ieml0063

Holman, E. A., Garfin, D. R., & Silver, R. C. (2014). Media's role in broadcasting acute stress following the Boston Marathon bombings. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(1), 93–98. https://doi.org/10.1073/pnas.1316265110

Holman, E. A., Thompson, R. R., Garfin, D. R., & Silver, R. C. (2020). The unfolding COVID-19 pandemic: A probability-based, nationally representative study of mental health in the United States. *Science Advances*, *6*(42), Article eabd5390. https://doi.org/10.1126/sciadv.abd5390

Hopwood, T. L., & Schutte, N. S. (2017). Psychological outcomes in reaction to media exposure to disasters and large-scale violence: A meta-analysis. *Psychology of Violence*, *7*(2), 316–327. https://doi.org/10.1037/vio0000056

Houston, J. B., Pfefferbaum, B., & Rosenholtz, C. E. (2012). Disaster news: Framing and frame changing in coverage of major U.S. natural disasters, 2000–2010. *Journalism & Mass Communication Quarterly*, *89*(4), 606–623. https://doi.org/10.1177/1077699012456022

Hurricane Research Division. (2023, April). *Continental United States Hurricane impacts/landfalls 1851–2022*. Atlantic Oceanographic and Meteorological Laboratories. https://www.aoml.noaa.gov/hrd/hurdat/All_U.S._Hurricanes.html

Jones, N. M., Thompson, R. R., Dunkel Schetter, C., & Silver, R. C. (2017). Distress and rumor exposure on social media during a campus lockdown. *Proceedings of the National Academy of Sciences of the United States of America*, *114*(44), 11663–11668. https://doi.org/10.1073/pnas.1708518114

Jung, J. (2017). Media dependency theory. In P. Rössler, C. A. Hoffner, & L. Zoonen (Eds.), *The international encyclopedia of media effects* (1st ed., pp. 1–10). Wiley. https://doi.org/10.1002/9781118783764.wbieme0063

Kavanagh, J., Carman, K. G., DeYoreo, M., Chandler, N., & Davis, L. E. (2020). *The drivers of institutional trust and distrust: Exploring components of trustworthiness*. RAND Corporation. https://doi.org/10.7249/RRA112-7

Kennedy, B., Tyson, A., & Funk, C. (2022, February 15). *Americans' trust in scientists, other groups declines*. Pew Research Center Science and Society. https://www.pewresearch.org/science/2022/02/15/americans-trust-in-scientists-other-groups-declines/

Knudsen, E., Dahlberg, S., Iversen, M. H., Johannesson, M. P., & Nygaard, S. (2022). How the public understands news media trust: An open-ended approach. *Journalism*, *23*(11), 2347–2363. https://doi.org/10.1177/14648849211005892

Lee, S. (2022). Subjective well-being and mental health during the pandemic outbreak: Exploring the role of institutional trust. *Research on Aging*, *44*(1), 10–21. https://doi.org/10.1177/0164027520975145

Lessenski, M. (2019, November 29). *The media literacy index 2019: Just think about it*. Open Society Institute Sofia. https://osis.bg/?p=3356&lang=en

Li, S., Sun, Y., Jing, J., & Wang, E. (2022). Institutional trust as a protective factor during the COVID-19 pandemic in China. *Behavioral Sciences*, *12*(8), Article 252. https://doi.org/10.3390/bs12080252

Metz, J. (2017). *Hurricane Harvey Aug 25–26, 2017*. https://www.weather.gov/media/crp/Hurricane_Harvey_Summary_Rockport.pdf

Monahan, B., & Ettinger, M. (2018). News media and disasters: Navigating old challenges and new opportunities in the digital age. In H. Rodríguez, W. Donner, & J. E. Trainor (Eds.), *Handbook of disaster research* (pp. 479–495). Springer International Publishing. https://doi.org/10.1007/978-3-319-63254-4_23

Muhammed, T. S., & Mathew, S. K. (2022). The disaster of misinformation: A review of research in social media. *International Journal of Data Science and Analytics*, *13*(4), 271–285. https://doi.org/10.1007/s41060-022-00311-6

National Hurricane Center and Central Pacific Hurricane Center. (n.d.). *Tropical cyclone climatology*. https://www.nhc.noaa.gov/climo/

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology*, *1*(2), 115–144. https://doi.org/10.1037/1089-2680.1.2.115

Patwary, M. M., Bardhan, M., Browning, M. H. E. M., Disha, A. S., Haque, M. Z., Billah, S. M., Kabir, M. P., Hossain, M. R., Alam, M. A., Shuvo, F. K., & Salman, A. (2021). Association between perceived trusted of COVID-19 information sources and mental health during the early stage of the pandemic in Bangladesh. *Healthcare*, *10*(1), Article 24. https://doi.org/10.3390/healthcare10010024

Pfefferbaum, B., Newman, E., Nelson, S. D., Nitiéma, P., Pfefferbaum, R. L., & Rahman, A. (2014). Disaster media coverage and psychological outcomes: Descriptive findings in the extant research. *Current Psychiatry Reports*, *16*(9), Article 464. https://doi.org/10.1007/s11920-014-0464-x

Prins, A., Bovin, M. J., Smolenski, D. J., Marx, B. P., Kimerling, R., Jenkins-Guarnieri, M. A., Kaloupek, D. G., Schnurr, P. P., Kaiser, A. P., Leyva, Y. E., & Tiet, Q. Q. (2016). The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5): Development and evaluation within a veteran primary care sample. *Journal of General Internal Medicine*, *31*(10), 1206–1211. https://doi.org/10.1007/s11606-016-3703-5

Roccato, M., Colloca, P., Cavazza, N., & Russo, S. (2021). Coping with the COVID-19 pandemic through institutional trust: Rally effects, compensatory control, and emotions. *Social Science Quarterly*, *102*(5), 2360–2367. https://doi.org/10.1111/ssqu.13002

Silverblatt, A. (2004). Media as social institution. *American Behavioral Scientist*, *48*(1), 35–41. https://doi.org/10.1177/0002764204267249

Simon, T., Goldberg, A., & Adini, B. (2015). Socializing in emergencies—A review of the use of social media in emergency situations. *International Journal of Information Management*, *35*(5), 609–619. https://doi.org/10.1016/j.ijinfomgt.2015.07.001

StataCorp. (2023). *Stata statistical software: Release 18*.

Tanaka, Y. (2021). Social media technologies and disaster management. In M. Sakurai & R. Shaw (Eds.), *Emerging technologies for disaster resilience* (pp. 127–143). Springer Singapore. https://doi.org/10.1007/978-981-16-0360-0_8

Thompson, R. R., Holman, E. A., & Silver, R. C. (2019). Media coverage, forecasted posttraumatic stress symptoms, and psychological responses before and after an approaching hurricane. *JAMA Network Open*, *2*(1), Article e186228. https://doi.org/10.1001/jamanetworkopen.2018.6228

Thompson, R. R., Jones, N. M., Holman, E. A., & Silver, R. C. (2019). Media exposure to mass violence events can fuel a cycle of distress. *Science Advances*, *5*(4), Article eaav3502. https://doi.org/10.1126/sciadv.aav3502

Ting, M., Kossin, J. P., Camargo, S. J., & Li, C. (2019). Past and future hurricane intensity change along the U.S. East Coast. *Scientific Reports*, *9*(1), Article 7795. https://doi.org/10.1038/s41598-019-44252-w

Van Der Meer, T. G. L. A., Hameleers, M., & Ohme, J. (2023). Can fighting misinformation have a negative spillover effect? How warnings for the threat of misinformation can decrease general news credibility. *Journalism Studies*, *24*(6), 803–823. https://doi.org/10.1080/1461670X.2023.2187652

Walsh, J., Wuebbles, D., Hayhoe, K., Kossin, J., Kunkel, K., Stephens, G., Thorne, P., Vose, R., Wehner, M., Willis, J., Anderson, D., Doney, S., Feely, R., Hennon, P., Kharin, V., Knutson, T., Landerer, F., Lenton, T., Kennedy, J., … Somerville, R. (2014). *Our changing climate: Climate change impacts in the United States: The third national climate assessment*. U.S. Global Change Research Program. https://doi.org/10.7930/J0KW5CXT

Westerlund, M. (2019). The emergence of deepfake technology: A review. *Technology Innovation Management Review*, *9*(11), 39–52. https://doi.org/10.22215/timreview/1282

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