

# How does one prepare for adverse weather events? Depends on your past experiences

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With much of the central plains and Midwest now entering peak tornado season, the impact of these potentially devastating weather events will be shaped in large part by how individuals think about and prepare for them. A new study published in *Risk Analysis: An International Journal* shows that people's past experiences with tornadoes inform how they approach this type of extreme weather in the future, including their perception of the risk.

Led by Julie Demuth, a scientist from the National Center for Atmospheric Research, the study, "Explicating experience: Development of a valid scale of past hazard experience for tornadoes," characterized and measured people's past tornado [experiences](#) to determine their impact on the perceived risks of future tornadoes. Better understanding of these factors can help mitigate future societal harm, for instance, by improving risk communication campaigns that encourage preparation for hazardous [weather events](#).

The results indicate that people's risk perceptions are highly influenced by a memorable past tornado experience that contributes to unwelcome thoughts, feelings and disruption, which ultimately increase one's fear, dread, worry and depression. Also, the more experiences people have with tornadoes, and the more personalized those experiences, the more likely they are to believe their homes (versus the larger geographic area of their city/town) will be damaged by a tornado within the next 10 years.

In the context of this study, Demuth defines 'past tornado experience' as "the perceptions one acquires about the conditions associated with or impacts of a prior tornado event. Such perceptions are gained by the occurrence of a tornado threat and/or event; directly by oneself or indirectly through others; and at different points throughout the duration of the threat and event."

The study was conducted through two surveys distributed to a random sample of residents in tornado prone areas of the U.S. during the spring and fall of 2014. The first survey evaluated an initial set of items measuring experiences, and the second was used to re-evaluate the experience items and to measure tornado risk perceptions. The sample sizes for the two surveys were 144 and 184, respectively.

Since tornado experiences can occur at any time throughout one's life, and in multiplicity, the survey items measured both one's most memorable tornado experience and his or her multiple experiences. A factor analysis of the survey items yielded four factors which make up the memorable experience dimensions.

- Risk awareness: information pertaining to the possibility of a specific tornado hazard occurring, as well as threat-related social cues from both people and the media.
- Risk personalization: one's protective behavioral and emotional responses as well as visual, auditory and tactile sensations experienced during the tornado.
- Personal intrusive impacts: ways that one is personally affected by an experience, including intangible, unpleasant thoughts and feelings from the experience.
- Vicarious troubling impacts: others' tangible impacts and verbal accounts of their experiences and intangible intrusive impacts. The "others" are people known personally by the responding individual. Although all the items in this factor reflect others'

accounts of a tornado experience, the respondent experiences these aspects by hearing about or witnessing them.

The factor analysis revealed two factors contributing to the multiple experience dimensions: common threat and [impact](#) communication, and negative emotional responses. The first factor captures one's personal experience with receiving common types of information (e.g., sirens) about tornado threats and tornado-related news. The second factor captures the amount of experience a respondent has with fearing for their own life, a loved one's life and worrying about their property due to a tornado.

Individual's past tornado experiences are multi-faceted and nuanced with each of the above six dimensions exerting a different influence on tornado risk perceptions. These dimensions have not been previously analyzed, particularly the intangible aspects - feelings, thoughts and emotions.

"This research can help meteorologists who provide many essential, skillful risk messages in the form of forecasts, watches, and warnings when [tornadoes](#) (and other hazardous weather) threaten. This research can help meteorologists recognize the many ways that people's past tornado experiences shape what they think and do, in addition to the weather forecasts they receive," states Demuth.

**More information:** Julie L. Demuth, Explicating Experience: Development of a Valid Scale of Past Hazard Experience for Tornadoes, *Risk Analysis* (2018). [DOI: 10.1111/risa.12983](https://doi.org/10.1111/risa.12983)

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