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Using the Tornado Tales Survey to Measure Warning Reception and Response during Evening and Nocturnal Events

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Introduction

- Nocturnal tornadic events are disproportionately fatal compared to daytime events (Ashley et al. 2008)
- Fatalities due to nocturnal events have risen from the 1960s- early 2000 (Ashley et al 2008)
- People are less confident in their ability to receive tornado warnings overnight (Krocak et al 2021; Mason et al 2018)
- Warning reception is essential to the protective action decision-making process (Lindell and Perry 2012)
- Tornado Tales is a survey available to anyone who has experienced a tornadic event or tornado warning
- This study utilized data gathered from the first iteration of the Tornado Tales Survey to identify potential issues with warning reception and response

Data & Methods

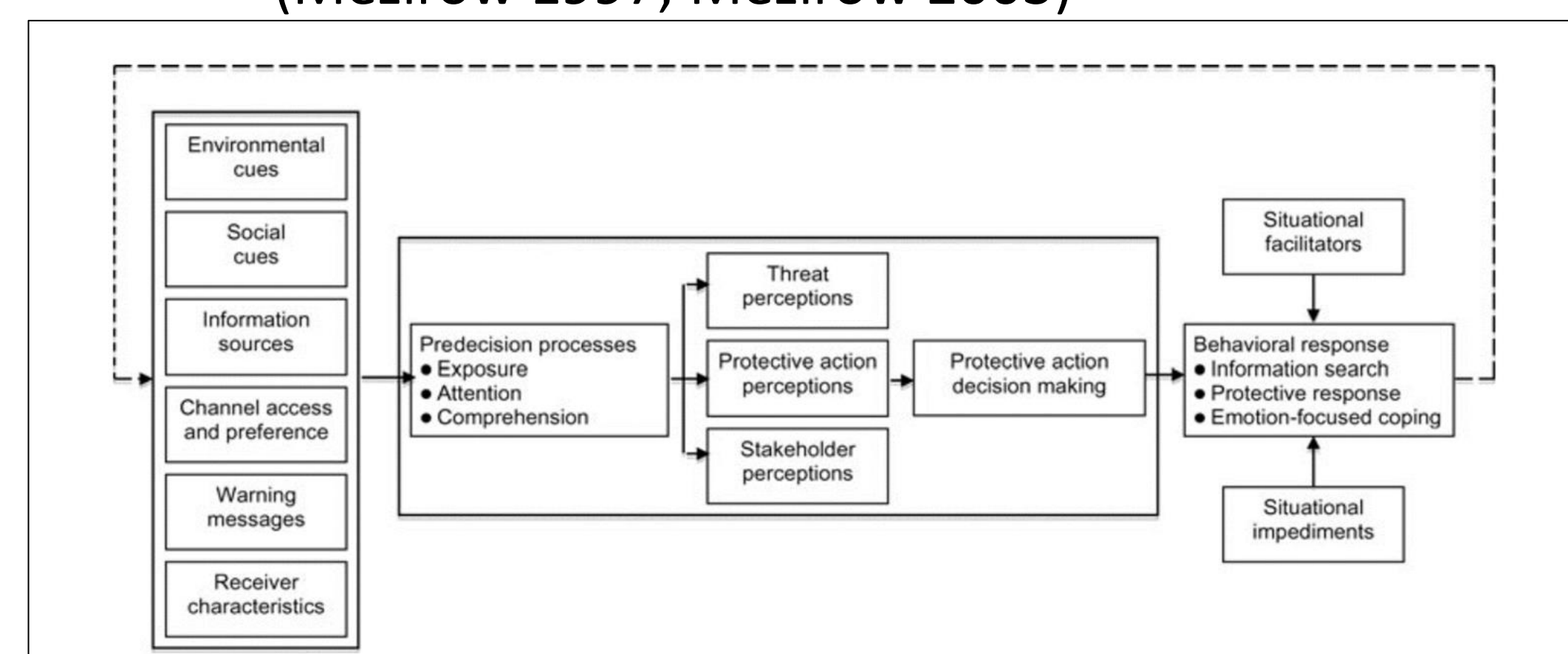
Quality Checking

- False and/or repetitive responses were eliminated
- Reports with location errors were eliminated

Qualitative Data

Responses were thematically analyzed for phrases related to:

- The Protective Action Decision Model (Lindell and Perry 2012)
- Milling (Wood et al. 2018; Doermann et al. 2021)
- Transformative Learning/Critical Reflection (Mezirow 1997; Mezirow 2003)

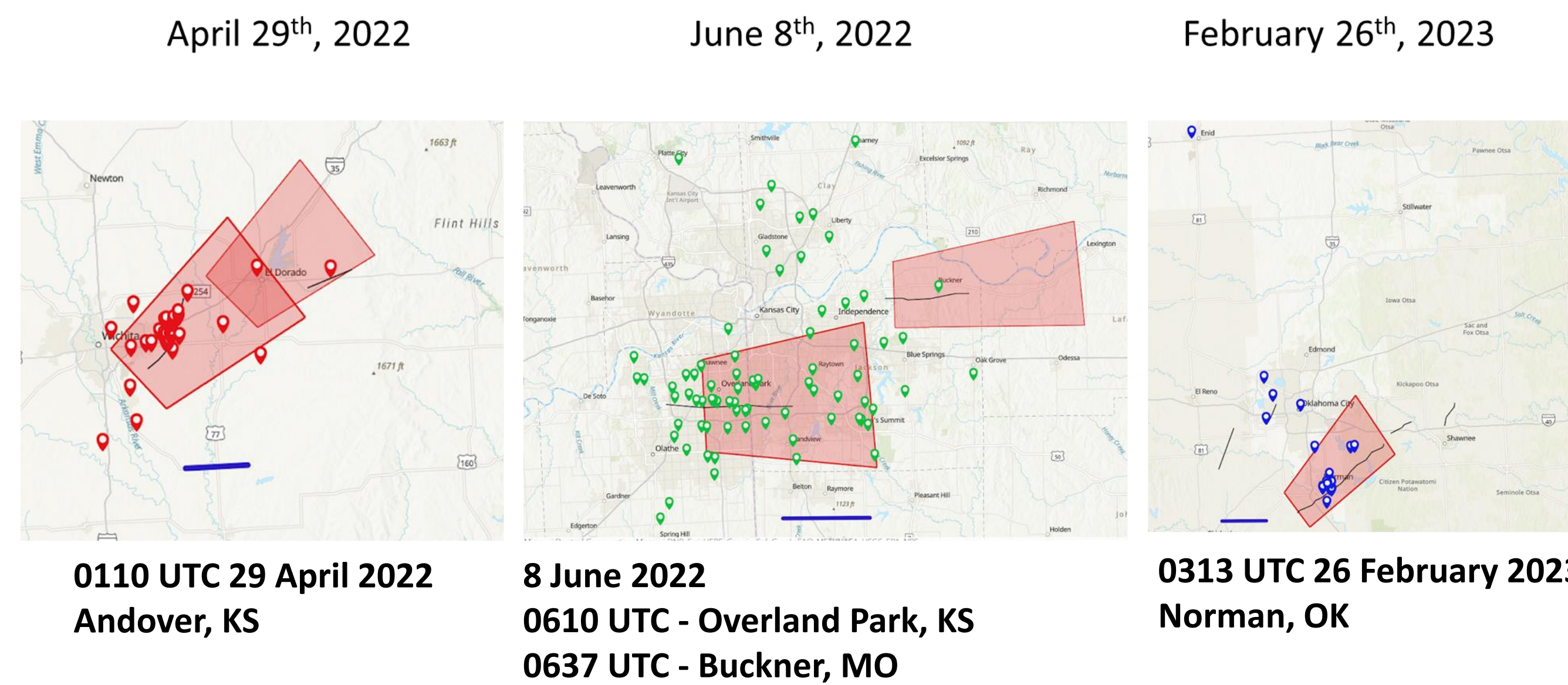


The Protective Action Decision Model. Figure courtesy of Lindell and Perry (2012).

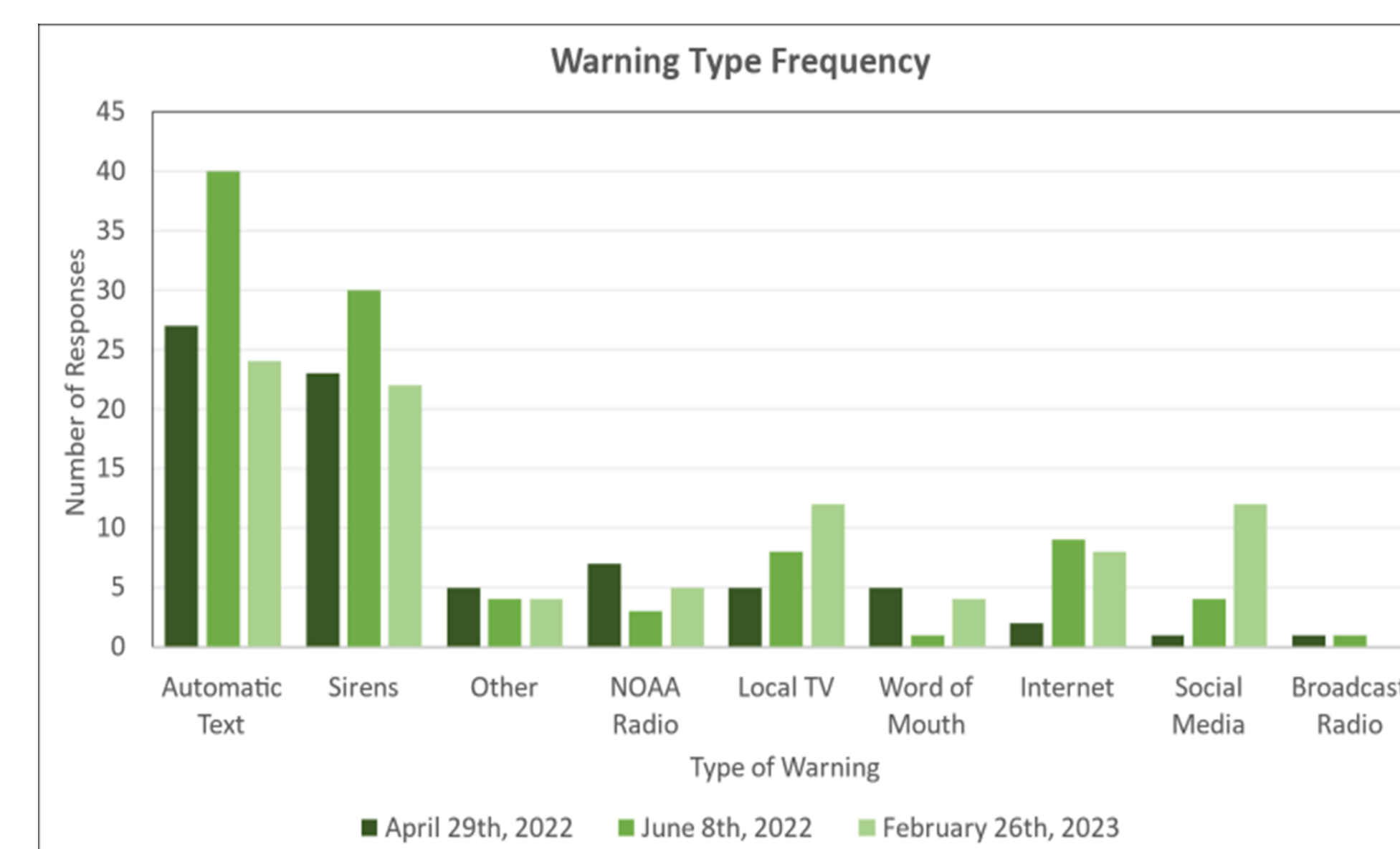
Quantitative Data

Responses were 1/0 coded, then chi-square tested for homogeneity.

Locations

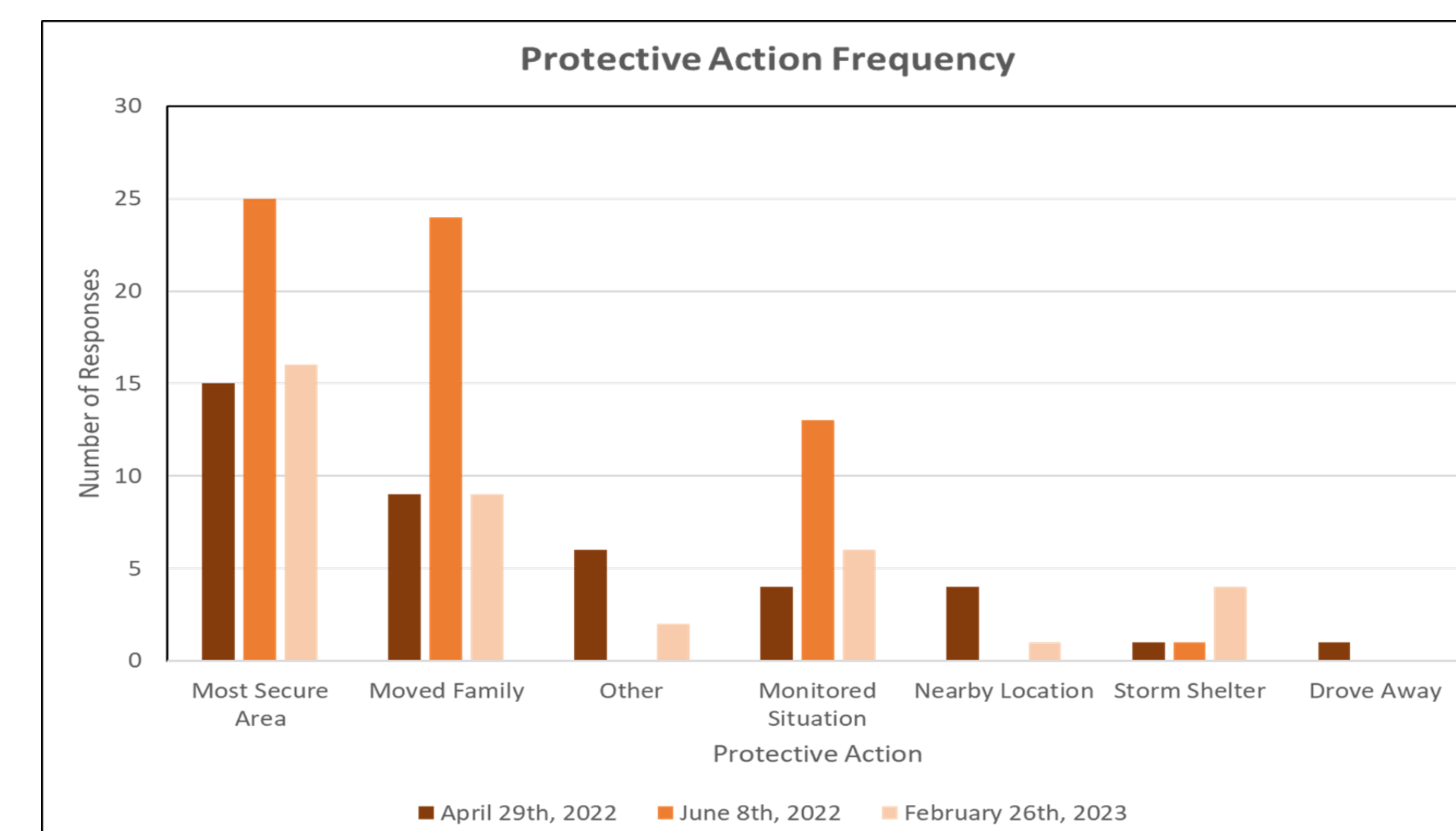


Results



Warning Source

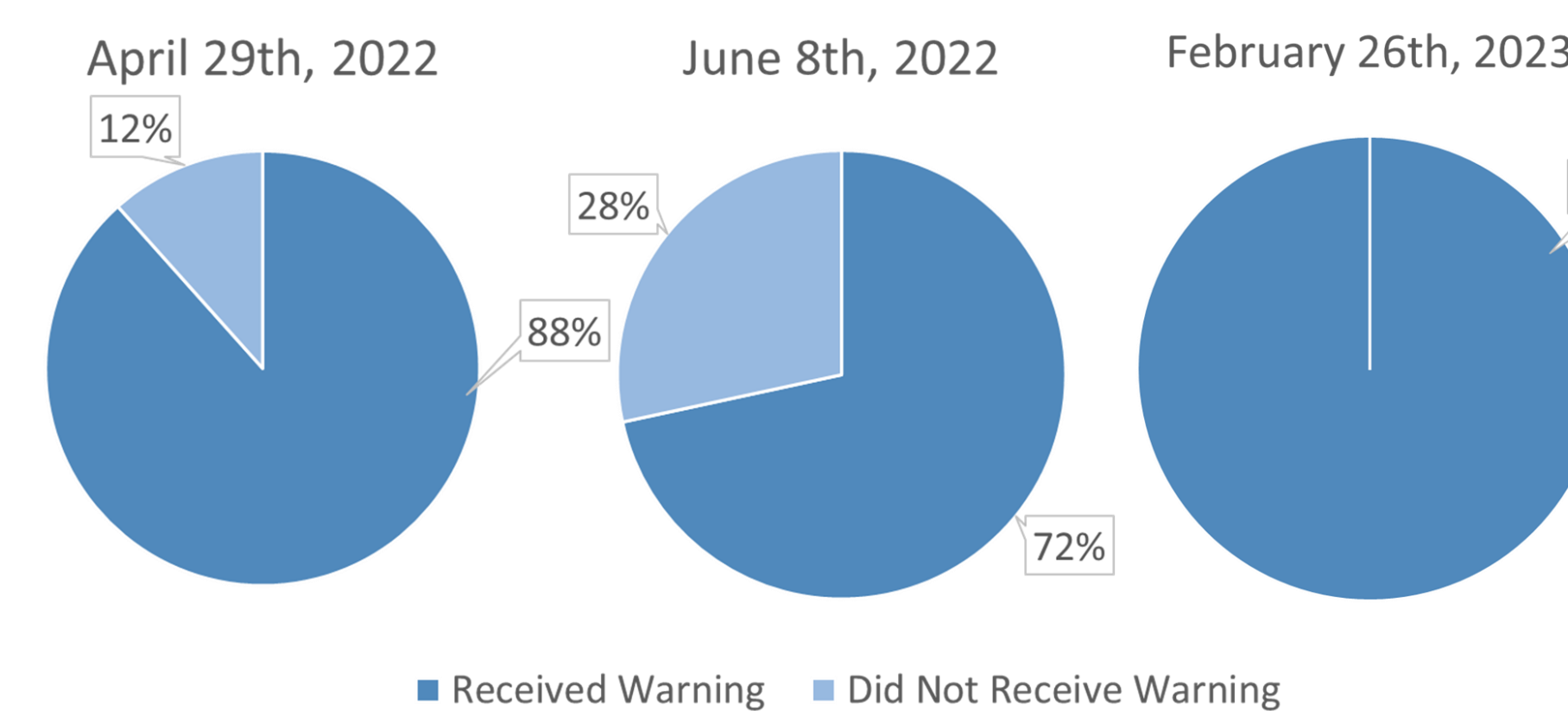
The most common warning sources across all three events were automated text alerts and tornado sirens.



Protective Action Types

The most common protective responses were to move oneself and one's family to a more secure area at the present location.

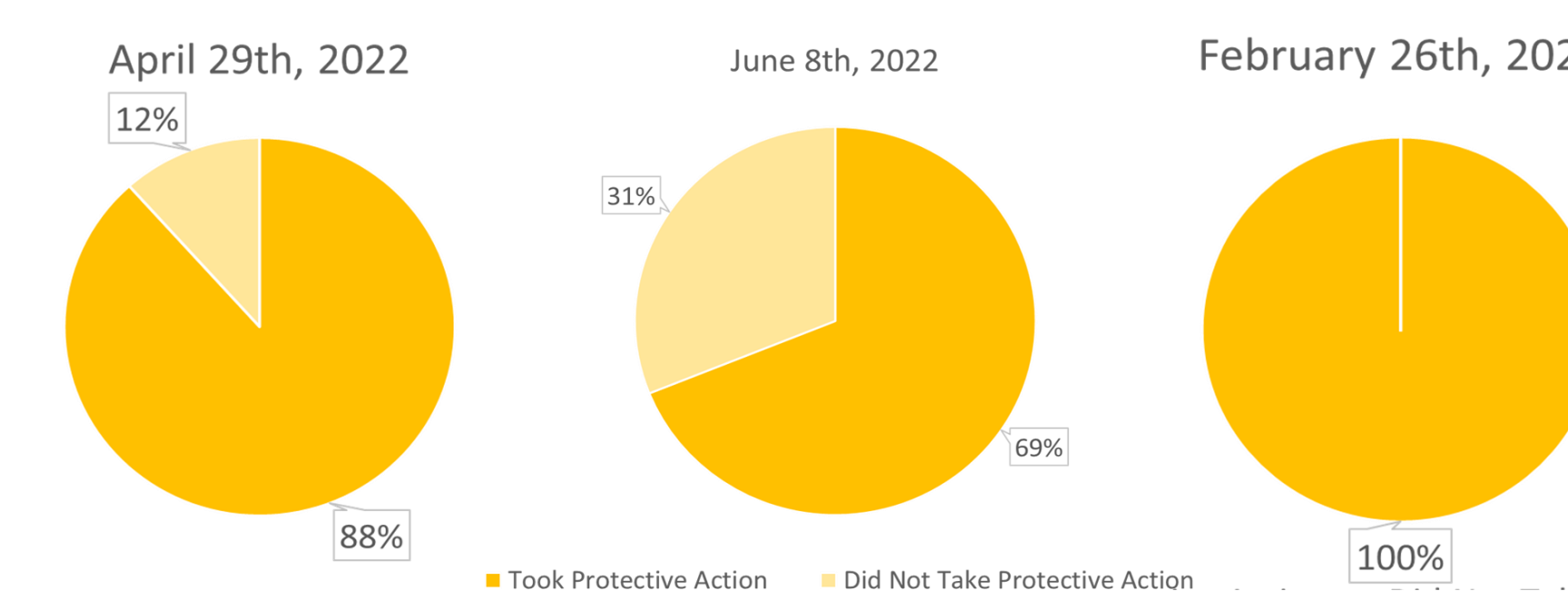
Warning Reception Rates



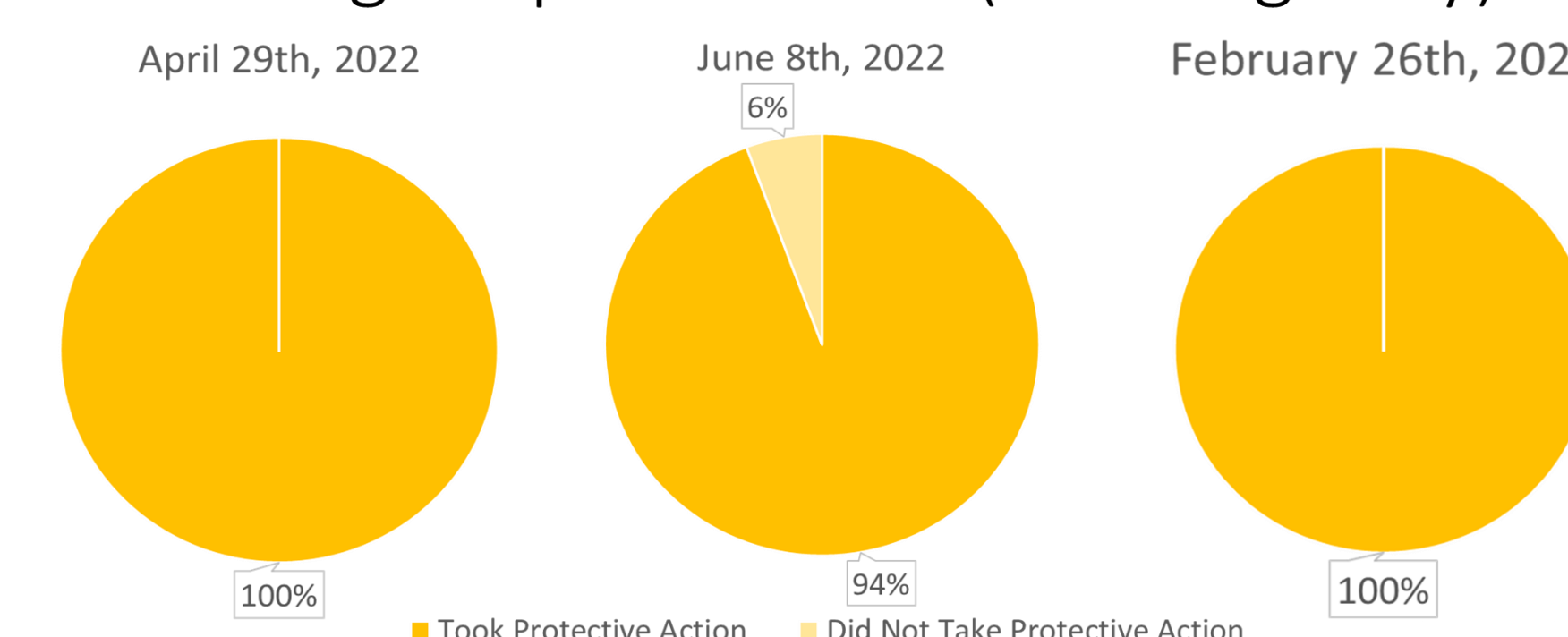
Warning Reception

Out of all three events, the June 8th early morning event had the lowest percentage of people receiving warnings at 72%.

Warning Response Rates (Total)



Warning Response Rates (Warning Only)



Protective Actions

Most respondents took some type of protective action during each event.

Discussion

- People are less likely to receive warnings in the early morning compared to the evening. This is possibly due to a higher percentage of people being asleep (Lee et al. 2017)
- Automated texts and sirens are the most reported warning sources, possibly due to lack of necessity for end-user attention.
- With sufficient warning, most respondents chose to take action.
- Most respondents chose to move to a secure location within their homes.

Conclusions

The discrepancy in nocturnal tornado fatality rates as compared to daytime events may be more strongly influenced by issues in warning dissemination/reception than by issues with complacency or lack of sheltering knowledge. Further research is needed to fully explore the potential that the Tornado Tales survey has to offer.

Acknowledgements

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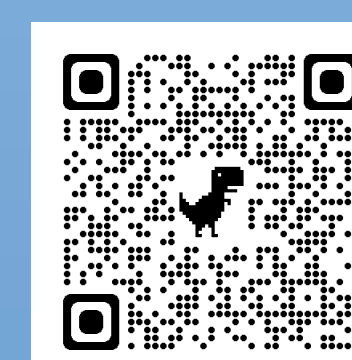
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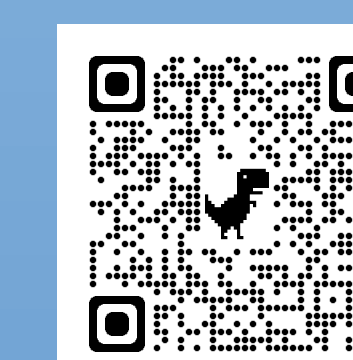
Have you been affected by a tornado, tornado warning, or severe storm that you thought could produce a tornado? Scan here to complete the Tornado Tales Survey.



To read the complete paper:



To read the project ArcGIS StoryMap:



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