Nocturnal Tornadoes and the Information Timeline:
What do people want and need?

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...and many others!
Overview

• Nocturnal tornadoes are challenging
  • No visibility, people are asleep, etc.
  • When are people least confident in information reception?

• Lots of work on what information meteorologists can provide
  • At different points in the event timeline (e.g., 4 days out, 3 hours out, 15 mins out)

• Less work on what information people use to make decisions
  • Might be helpful when developing new forecasting tools, communication products, etc.

• We aim to investigate:
  • What information people want
  • When the want it
The Severe Weather and Society Survey

- A yearly survey of the US public that systematically measures public reception, understanding, and response to severe weather forecasts

- Includes two types of question:
  - Repeat questions that measure core concepts
  - New questions that measure emerging topics, interests, and challenges (probability communication, overnight warnings, COVID-19)

- 2020 sample: 3000 US adults
- 2021 sample: 1550 US adults
The Tropical Cyclone and Society Survey

- Similar to the Wx Survey, but focused on tropical cyclones and hurricanes
- Question themes:
  - Reception, understanding, response to TC forecasts
  - Understanding of probabilistic forecasts
  - Numeracy, "weather numeracy"
- 2021 sample: 1550 US adults
We will discuss the results of three experiments today:

• Confidence in warning reception/response across time
• What weather information do people want?
• When do they want it?
Experiment 1: tornado warning reception

For some people the time of day influences tornado warning reception, understanding, and/or responsiveness.

If a tornado WARNING were issued for your area tomorrow at [random time], how confident are you that you would…

• Receive the warning?

• Understand the warning?

• Take protective action in response to the warning?

Multiple choice answer from not at all to extremely confident
Experiment 1: tornado warning reception

[Bar chart showing the percentage of respondents who did not receive warning at all, not very, somewhat, very, and extremely.]

- 1 AM to 9 AM:
  - Not at all: 11.2%
  - Not very: 15.9%
  - Somewhat: 29.1%
  - Very: 36.5%
  - Extremely: 24.4%

- 10 AM to 5 PM:
  - Not at all: 5.2%
  - Not very: 5.6%
  - Somewhat: 27.0%
  - Very: 34.0%

- 6 PM to midnight:
  - Not at all: 2.9%
  - Not very: 9.4%
  - Somewhat: 27.0%
  - Very: 26.5%
Experiment 1: tornado warning reception
Experiment 2: what information do people want?

Severe weather [hurricane] forecasts often include multiple pieces of information. We want to know how important each of the following pieces of information is to you.

Please drag the boxes below to rank each piece of information from most important (top) to least important (bottom).

- **Location**: what area is the storm going to affect?
- **Timing**: when is the storm going to happen?
- **Chance**: how likely is the storm to occur?
- **Severity**: how intense is the storm going to be (for example: wind speed, hail size, amount of rain)?
- **Impacts**: how might the storm impact you and surrounding areas? (for example: poor visibility, traffic delays, power outages, property damage)
- **Protective actions**: how can you stay safe during the storm? (for example: slow down when driving, stay inside, seek shelter)
Experiment 2: what information do people want?

[Severe weather/Hurricane] forecasts often include multiple pieces of information. Please rank each piece of information from most important to least important.
Experiment 3: when do they want it?

Interesting to see how people rank different pieces of information, but do those rankings change along the event timeline?

Survey experiment:

Some people look for different kinds of information at different points in time. In the next few questions, we are going to give you a timeline and ask you to indicate the type of information that is most important at each point in time.

Severe weather:
• 3 days before the storm
• 1 day before the storm
• 4 hours before the storm
• 60 minutes before the storm
• 15 minutes before the storm

Tropical cyclones:
• 5 days before the storm
• 3 days before the storm
• 2 days before the storm
• 1 days before the storm
Experiment 3: when do they want it?

<table>
<thead>
<tr>
<th>Time Before Forecast Event</th>
<th>Protective Actions</th>
<th>Location</th>
<th>Severity</th>
<th>Impacts</th>
<th>Timing</th>
<th>Chance</th>
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<tbody>
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</table>

Respondents (Percent)
Experiment 2: Tropical Cyclones

The diagram shows the change in respondents' concern levels over time before a forecast event. The factors considered are:

- Location
- Chance
- Timing
- Severity
- Protective Actions
- Impacts

The y-axis represents the percentage of respondents (in percent) and the x-axis represents the time before the forecast event in days (5 days, 3 days, 2 days, 1 day). The graph illustrates how respondents' concerns evolve as the event approaches.
What does this mean?

- People are much less confident in receiving a warning overnight
  - Midnight to 4a is time of lowest confidence
  - They need information **before** this time

- People first seek out the “will it happen” information
  - Chance, location (if it’s not my location, I don’t need to worry)

- Then they seek out the other pieces of information
  - When, how bad, and what should I do?

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