

Survey Based Evaluation of Communicating Uncertainty in Weather Forecasts

Rebecca Morss and Jeff Lazo

WAS*IS Progress Report

March 13, 2006



Conceptualization

Generation	→	Weather characteristics (rain, temp, etc), spatial/temporal, changes in observations, modeling, forecaster contribution, limitations of prediction
↓		
Transmission	→	Method (TV, radio, print); Mode (verbal, visual, text); Message (timing, frequency, . . .)
↓		
Reception	→	User specific/context specific; language; culture. education; understanding probabilities
↓		
Actualization	→	Decision making, changes in utility.
↓		
Valuation	→	Stated preference; revealed preference; general equilibrium; user differences.



Integration with Storm III Survey

- Choice based value of improved wx forecasts
 - 1200 subjects
 - extensive socio-demographic data

17 If you had to choose, would you prefer Program A or Program B? Check one box at the bottom.

	Program A ▼	Program B ▼
FREQUENCY OF UPDATES (Currently 4 times a day)	9 times a day	12 times a day
ACCURACY OF ONE-DAY FORECASTS (Currently correct about 80% of the time)	correct 90% of the time	correct 85% of the time
ACCURACY OF MULTIDAY FORECASTS (Currently accurate up to 5 days into the future)	accurate up to 14 days in the future	accurate up to 14 days in the future
GEOGRAPHIC DETAIL (Currently to 30 by 30 miles)	to 7 by 7 miles	to 30 by 30 miles
ADDED YEARLY COST TO YOUR HOUSEHOLD	\$15 more	\$8 more
<i>Check (✓) the box for the program you prefer →</i>	<input type="checkbox"/>	<input type="checkbox"/>

Case Studies

- **Probability of precipitation**
 - Gigerenzer (2005) and Murphy (1980)
- **Probabilistic Quantitative Precipitation Forecasts**
- **National Digital Forecast Database**
 - 5x5 (or 2.5x2.5) km grid, on which NWS now distributes forecasts out to 7 days
 - no provision for probability information except PoP
 - Working Group recommended
 - expected value (or median)
 - lower bound (at perhaps the 10 percentile value)
 - upper bound



Links to Other Research

- **Weather saliency**
 - Alan Stewart – Georgia
 - factor analytic approach
- **Latent class analysis**
 - develop population segments
- **Mental models**
 - identify gaps to improve communication
- **Experimental economics**
 - controlled decision making
 - real consequences



WAS*IS Discussion Board

- Ideas for other wording to be tested
- Survey Executive implementation

Suppose it is Monday afternoon and you receive the following message:

"There is a winter storm warning in effect until 8 pm Tuesday."

What does this information mean to you?

- There is definitely going to be a winter storm before 8 pm on Tuesday.
- There may be a winter storm before 8 pm on Tuesday.
- There is a small chance there will be a winter storm before 8 pm on Tuesday.
- I don't know.
- Other, please specify

Suppose now that you receive the following information early Tuesday morning:

"...winter storm warning cancelled...
...blizzard warning in effect until 8 p.m..."

What does this new information tell you?

- There is no longer a chance of a winter storm.
- The storm is going to get worse.
- The storm won't be as bad as originally thought.
- I don't know.
- Other, please specify