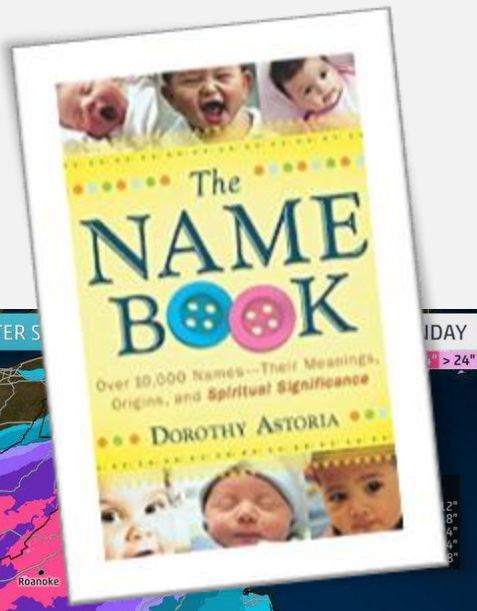


SOCIAL SCIENCE AND NAMED WINTER STORMS

Jen Henderson, Adam Rainear, Jen Sprague, and Gina Eosco

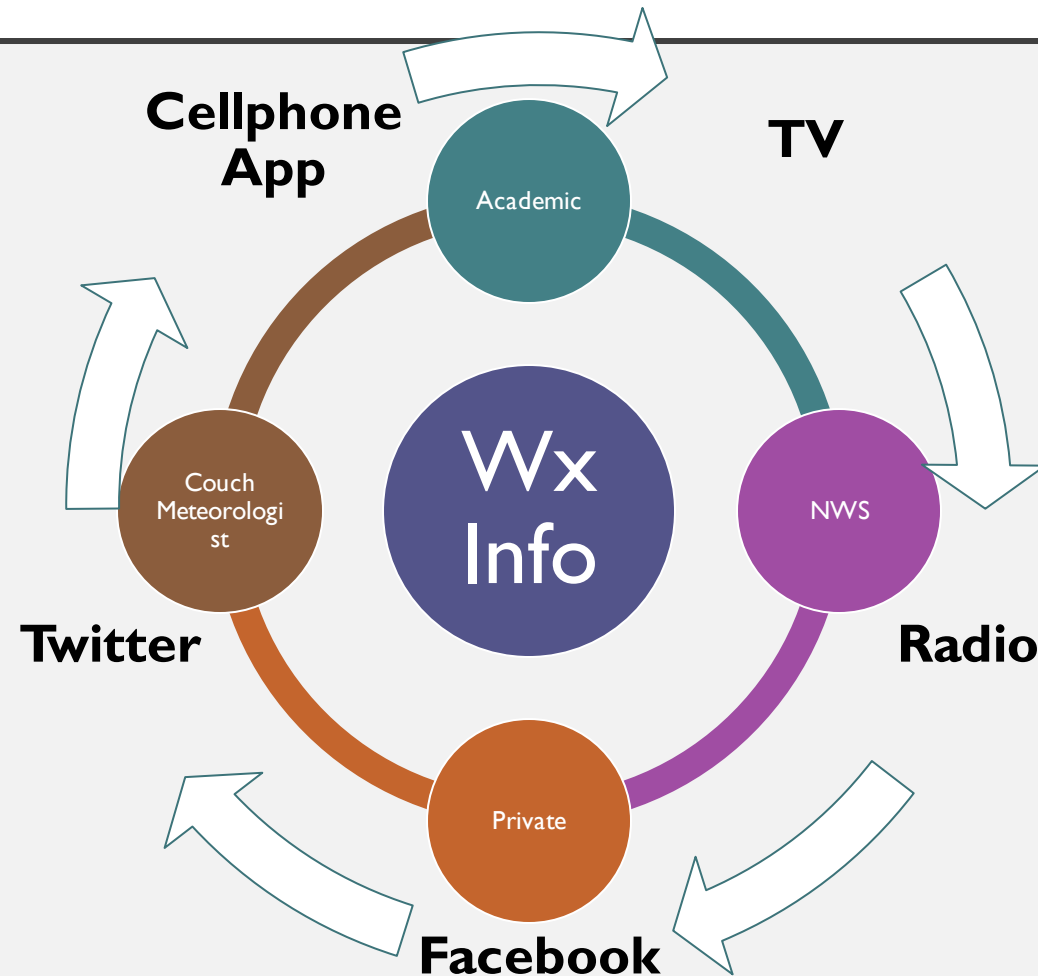
THE PRACTICE OF WINTER WEATHER COMMUNICATION

- How does winter weather communication function in our field?
- How can social science perspectives help us think about a possible role of naming storms?

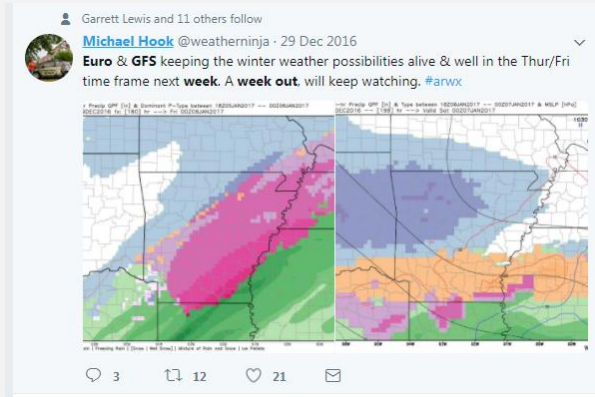


WINTER WEATHER COMM IN ACTION

- Thriving Weather Enterprise!



COMMUNICATE OVER TIME



MODELS

7-10 days
before

**More
MODELS**

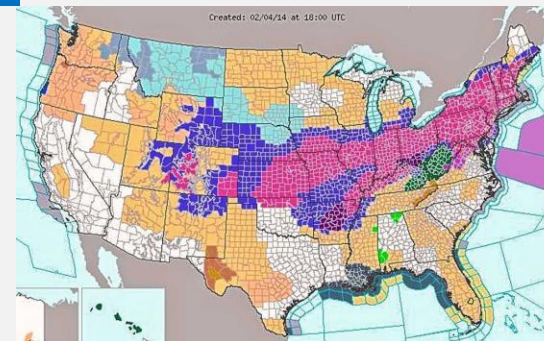


Watch

36-72
hours



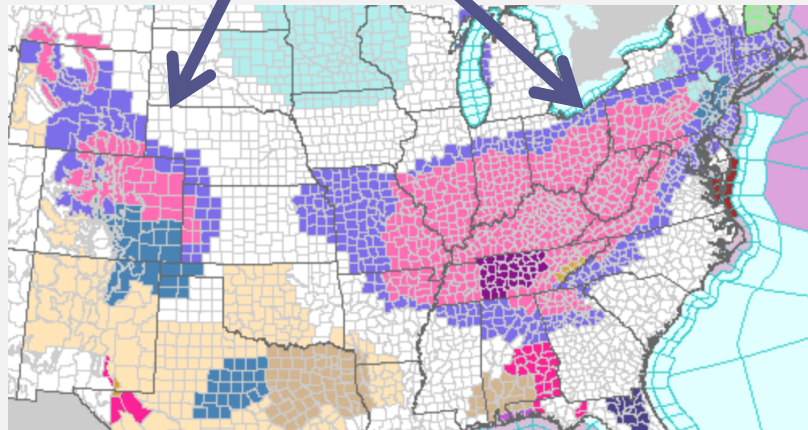
Warning



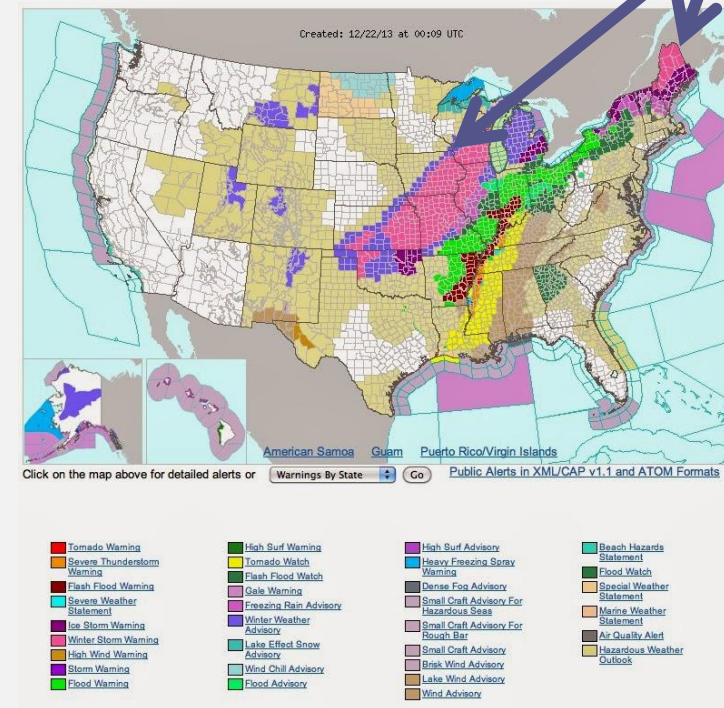
EVENT

CHALLENGE #1: IT CAN SNOW IN A LOT OF PLACES

Same Storm?

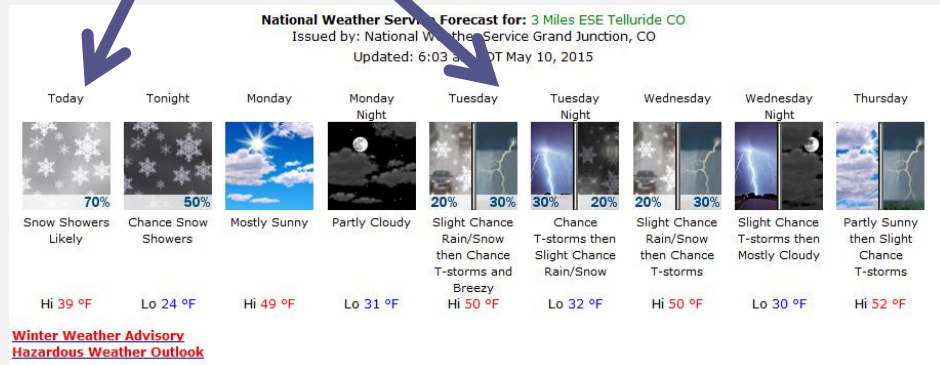


Same Storm?



CHALLENGE #2: IT CAN SNOW REPEATEDLY IN THE SAME PLACE!

Same
Storm?



Same
Storm?



CHALLENGE #3: PEOPLE!



POSSIBLE COMMUNICATION FUNCTIONS FOR NAMING

- **Communicate Risk?** Does the act of naming help convey the risks of winter storms?
 - Are we assuming that the public does *not* know the risk of winter storms?
 - P.S. Not everyone thinks of winter storms as risky ... 
- **Organize?** Does the act of naming help organize communication for multiple storms?
 - Ex. DC blizzard .. Small event two days before (traffic nightmare), followed by blizzard. Would naming have helped communicate the differences?
- **Audience?** Who is the audience for naming?
 - Is it the public?
 - Emergency management and weather community?
 - Everyone?
- *What do we know about current research that help us inform these questions?*

CURRENT SOCIAL SCIENCE RESEARCH

Social science studies directly related to winter weather

- Hall, G., and Endfield. (2017). “Snow Scenes”: Exploring the Role of Memory and Place in Commemorating Extreme Winters. *Weather, Climate and Society*.
- Bonnan-White, J. ; Shulman, J. ; Bielecke, A. (2014). Snow tweets: emergency information dissemination in a US county during 2014 winter storms. *PIOS*.
- Drobot, S., Demuth, J. Schmidt, C. (2008). The January 5-6, 2008, California winter storm : assessing information sources, actions, and damages. *Natural Hazards Center*.
- Drobot, S. (2007). Evaluation of winter storm warnings: A case study of the Colorado Front Range December 20-21, 2006, winter storm. *Natural Hazards Center*.

Studies directly related to named winter storms

- **Rainear, A.M.**, Lachlan, K.A., & Lin, C.A. (2017). What's in a #Name? An Experimental Study Examining Perceived Credibility and Impact of Winter Storm Names. *Weather, Climate, & Society*. In Press. <https://doi.org/10.1175/WCAS-D-16-0037.1>

Research from other hazards or areas relevant to our concerns

- Perhaps literature from health and medicine where drugs are named and may influence people's actions/ perceptions
- Perhaps literature from other hazards studies about named dangers and affects on people in terms of awareness, prevention, action (e.g. names of drugs or poisons, names of diseases and preventative actions, etc).

SOCIOLOGY / ANTHROPOLOGY OF WEATHER

- People's past experience and assumptions about risk shape their decisions.
- Culture and societal influences are just as important as weather issues.
- Racial, ethnic, gender and religion all affect how people respond to and think about weather. There is no unified public.
- People are not rational actors who get information and make decisions the way experts want them to. People have the right to not act.
- More information or accurate information doesn't always lead to faster or "better" decisions. "Better" is different for everyone.
- Issues like personalization of risk, trust in authority (worldview), beliefs about existence, and familial and kinship dynamics are important in emergency decisions.

POTENTIAL QUESTIONS: THE PUBLIC

- How do people currently understand winter weather alerts (e.g. blizzard, winter warnings, etc.)? How aware are they of winter weather events in their area?
- In what ways do people get information about winter weather? What information spurs action? What actions do they take and why?
- What elements of people's lives (e.g. job, resources, etc.) enable to or prevent them from taking recommended NWS / private met actions?
- How have people experienced named storms? How do people understand them & naming practices relative to their risk? To severity of the storm?
- What names would create awareness? What alternatives might exist to raising awareness about severe winter storms?
- Others?

POTENTIAL QUESTIONS: THE EXPERTS

- How do experts in different weather sectors currently collaborate / communicate re: winter weather?
- How do / will named storms criteria relate to current warning infrastructures and practices?
- What assumptions do different groups make about the affects of naming storms on public awareness and preparedness?
- What technological, infrastructure, or policy changes would be affected by named storms in each sector?
- How would naming storms affect partner / stakeholder practices and policies (e.g. emergency managers, department of transportation)?
- Others?

STORM NAMING

HISTORICALLY

- WMO manages name list for Atlantic Hurricane season
- NHC implements the use of the names
 - North Atlantic/Eastern Pacific
- Initially, storms named for communication with ships and coastal entities
- Common European names
 - Bill, Andrew, Kate, Larry

Winter Storms

- Following 2011 Halloween storm, the Weather Channel (TWC) began examining safety impact and awareness for naming
- 2012 began naming storms
 - Used the IMPACT tool to dictate whether a storm will be named
- Names based on Greek Mythology

SOME CONSIDERATIONS

- Field of meteorology is always expanding to incorporate new forecasting and communication tools
- Recent Storm Surge Risk Communication Project by the NHC underwent years of empirical testing before being publicly utilized
 - Surveys and experiments
- Researchers have called for forecasters to test their message interpretations (Morrow et al., 2015)
 - Understand cognitive and emotional responses for behavior/impressions
 - Similar calls in field of risk communication to utilize previously tested frameworks and theory

THEORETICAL FRAMEWORK

- Health Belief Model (Becker, 1974)
 - Health/risk communication theory used to explain behavior regarding risk and health messages
 - Perceived severity & perceived susceptibility
 - Used to explain recycling behavior, climate change related environmental behaviors, etc.
 - Individuals are unlikely to take action unless they believe the forecast is relevant to them and puts them at risk (Baker et al., 2012; Villegas et al., 2013)
- Source credibility (McCroskey & Teven, 1999)
 - Attitude an individual has toward another individual or organization

RESEARCH QUESTIONS

- **RQ1:** Will perceived source credibility of TWC be greater in the control message or in one of the named messages?
- **RQ2:** Will perceived severity of and perceived susceptibility to winter storms vary across naming strategies?
- **RQ3:** Will different naming strategies elicit positive or negative reactions to the storm names?

METHOD

- Undergraduate students ($N=407$) at a northeastern public university
- Recruited in April 2015 ($M=19.2$, $SD=1.15$)
- Participants reported media usage and frequency of checking weather
- Randomly assigned to one of three conditions
- Answered questions related to storm name reaction, severity and susceptibility, and source credibility

STIMULUS (BILL CONDITION)



The Weather Channel

@weatherchannel



Following

Up to 1 FOOT of #SNOW for parts of New England as Winter Storm #Bill tracks NE this weekend. Expect travel delays.



RETWEETS

96

FAVORITES

357



4:33 PM - 2 Jan 2015

STIMULUS (CONTROL CONDITION)



VARIABLES

- Severity/susceptibility (Becker, 1974)
 - 7-point Likert (agree to disagree), averaged into two computed variables
- Credibility (McCroskey & Teven, 1999)
 - 18 items total, 3 sub-factors emerged and were computed into variables
 - Goodwill, competence, and trustworthiness are the factors
 - 7-point semantic differential scale
- Storm name reaction
 - 5 items of paired adjectives on a 7-point scale
 - 2 items dropped from analysis

RQ1: WILL PERCEIVED SOURCE CREDIBILITY OF TWC BE GREATER IN THE CONTROL MESSAGE OR IN ONE OF THE NAMED MESSAGES?

- ANOVA tests across conditions
- **Trust:** $F(2,407) = 1.74, p=n.s.$
 - *Control* ($M=2.99, SD=1.12$), *Bill* ($M=2.83, SD=1.06$), or *Zelus* ($M=2.93, SD=1.18$) conditions.
- **Goodwill:** $F(2, 407) = 1.85, p=n.s.$
 - *Control* ($M=3.66, SD=.86$), *Bill* ($M=3.50, SD=.97$), or *Zelus* ($M=3.55, SD=.96$) conditions.
- **Competence:** $F(2,407) = 1.01, p=n.s.$
 - *Control* ($M=2.75, SD=1.10$), *Bill* ($M=2.66, SD=1.07$), or *Zelus* ($M=2.63, SD=1.11$) conditions.

RQ2: WILL PERCEIVED SEVERITY OF AND PERCEIVED SUSCEPTIBILITY TO WINTER STORMS VARY ACROSS NAMING STRATEGIES?

- ANOVA tests across conditions for each
- **Severity:** $F(2,405) = .36, p=n.s.$
 - *Control* ($M=4.66, SD=.98$), *Bill* ($M=4.73, SD=1.08$), or *Zelus* ($M=4.70, SD=1.12$) conditions.
- **Susceptibility:** $F(2,405) = 2.04, p=n.s.$
 - *Control* ($M=4.85, SD=1.09$), *Bill* ($M=4.94, SD=1.09$), or *Zelus* ($M=4.77, SD=1.18$) conditions.

RQ3: WILL DIFFERENT NAMING STRATEGIES ELICIT POSITIVE OR NEGATIVE REACTIONS TO THE STORM NAMES?

- T-test to compare the reaction of those who saw *Bill* vs. *Zelus*
 - $t(279) = .294, p=n.s$
 - *Bill*: ($M=3.62, SD=.85$)
 - *Zelus*: ($M=3.59, SD=.87$)
 - No analysis performed on the control condition

DISCUSSION & IMPLICATIONS

- Naming winter storms could alter how users seek out information about storms
 - Searching via a name rather than location
 - How you search and where you find information (social media vs. webpage, etc.) alters credibility perceptions of media organizations, government agencies, forecasters, etc.
- We already name storms post-hoc
 - See Snow-tober, Snowmageddon, Storm of the Century
- Lack of uniformity among government agencies, media organizations, other groups

PAPER CITE & INFO

- Early online: <http://journals.ametsoc.org/doi/abs/10.1175/WCAS-D-16-0037.1>
- **Rainear, A.M.**, Lachlan, K.A., & Lin, C.A. (2017). What's in a #Name? An Experimental Study Examining Perceived Credibility and Impact of Winter Storm Names. *Weather, Climate, & Society*. In Press.
- Recording:
<https://ams.confex.com/ams/96Annual/webprogram/Paper289355.html>

EXPANDING FUTURE RESEARCH

- Special Issue on Communicating High Impact Weather: Improving warnings and decision-making processes
 - [WMO High Impact Weather Project](#)
 - Another paper using Twitter and names with some of my (Adam) colleagues
 - Potential paper examining the naming of Nor'Easters in this special issue