Sharing Expert Decisions

Examining Television Meteorologists' Tweets of a Severe Weather Forecasting Team's Warnings

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Introduction

The National Weather Service has established the Storm Prediction Center and Forecast Offices around the country to monitor and produce predictions, warnings, and watches about weather events. However, the National Weather Service (NWS) relies mostly on local television stations to communicate this information to the public. Although many Forecast Offices have Twitter accounts, residents often turn to local news station's Twitter for information on these weather events. In this study we analyzed one year of tweets from a small prediction team as well as tweets from the lead meteorologist twitter accounts from ABC, CBS, FOX, and NBC stations in the Oklahoma City, OK television market. We focused on tweets sent on days severe weather occurred (N = 17,259). Agenda setting theory served as a lens to examine these results and advance our understanding of weather communication in the digital age. We found that tweets from television meteorologists differed significantly from those of the NWS for clout, analytical thinking, and positive emotional valence. Tweets were also significantly different for authenticity and negative emotional valence, but only when individual stations were compared to the NWS. This paper contributes to small group literature the idea that expert teams, who rely on the media to report their decisions, may have their decisions reported in differing manners based on the motivations of the media.

Study Design

The researchers downloaded tweets using a proprietary program that allows access to the last year of tweets based on a hashtag or Twitter handle. The researchers downloaded one year of tweets from the National Weather Service (NWS) Twitter account of the office responsible for the region of study, as well as one year of tweets from each of the four major television station's (ABC, CBS, FOX, NBC) meteorology teams. The first researcher coded all tweets from the NWS for mentions of severe weather events. The first researcher also marked tweets that were retweets. The second researcher then verified these codes and removed all non-severe weather tweets and retweets from the NWS data. The second researcher then removed tweets from local stations that occurred on days when no NWS tweets were present, as well

as retweets, from the dataset. This data reduction was performed to ensure that tweets in the dataset were original and about severe weather.

Study Measures

In this study we examined four characteristics of severe weather tweets (clout, emotional language, analytical soundness, and authenticity) that may be used at differing degrees by both the NWS and local television stations. We believe that these four factors play a key role in establishing source credibility.

Clout

The perceived credibility of a weather reporting outlet and their messages affects the viewers' evaluation of the outlet's clout. In contrast to uncertain or hedging language, clout encompasses confident language and conveys the authority of the outlet to disseminate information.

Analytical Thinking

Analytical thinking is the reliance on fact in messages. It stands in contrast with narrative construction tactics to formally present information as it is, creating logical and clear messages. Furthermore, it can indicate distance between the viewer and the source of the message, resulting in the source appearing more aloof.

Authenticity

Message authenticity is marked by honesty and candor. Messages which score high on authenticity include a more first-person perspective and insightful language. Authenticity differs from clout in that it is about being genuine rather than authoritative. Authentic messages are likelier to address limitations and uncertainty.

Emotional Language

The use of emotion in weather forecasts was a point of study within this research. The effects of emotional language within media have been examined across a variety of contexts. As referenced earlier, in cases of extreme or dangerous weather events the action, or inaction, of individual residents could be a matter of life and death. Therefore, in severe weather it may benefit viewers and stations to construct weather messages which reflect appropriate emotional valence and heighten the importance of weather events to viewers.

Tweet Characteristics

The final dataset contained 17,259 tweets: NWS (n = 3,059), ABC (n = 5,316), CBS (n = 3,100), FOX (n = 3,354), and NBC (n = 2,430). Tweets averaged 30.94 words per tweet (SD = 6.06) and 7.50 words per sentence (SD = 4.30). Linguistic Inquiry and Word Count (LIWC) 2015 was used to score the tweets using the composite summary variables of analytical thinking, clout, authenticity, and emotional. LIWC assigns scores on a range from 0-100.

In the overall sample, analytic thinking had a mean of 89.71 (SD = 11.33), clout 55.91 (SD = 16.29), and authenticity 15.90 (SD = 34.02). The composite scale of emotional tone is scored uniquely in that 0 equals fully negative tone, 100 equals a fully positive tone, and 50 is no emotional tone. To conduct linear quantitative analysis the researchers used the sub-dimensions of positive emotion and negative emotion to evaluate emotional tone. Positive emotions had an average score of 13.33 (SD = 1.74) and negative emotions had an average score of 11.43 (SD = 1.34).

Study Results

All tests were performed in IBM's SPSS statistical package.

Overall Media Tweets and NWS Tweets

Significant differences were found for clout, analytical thinking, and positive emotions, as illustrated below.

Source	Clout	Analytical Thinking	Authenticity	Positive Emotions	Negative Emotions
National Weather Service	51.97***	91.25***	15.97	1.86**	1.37
	(12.71)	(10.04)	(20.19)	(2.62)	(2.15)
Media Outlets	56.76***	89.38***	15.88	1.72**	1.33
	(16.84)	(11.56)	(20.45)	(2.47)	(2.22)
Total	55.91	89.71	15.90	1.74	1.34
	(16.28)	(11.33)	(20.41)	(2.49)	(2.21)

Table 1: ANOVA between the media at large and the National Weather Service.

Note: Mean listed and standard deviation in parentheses. * = p < .05, ** = p < .01, *** = p < .001

Regarding clout, the NWS scored lower than media stations. Perhaps this is because meteorologists at the NWS are more sensitive to uncertainty in weather models than television meteorologists are. An alternative explanation is that the NWS tweets use more analytical language, which was also statistically significant, when providing forecast predictions. The NWS was also found to use more positive emotions when tweeting about severe weather than media outlets were.

Individual Station Tweets and NWS Tweets

Significant differences were found for clout, analytical thinking, and positive emotions, as illustrated below.

Source		Clout	Analytical Thinking	Authenticity	Positive Emotions	Negative Emotions
National Weather Service	ABC	-4.54*** (0.36)	3.90*** (0.25)	2.66*** (0.46)	-0.06 (0.06)	0.41*** (0.05)
	CBS	-9.16*** (0.41)	-0.72 (0.29)	0.89 (0.52)	0.71*** (0.05)	-0.24*** (0.06)
	FOX	-4.06*** (0.40)	0.66 (0.28)	-1.89*** (0.51)	0.00 (0.06)	-0.30*** (0.05)
	NBC	-0.82 (0.44)	2.43*** (0.30)	-3.83*** (0.55)	0.08 (0.07)	0.09 (0.06)
CBS^	ABC	4.63*** (0.36)	4.62*** (0.25)	1.77*** (0.46)	-0.76*** (-0.06)	0.65*** (0.05)
	FOX	5.10*** (0.40)	1.38*** (0.28)	-2.78*** (0.51)	-0.70*** (0.06)	-0.06 (0.05)
	NBC	8.34*** (0.43)	3.15*** (0.30)	-4.72*** (0.55)	-0.63*** (0.07)	0.34*** (0.06)
FOX	ABC	-0.47 (0.35)	3.24*** (0.25)	-4.55*** (0.45)	-0.06 (0.05)	0.71*** (0.05)
	NBC	3.24*** (0.42)	1.77*** (0.30)	-1.94** (0.54)	0.08 (0.07)	0.40*** (0.06)
NBC	ABC	-3.72*** (0.39)	1.47*** (0.27)	6.49*** (0.50)	-0.13 (0.06)	0.32*** (0.05)

Table 2: MANOVA of specific television stations and the National Weather Service. Note: Mean Difference listed and Standard Error in parentheses. * = $p < .05$, ** = $p < .01$, *** = $p < .001$. ^ = family-owned station and all other stations are network-owned.

An important note in this analysis is how CBS scored significantly different from both other networks and also from the NWS. Perhaps CBS being a family owned station as opposed to a network owned station explains why. Additionally, the NWS was found to use significantly less clout and significantly more analytical thinking than some of the other stations. It is likely that the NWS uses language that is more hedged and probabilistic than local television forecasters do. The mixed results regarding authenticity and negative emotions (the NWS was significantly higher than some stations and significantly lower than others) explains the non-significant findings in the overall comparison, as these significant differences would statistically cancel each other out.

Conclusion

In this study we sought to examine how media outlets reported the decisions of expert weather forecasters and to see if severe weather messages differed when they came from the National Weather Service (NWS) compared to television weather forecasters. Considering the importance of weather warnings, presenting prompt and correct, as possible, severe weather messages to viewers is crucial. The content of weather messages viewers receive affects their actions, or lack thereof. During severe weather threats, resident's actions have implications for their own personal safety as well as for society at large.

The results of this study illustrate why future researchers should approach media studies differentially based on the outlet's vulnerability to agenda setting. The ability of the NWS and television weather outlets to set the agenda for what weather messages viewers receive is clear, but we found the individual methods or modes of agenda setting to be more nuanced than initially thought. Agenda setting alters the messages distributed from the NWS and local television stations in diverse ways. Notably, we found that agenda setting resulted in differences not only between the NWS and local television stations, but also among the television stations themselves. Namely, the family-owned television station (CBS) was more prone to tweet information differentially than the network-owned stations of ABC, FOX, and NBC.

Funding

Copies have not been printed but are available through the SCIPP website.