

# Keeping Up with the Tweet-dashians: The Impact of ‘Official’ Accounts on Online Rumoring

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## ABSTRACT

This paper examines how “official” accounts participate in the propagation and correction of online rumors in the context of crisis events. Using an emerging method for interpretive analysis of “big” social data, we investigate the spread of online rumors through digital traces—in this case, tweets. Our study suggests that official accounts can help to slow the spread of a rumor by posting a denial, and—supported by reflections from an organization that recently dealt with a rumor-crisis—offers best practices for organizations around social media strategies and protocols. Based on tweet data and connections to existing literature, we also demonstrate and discuss how mainstream media participate in rumoring, and note the role of a new breed of online media, “breaking news” accounts. This analysis offers a complementary perspective to existing studies that use surveys and interviews to characterize the role official accounts play in online rumoring.

## Author Keywords

Social computing; social medial; rumoring; information diffusion; crisis informatics; reputation management

## ACM Classification Keywords

H.5.3 Information Interfaces & Presentation: Groups & Organization Interfaces: Collaborative computing, Computer-supported cooperative work

## INTRODUCTION

In recent years, social media have become a common channel for receiving and sharing news. Indeed, a significant portion of American adults now sees the Internet as a go-to source for reliable news [5,46]. Notably, because of its reach and instantaneity, Twitter has increasingly been used to find, share, and disseminate time-sensitive content such as breaking news [28] and information about unfolding crisis events [e.g. 8,18,19,22,23,37].

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Due to its reach—with 302 million monthly active users, 500 million Tweets sent per day and 77% of accounts outside the U.S. [1]—many organizations, journalists and other interests groups have adopted Twitter for “official” use. Companies include this specific tool in their marketing and crisis plans; journalists and newsrooms largely adopt it, as it accelerates the news cycle by affecting how information is “sourced, broken and distributed” [29]. Emergency managers, although slow to adopt [44], have increasingly incorporated it into their preparedness, response and recovery plans as well—according to a 2012 NEMA report [34], 8% of county emergency managers and 85% of local response use social media.

Twitter can be viewed as a competitor to mainstream media, “putting it out of business” [29] or as a necessary adaptation to the audience’s informational habits and changing landscape [e.g. 2,13,18,17,20,24,43]. Others suggest that the unreliability of information shared on social media contribute to the rapid spread of misinformation [18,26] and validate the necessity of dependable news media or “official” [29] channels to regulate and manage the flow of information. Although organizations, emergency management agencies and mainstream media might not be the first to publish content about a given event, “their agendas and discussions continue to shape conversation around major news stories” [29, p.6].

To understand how these “official” channels can impact the propagation and correction of crisis-related rumors on Twitter, this research examines two false rumors from two distinct crisis events. These events are notable in that both were addressed by the “official” accounts belonging to the organizations that were implicated in the event: a government response organization that was rumored to be carrying out “raids” of Muslim neighborhoods during a hostage situation in Sydney, Australia, and an airline that was the subject of a hijacking rumor.

## BACKGROUND

### Informal Communication during Crisis Events

The speed of information sharing enabled by Twitter becomes particularly relevant in times of crisis. Many scholars have highlighted Twitter as a particularly effective tool for multidimensional communication—top-down, bottom-up, and lateral—during a crisis event [8,19,23].

Through their ability to facilitate collective sensemaking, social media serve the purpose of filling in the possible information vacuum left by mainstream media [37] or other official channels who may be more closely bound to veracity and accuracy, such as local authorities and emergency management agencies. In their absence, informal information around a given crisis might be appointed more trust [11]. Additionally, some users' pursuit of 'being first' surpasses commitments to fact-checking and accuracy [15], which in turn can generate dubious, if not bluntly inaccurate, information.

### **Rumoring as Collective Sensemaking during Disasters**

The term rumor is often equated with the spread of misinformation, but these two concepts are actually quite distinct—rumors can be true or false, but can also exist somewhere in between. In examining online rumoring behavior during times of crisis, our research utilizes a perspective developed in the social psychology literature [10,14,30,33,36] that views rumoring as a collective sensemaking process that occurs during situations that are uncertain and ambiguous. In this view, rumoring can be seen as a natural reaction to the anxiety and uncertainty of crisis events, as community members work together to provide meaning [36]. Though this perspective accounts for misinformation that is intentionally introduced and spread, it focuses more broadly on the downstream, collective activity to process into a coherent narrative the often incomplete and/or inaccurate information characteristic of crisis events. This context is similar to "fog of war" situations where fear, uncertainty, and limited situational awareness shape information sharing practices [12,25]; and indeed, much of the early social psychology literature on rumoring drew from studies within the war context [3,10].

Viewing rumoring in this way highlights the complexity of official crisis communications. In this context, imperfect information is often preferable to no information at all—e.g. Shklovski et al. [38] found that when people do not or cannot get access to official information and answers to their questions quickly enough, they find back channels where they can gather improvised news to fill the void.

Alexander [2] anecdotally illustrated this situation with the freight train derailment that occurred at Wetteren near Ghent, Belgium, in the night of May 4, 2013. In the explosion that followed, the affected train released a toxic cloud of acrylonitrile gas. At that time, the authorities did not possess information that they deemed certain enough to be disclosed to the public. In turn, a sense of uncertainty and fear developed in the public space and people gathered online in an attempt to discuss and explain the consequences of the event. Rumors arose and a large amount of inaccurate information was shared, yielding a "distorted, inaccurate and alarmist" depiction of the event [2]. Research studies have thus suggested that when official sources fail to provide answers in timely manner, audiences

will attempt to fill those information gaps, and rumors, including false rumors, will propagate [30].

### **The Role of Official Sources in Social Media**

Official channels face an "urgency of providing reliable information to the many" [16, p. 416]. The speed at which information is shared is an affordance for official channels as they can communicate with a large number of constituents at once and shape the message, thus influencing information input and audiences' disaster "knowledge, attitudes, and behaviors" [20,45]. Though many breaking news stories now emerge first on social media sites like Twitter, it appears that official sources, including mainstream media, work to authenticate, propagate and eventually correct these stories [29]. Alexander [2] suggests that "knowledgeable people" can quickly correct misinformation. Bird et al. [7] explain that 'moderators' (read: officials managing social media channels) are usually highly responsive in validating information and orienting users to official information and sources as they become available. Taylor et al. [41] describe that social media tools should act as a medium guiding audiences to official, verified information, and in turn be used to strengthen and reiterate these communications to a greater network.

This suggests that social media intensify the pressure on official sources to keep up with information propagation [22] and manage the divulged messages. Indeed, the survival of an organization in a crisis may be directly linked to the speed of its response. Jin et al. [23] argue that organizations should be proactive in their response by leveraging official accounts to maintain their ethos as authoritative and accessible sources, especially if the crisis was not generated by the organization itself; in other words, if the organization is not directly responsible for creating the situation. However, other studies have suggested that it is possible that official communication may be drowned in "the noise of the many-to-many communication model made possible by social media" [16, p. 416].

### **Examining the Role of Official Sources in "Correcting" Rumors using Trace Data of Actual Rumor Propagation**

This research seeks to understand the role that mainstream media, new media and other "official" channels play in the propagation and correction of crisis-related rumors on Twitter. Since the traditional media is often put in contrast to social media channels in how they treat and affect a crisis event, the impact of official channels on the spread of rumors on Twitter has not been extensively discussed. Furthermore, existing research on the interplay of mainstream news and Twitter—e.g. Newman's influential study [29]—relies primarily on market research, Internet surveys, mainstream media log files, and interviews. Our research attempts to add empirical evidence to support (or challenge) these insights, using an emerging method for integrating qualitative, quantitative and visual analysis [27] to examine the digital trace data of actual rumors propagating on Twitter.

## METHOD

This study is part of a large project examining the online spread of rumors. Though the primary focus of that work is to develop automated strategies for detecting rumors, the meta-work of that project includes the production of a valuable collection of event-related rumors that are coded for specific behaviors and can be examined for other research questions. In our preliminary analysis, we examine two rumors from two different crisis events to better understand the effects of official accounts on rumor propagation.

### Data Collection for Crisis Events

Our analysis examines the spread of rumors on Twitter during crisis events, primarily using a digital record of tweets related to a specific crisis event, collected in real-time using the Twitter Streaming API. The crisis events we study are largely unpredictable and emergent. Relying on routine monitoring of media and social media, our team of researchers detects events as they are occurring and then selects search terms for a forward-in-time collection. As the event progresses and new features become prominent, we adjust search terms to ensure comprehensive coverage. Inherent limitations in this process can result in an event collection that lags several minutes to a few hours after the initial event impact. Collecting at the event level allows researchers to catch tweets about rumors within that event that emerge later in its lifecycle (as we did for the rumor in Case 1). For other rumors (like the one in Case 2) we may miss the initial rumor-related tweets. In the latter case, we use additional sources to understand the full rumor timeline and are careful to shape our analysis and claims around the limitations of our data. Though these collection methods have limitations, they are consistent with best practices for collecting crisis event-related Twitter data [4,9].

### Identifying Rumors within an Event Collection

We identify rumors from within these event collections using two complementary approaches. The first requires researchers to follow the live Twitter stream during an event and record rumors they notice as the event evolves. The second approach involves a post-hoc analysis of the tweets in the event collection, where we employ a combination of quantitative, qualitative and visual analysis to identify rumors that meet the following criteria: A) our event collection includes the entirety or the majority and major features of the rumor; B) the rumor or some specific variant of the rumor can be reduced to a single definition for which our coding scheme can be consistently applied; C) there exist a set of search terms that will allow us to identify a low-noise, comprehensive sample of the rumor that will be appropriate for manual coding. After determining that a rumor is appropriate for our analysis, we craft an effective search string and identify the subset of event tweets related to that rumor. We then send these tweets to a team of trained coders for manual classification.

## Tweet Manual Coding

We manually “code” or “classify” every tweet in the subset of tweets related to that rumor. Our coding scheme consists of two levels of classifications. There are five first-level codes (*affirm*, *deny*, *neutral*, *uncodable*, and *unrelated*) and three second-level codes (*implicit*, *ambiguity*, and *uncertainty*). The first-level codes are mutually exclusive—i.e. if a tweet is marked as “affirm”, it cannot be marked as “deny”. Second-level codes can be applied in any combination with first-level codes and one another.

This research is focused on behaviors that act to spread or, conversely, correct a rumor. Therefore, the classification of the tweets is based on the rumoring behavior of the tweet. We label tweets that support or function to pass along the rumor as *Affirm*, and label tweets that function to correct or deny a rumor as *Deny*. *Neutral* tweets did not take a stance on either affirming or denying the rumor. Some of those tweets tend to simply provide information or ask for more information. *Uncodable* tweets contain any non-English words or other words that many English speakers would not recognize. *Unrelated* tweets are unrelated to the rumor, typically “noise” picked up due to our search terms. For rumors with many permutations, we will choose to exclude certain permutations to focus on one variant of the rumor. In those situations, we will mark one selected permutation of the rumor as “unrelated”.

Table 1 provides examples for each first-level code using tweets from the WestJet hijacking rumor (described below in the Findings).

Codes	Example Tweet
Affirm	Breaking: West Jet Flight WA2154 sends “hijack signal” in-flight over Mexico; flight departed Vancouver for Puerto Vallarta
Deny	lol exasperation after news of a hijacked plane ... that turned out to be wrong
Neutral	@Aviator pls advise. Which means hijack? 00000 or 7500?
Uncodable	Compagnia West Jet volo #WS2154 nega che abbia mandato segnale di dirottamento
Unrelated	Wow @WestJet I almost thought you would not get a flight delayed

Table 1. Example Tweets for Each Code

### Additional Data Collection

For research related to the rumored hijacking of WestJet flight 2514, we include two additional data sources in this analysis: 1) information gathered through a one-hour interview with an operator of the WestJet Twitter account; and 2) event-summary documents created by WestJet employees that include a timeline of tweets during the early period of the event. The latter is important because it allows us to fill in the record for a period of time that our collection missed.

### **“Signature” Method of Analysis**

Using the process described above, we have captured, identified, and coded fifteen rumors from six crisis events. During exploratory analysis of a subset of these rumors, using a method outlined in Maddock et al. [27] where researchers iteratively develop and interpret a rumor’s “signature” or pattern of information flow across multiple dimensions, we identified two false rumors that had similar properties: 1) domination of the overall rumor signal by retweets of a small number of accounts; and 2) a fast-moving and strong correction, initiated or catalyzed by an “official” account. In interpreting these signatures, we identified new questions about how media—both mainstream and new—are participating in both the spread and correction of online rumors, and how official accounts of emergency responders and other organizations can reduce the spread of false rumors.

In this paper, we examine these questions by looking at two rumors from two separate crisis events in particular. The first involves claims that the Australian Police Force was carrying out raids of a Muslim-dominated neighborhood during the Sydney Siege (a hostage crisis in December 2014). The second involves the rumored hijacking of a WestJet flight in January 2015.

### **Analyzing Retweet Signatures**

Following the method outlined in Maddock et al., [27], our analysis utilizes visual and qualitative methods to unpack the progression of each rumor across its lifetime (Figure 1 and Figure 4), identifying key moments in its diffusion and analyzing specific tweets propagating at that moment.

The *temporal signature* or overall volume of a rumor is a measure of the number of people who actively participate in spreading the rumor [27]. In terms of rumor propagation behaviors, there are two types that can be identified simply from the structure of the tweet. The first is the creation of “original” or “unique” content—which can include starting a new rumor, restating an existing rumor in new terms, or building on to an existing rumor. The second is the creation of a retweet—which simply passes along something someone else has tweeted verbatim or with added comments, which are often distinguishable from original content due to their placement in the structure of tweets. The volume of retweets that an account receives is a measure of the impact a given account has on the propagation of a rumor. To address the role played by specific accounts, we identified the most-retweeted accounts using the standardized retweet information embedded in tweet meta-data. Once those accounts were identified we were able to use a specified search string to collect all tweets that were created by retweeting those accounts. We were then able to visualize the retweet-impact of each of those accounts—their *retweet signatures*—over time and across codes (Affirms and Denies). These analyses help us see how individual accounts can impact the overall spread and correction of a rumor.

### **CASE 1: RUMORED RAIDS OF THE LAKEMBA NEIGHBORHOOD DURING THE SYDNEY SIEGE**

This case highlights the role of media accounts in rumor propagation as well as the ability of an “official” Twitter account to invigorate correctional conversation after a false rumor has run its course.

#### **Event Background and Rumor Identification**

On Monday, December 15, 2014 at 9:44am AEDT, a lone gunman took ten customers and eight employees hostage at a chocolate café in Sydney, Australia. The “Sydney Siege”, as it became known on social media, lasted about 16 hours, when upon hearing gunshots, police officers stormed the café. The hostage-taker and two hostages were killed.

The information space that surrounded the standoff was chaotic, as police, media and both the Australian and international audience tried to make sense of incomplete and changing information. Even the number and identity of the gunmen/gunman were uncertain prior to the police entering the café. The fact that the Sydney central business district was closed aroused a substantial amount of public attention, and this broad attention resulted in a great deal of rumoring on Twitter.

#### **Event Collection**

We initiated our collection for the Sydney Siege on Monday, December 15, 2014 at 11:07am<sup>1</sup>, approximately an hour and a half after the event began, and ended it on December 28 at 9:41am. We tracked a large number of search terms, including: *siege*, *sydneysiege*, *Sydney*, and *martinplace*. This collection resulted in 5,429,345 tweets. From this collection we identified and coded several rumors, including the Lakemba Raids rumor that we focus on in this paper. Significantly, this rumor did not begin propagating on Twitter until *after* our collection began, which means we can look at its entire life cycle and analyze the whole of its retweet signature.

#### **Rumor Description**

Due to specific demands made by the hostage-taker during the event, including a request for an ISIS flag, it was largely assumed that the siege was related to Islamic terrorism. Likely emerging from the sensemaking process around some of these assumptions, and catalyzed by its mention during a radio broadcast by shock-jock radio host Ray Hadley, the Lakemba Raids rumor claimed that, in parallel with and response to the Sydney Siege, the Australian Federal Police (AFP) were carrying out home raids in Lakemba, a neighborhood with a large percentage of Muslims. However, this rumor was eventually denied by the AFP. It was later explained that 20 police officers had taken a previously scheduled tour of the Lakemba Mosque as part of a police induction day, which may have been the rumor’s source.

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<sup>1</sup> Times for this rumor are in AEDT, local time at the site of the event.

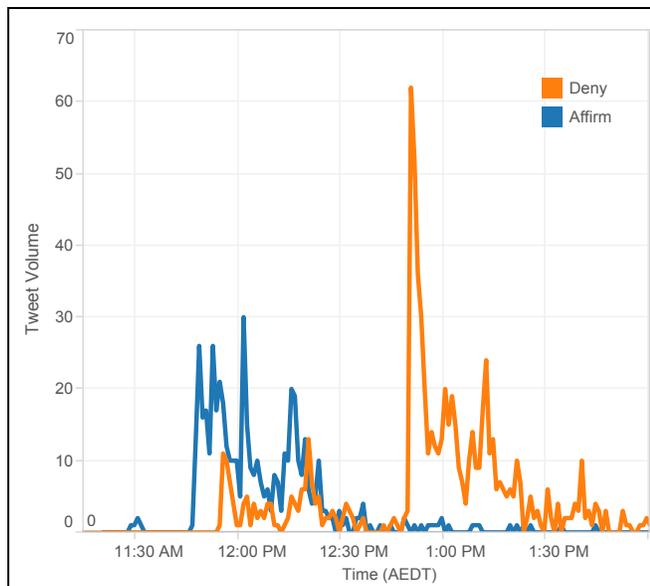
For this rumor, we selected all tweets from our Sydney Siege event collection that included the word “Lakemba.”

### Tweet Analysis of the Lakemba Raids Rumor

The first tweet referencing raids in Lakemba appeared at 11:30 a.m. and directly attributed the rumor to comments made on Ray Hadley’s radio show:

**tim\_dunlap** (11:29am AEDT): Ray Hadley reporting on @2GB873 homes in Lakemba are being raided by police at present #sydneysiege

During the next few minutes, four other tweets made a similar claim. One was a retweet of the above tweet and the other three were original tweets. Two cited Ray Hadley, through his show’s Twitter handle, as the origin of the rumor. The rumor then went dormant for roughly 10 minutes before spiking at just after 11:45 a.m.



**Figure 1. Tweet Volume over Time by Code: Affirm, Deny Lakemba Raids Rumors**

Over the next two and a half hours, Twitter users posted 1,279 tweets related to this rumor. Of these, 493 (38%) affirmed the rumor and 736 (57%) denied it. Figure 1 shows the volume of tweets for each code over time.

After the initial peak at 11:45 a.m., affirmations stayed consistently dominant with several significant peaks between then and 12:20 p.m. At 12:21 p.m. volume for both affirmations and denials were at 13 tweets per minute (TPM) after which, affirmations declined.

For roughly 15 minutes, between 12:30 p.m. and 12:45 p.m., the rumor seemed to have all but died out again, with affirmations and denials consistently below four tweets per minute. Then, at 12:50 p.m., the Australian Federal Police posted the following tweet:

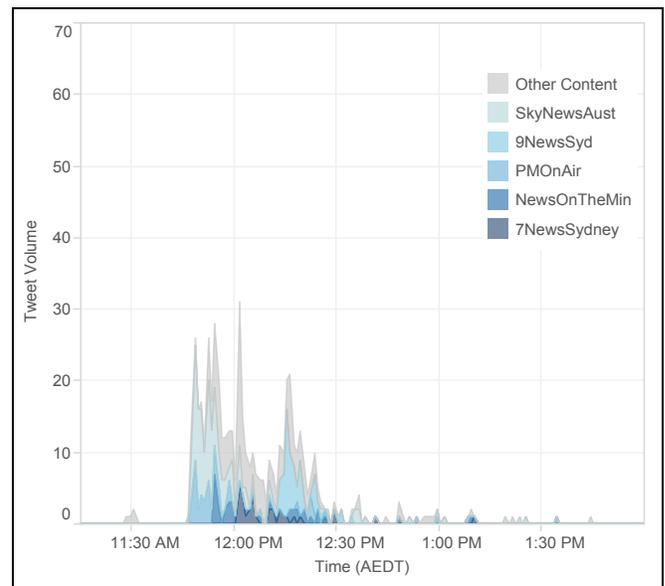
**@AFPmedia** (12:50pm AEDT): Reports that the AFP is conducting search warrants in the Sydney suburb of Lakemba are incorrect.

One minute later, rumor-related tweet volume increased to 62 tweets per minute, and all were denials. Of these, 56 (90%) were retweets of @AFPmedia’s post. Although affirmation levels had already significantly decreased, the @AFPmedia account’s tweet re-invigorated the discussion, with denials dominating the overall signal.

After the initial peak of denials, there were a few smaller spikes in tweet volume denying the rumor (also predominantly retweets of @AFPmedia) before conversation began to peter out. In our larger dataset of rumors, many have downstream echo effects where the rumor re-surfaces, although typically at a lower rate. Though causation is impossible to establish with trace data, the fact that affirmations of the rumor never again rose above 2 TPM, suggests that the @AFPmedia’s “official” correction may have had a dampening effect—preventing a resurgence of the rumor.

### Impact of Highly Retweeted Accounts on Rumor Affirmation

Of the 493 tweets affirming this rumor, 323 were retweets of only five sources, of which three (@SkyNewsAust, @9NewsSyd and @7NewsSydney) were local affiliates of media conglomerates that would be considered “trusted” accounts.



**Figure 2. Affirm Volume over Time by Retweeted Account Lakemba Raid Rumor**

Figure 2 shows the volume of retweets for each of these accounts. When the rumor began to gain steam just after 11:45 a.m., @SkyNewsAust and @PMOnAir a broadcaster for @SkyNewsAust were the dominant accounts being retweeted. In the first large spike, 25 of the 26 tweets are retweets of those two accounts. At this time, both accounts tweeted affirmations of the rumor, referencing one-another

in their tweets. @PMOnAir’s tweet has since been deleted but was similar to the following tweet by @SkyNewsAust:

[11:48am AEDT]: NSW Police + AFP are raiding several homes in Lakemba right now. More #martinplacesiege #sydneysiege

These two accounts stayed dominant in the first two peaks, but began to lose momentum shortly after 11:54 a.m., permanently dropping below 5 TPM by 12:03 p.m. Just before that final decrease, @7NewsSydney sent the following tweet:

[12:01pm AEDT]: Reports of police raids at Lakemba, south-west of Sydney. Rolling coverage on #siege situation

This tweet became dominant for a short period of time, before a new peak emerged, initiated by a tweet from @9NewsSyd:

[12:02pm AEDT]: JUST IN: Raids occurring at Lakemba homes in south west Sydney. It's unknown if raids are related to siege underway in Sydney's CBD. #9News

Shortly after this point retweets of @7NewsSydney and @SkyNewsAust drop to zero and retweets of @9NewsSyd become dominant.

Account	Description	Times RTed
SkyNewsAust	Sky News is Australia's 24/7 news channel, bringing you the latest news as it happens.	138
9NewsSyd	Sydney's No.1 News with @PeterOverton, nightly at 6pm on @Channel9.	62
PMOnAir	Broadcaster - Sky News Aust	54
NewsOnTheMin	Breaking News. Wherever it happens. Whenever it happens. Its here.	37
7NewsSydney	First For News in Sydney with @MarkFerguson_7 @ChrisBath7 @jim_wilson7 @_SarahCumming Nightly at 6pm.	32

**Table 2. Number of Retweets for Highly Retweeted, Affirming Accounts, Lakemba Raids Rumor**

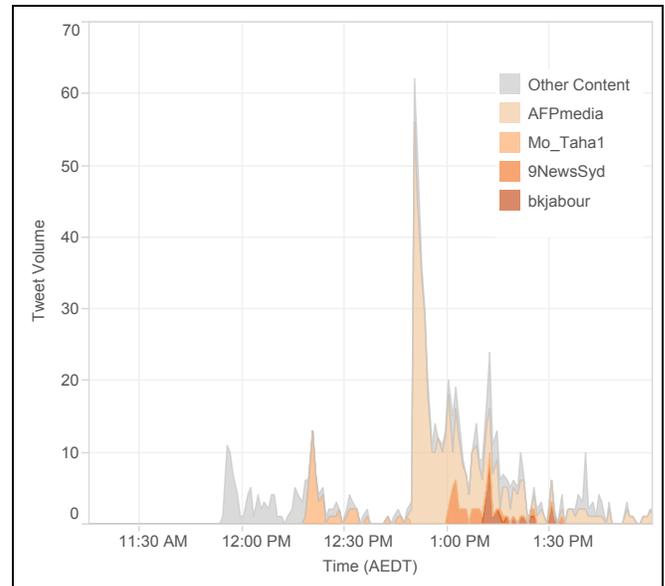
Each of the tweets listed above are responsible for 100% of their corresponding account’s affirming retweet volume (Table 2). In other words, these were the only affirming tweets from these accounts. In addition, the total retweet volumes for @PMOnAir and @NewsOnTheMin were initiated by one tweet from each account. This means that 65% of affirmation volume is not only derived solely from five accounts, but solely five tweets.

*Impact of Highly Retweeted Accounts on Rumor Denial.*  
Of the 736 tweets coded as denials, 522 (70%) originated from five accounts belonging to media and official sources.

An early denial of this rumor appeared in a tweet by a reporter for ABC News (@Mo\_Taha1) who tweeted:

[12:19pm AEDT] Police & local community sources have told me there are no raids taking place in Lakemba. #siege @abcnewsSydney @702sydney

This tweet accounts for 69% of denials of the rumor from 12:19 p.m. to 12:49 p.m., up until official account of The Australian Federal Police tweeted its denial. The @AFPmedia tweet set off a rapid spike in denials, almost all direct retweets. Of all tweets denying the rumor, 412 (64%) were retweets of this status.



**Figure 3. Deny Volume over Time by Retweeted Account Lakemba Raid Rumor**

Account	Description	Times RTed
AFPmedia	Latest news updates from the Australian Federal Police. This is an official AFP account. DO NOT REPORT CRIME HERE.	412
Mo_Taha1	Reporter & producer for @abcnews in western Sydney. Global affairs, politics & human interest. Tweets are mine.	51
9NewsSyd	Sydney’s No. 1 News with @PeterOverton nightly at 6pm on @Channel9	32
bkjabour	Guardian Australia reporter. Views not the Guardian's, unless its view is curly hair is cool.	27

**Table 3. Number of Retweets for Highly Retweeted, Denying Accounts, Lakemba Raids Rumor**

Following the “official” declaration that the rumor was untrue, @9NewsSyd (who was also a top affirmer) denied the rumor as well. Their denial retweet volume was half the

volume of retweets of their earlier affirmation, suggesting that the crowd was more likely to retweet their affirmation than their denial.

All of the denial retweet volume for each of these accounts (Table 3) comes from one tweet from each account. This means 70% of denial volume came from four tweets.

In the “Lakemba Raids” example, the majority of rumoring can be attributed to just nine original tweets. This implies that it is possible for just a handful of accounts to drive both the propagation and correction of a given rumor.

## CASE 2: RUMORED HIJACKING OF WESTJET FLIGHT 2514

The following description again highlights the role of media, breaking news, and the “official” Twitter account of an implicated organization on the spread and correction of a fast-paced rumor. In this case, actions taken by the official account appear to have helped to stop the propagation of the rumor. Here, we draw from the tweet record of the rumor as well as an interview with one of the employees operating the organization’s official Twitter account during the event.

### Event Background and Rumor Identification

On Saturday January 10, 2015, a flight-tracking website reported that WestJet flight 2514—a flight bound for Puerto Vallarta, Mexico from Vancouver, Canada—was “squawking” via its transponders the standardized code for hijacking, 7500. Soon after, a Twitter user shared a screen shot of the flight-tracker site with the following message:

```
[4:13pm MT]: BREAKING: West Jet #WA2154 is squawking #7500
```

Shortly after that tweet was posted, another Twitter user replied, “Isn’t that a hijacking?” Soon, several Twitter users began to engage in conversation and speculation about what this information might mean. At its peak, a large number of tweets (~400 per minute) referred to a possible hijacking. The airline (WestJet) has no evidence that such a code was ever transmitted from the plane itself. However, instrument errors in the website’s ground-based equipment occasionally do alter the content of codes, which is likely what happened here. And, though there is not 100% certainty about how the hijack code ended up in the flight-tracking system, it is now clear that there was no hijacking situation on that flight.

### Event Collection

We began collecting tweets for this event at 4:33 p.m. MST<sup>2</sup> on January 10, 2015, approximately 20 minutes after the first tweet, and stopped at 2 p.m. on January 11, 2015. We tracked the following terms: *westjet*, *#WS2154*, *hijack*, *hijacked*, and *hijacking*. There are 27,143 tweets in this event collection.

<sup>2</sup> All times for this rumor are in MST, the local time for WestJet employees at the time of the event.

Due to the lag in initiating our collection, we do not have all of the Twitter data for the first 20 minutes of this rumor. However, we were able to back-fill some of this data and gain an understanding of the rumor’s origin and early spread by using Twitter Advanced Search functionality and through data shared directly with us by WestJet. Additionally, we did capture 100% of the tweets (and downstream tweet volume) of the “official” account in this rumor, @WestJet.

### Rumor Description

This rumor had several distinct permutations with varying qualities of veracity. For this analysis, we selected and coded for one major variant—that the plane had been hijacked. We used a search string to identify a subset of event terms related to this rumor (eliminating noise from the initial search terms), and then utilized manual coding (i.e. the “unrelated” code) to remove tweets that did not refer directly or indirectly to a hijacking.

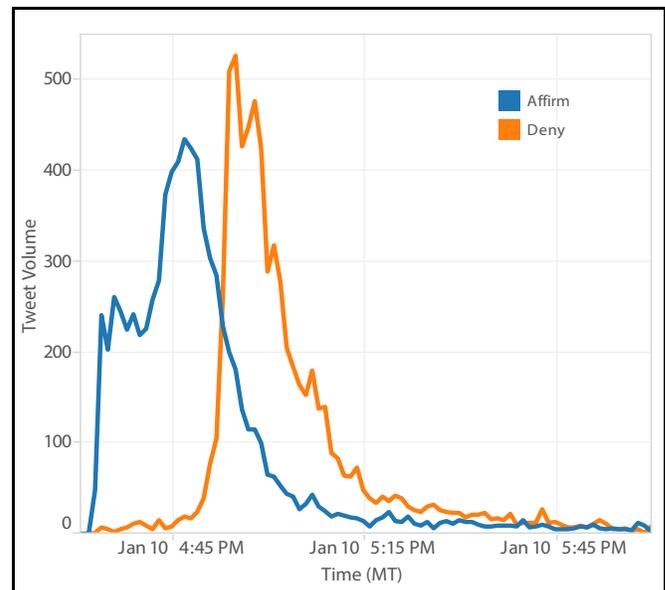


Figure 4. Tweet Volume over Time by Code: Affirm, Deny WestJet Hijacking Rumor

### Early Rumor Propagation

About five minutes after the initial tweet, a flight-tracking website called Flightradar24 picked up the story, tweeting:

```
[4:18pm MT] Westjet flight #WS2154 is squawking 7500 = hijack. Not confirmed and can just be a mistake! flightradar24.com/WJA2154/53e61e7
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According to representatives of WestJet who were following this story, Flightradar24’s Twitter account had approximately 180,000 followers at the time of this tweet. Though this tweet conveys some uncertainty about an actual hijacking, it affirms the rumor. WestJet’s records claim this tweet received 850 retweets and sparked conversation about the signal code and the hijacking. A growing crowd—consisting of breaking news accounts,

aviation enthusiasts, members of the media, and eventually a broader Twitter audience—began to participate in the rumoring surrounding this event.

**Tweet Analysis of the WestJet Hijacking Rumor**

Our analysis focused on the period of peak tweet volume from 4:30 p.m. on January 10 to 6 p.m. on January 11, during which 17,576 tweets were sent. Of that total, 7,875 were coded as affirming the rumor and 7,176 were coded as denying it. As aforementioned, due to limitations with our event collection, the initial 20 minutes of the rumor’s propagation are missing. However, Figure 4 shows that rumor affirmations were at 400 tweets per minute and rising at about 4:45 p.m. Three tweets that were propagating at high rates during this time demonstrate the rumor’s nature:

[4:45pm MT] RT @PzFeed: ALERT: WestJet Flight WA2154 sends hijack signal in-flight over Mexico; flight departed Vancouver for Puerto Vallarta <link>

[4:45pm MT] RT @airlivenet: UPDATE: West Jet #WA2154 is now squawking #7500 again - possible Hijack situation <http://t.co/5Kdkwvo05Q> - @NikPhillips666

[4:45pm MT] RT @rConflictNews: BREAKING: West Jet #WA2154 sends out Hijack signal - 3 people inside cockpit, Mexican Air Force Handling w/ NORAD <link>

Shortly after this peak, the rate of affirms began a slow, but steady descent. At about that same time, denials began to spike, going from less than 10 TPM at 4:45 p.m. to over 500 tweets per minute at 4:55 p.m. Though the overall number of affirming tweets is greater than denying tweets, the latter spiked more quickly and achieved a significantly higher rate (per minute). This spike is mostly constituted by retweets of two tweets, both originally authored by the official Twitter account of WestJet airlines:

[4:55pm MT] RT @WestJet: Contrary to internet rumour, air traffic control has confirmed #WS2154 is “squawking” standard transponder code, not 7500.

[4:55pm MT] RT @WestJet: There is no abnormal behavior from WestJet flight #2154. We expect it to land shortly in Puerto Vallarta.

The intersection of these signals (Figure 4)—especially the rapid rise of the denial signal at the same time as the affirm signal begins to fall, permanently—suggests that denial tweets may have had direct impact on the rate of affirm tweets being sent. In other words, Twitter users may have stopped spreading the rumor when they saw the above tweets (and retweets of those tweets) denying it.

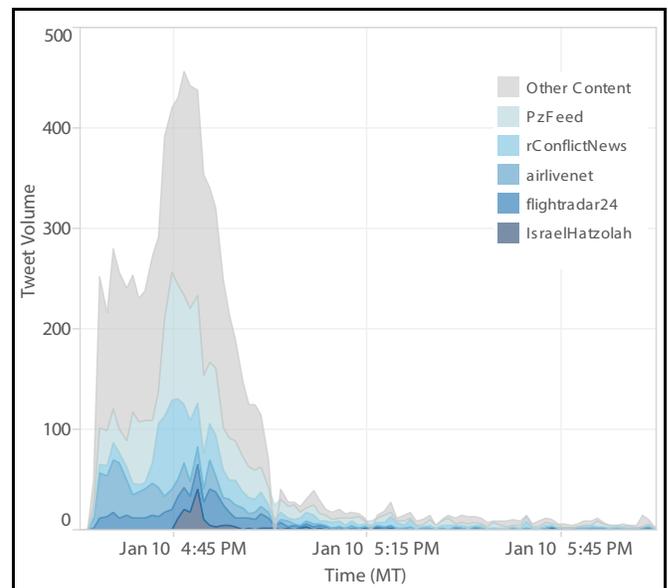
*Impact of Highly Retweeted Accounts on Rumor Affirmation*  
Of the 7,875 tweets in our data affirming the rumor, 4,374 (55%) were retweets of just five accounts. Table 4 lists those accounts and the number of retweets they received for their affirming tweets. Interestingly, all of these accounts

can be classified as either “breaking news” or flight tracking accounts.

Account	Description	Times RTed
PzFeed	A global news channel bringing you breaking news as it happens and the most talked about stories, pictures and videos from around the world.	1906
rConflictNews	We strive to bring you breaking news on conflicts around the world.	1081
airlivenet	Aviation News, Realtime Alerts, Reports, Booking #avgeek	686
flightradar24	Track air traffic in real time from all around the world!	554
IsraelHatzolah	Leader in breaking & exclusive news from Israel & surroundings • Real-Time news feed worth sharing	147

**Table 4. Number of Retweets for Highly Retweeted, Affirming Accounts, WestJet Rumor**

Figure 5 shows the impact of each account on the total volume of the affirm signal for that rumor. At the start of our collection the top four most-retweeted accounts (@PzFeed, @rConflictNews, @airlivenet and @flightradar24) were already actively tweeting—and being retweeted—for this event. Though @airlivenet was influential early on, retweets of @PzFeed and @rConflictNews become more prominent over time, constituting 52% of the affirmation signal at its peak.



**Figure 5. Affirm Volume over Time by Retweeted Account**

*Impact of Highly Retweeted Accounts on Rumor Denial*  
Of the 7,176 tweets that were coded as denying the rumor, 3,906 (54%) were retweets that originated from five accounts. Three of these (@PzFeed, @airlivenet, and @flightradar24) were also among the top most retweeted

accounts for affirming tweets. This shows that their self-corrections were visible and propagated in the space. Interestingly, rumor denials sent by these accounts were not retweeted as often as their rumor affirmations had been, which suggests that once an official source has entered the conversation, these accounts garner less attention.

These findings support the implication found in the Lakemba case study, that a small handful of accounts are capable of driving the majority of a rumor’s volume.

Account	Description	Times RTed
WestJet	Welcome to the official WestJet Twitter account! We're online from 9 a.m. to 5 p.m. MT on business days and from 10 a.m. to 4 p.m. MT on weekends.	2802
PzFeed	A global news channel bringing you breaking news as it happens and the most talked about stories, pictures and videos from around the world.	385
airlivenet	Aviation News, Realtime Alerts, Reports, Booking #avgeek	316
flightradar24	Track air traffic in real time from all around the world!	207
NewsOnTheMin	Breaking News. Wherever it happens. Whenever it happens. Its here.	196

**Table 5. Number of Retweets for Highly Retweeted, Denying Accounts**

Table 5 indicates that retweets of the official @WestJet account constituted a large portion of the overall denial signal, and Figure 6 shows that retweets of @WestJet were responsible for the initial spike in denial tweets. The two tweets that make up that spike are listed above. Both were posted at 4:53 p.m., within one minute of each other.

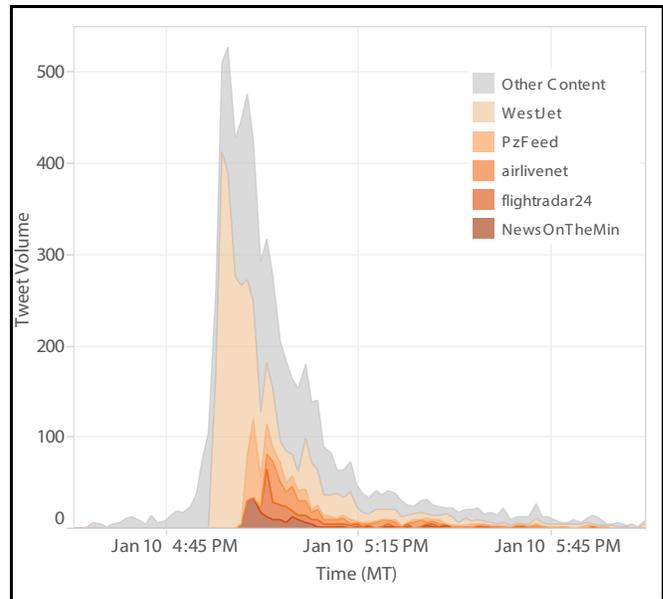
Corrections by the other influential accounts came after the @WestJet tweets, suggesting that those “official” tweets induced other prominent accounts (including those that had sent affirmations of the rumor) to make their own corrections, which were then propagated by others.

**Action and Reflection from WestJet**

Approximately five months after the rumored crisis—or the “rumor crisis” from their point of view—we interviewed a representative of WestJet (Darren, personal communication, May 2015), who was among the group of communication employees monitoring the situation and operating their Twitter account that day.

**WestJet’s Social Media Strategy**

The company has a team of two employees and a manager assigned to social media who generate promotional and informational content, and another team of employees who routinely monitor conversations for mentions of their company and respond to direct inquiries from customers.



**Figure 6. Deny Volume over Time by Retweeted Account**

Though WestJet had an active social media presence and a set of protocols in place as part of a crisis plan, at the time of the event, they did not have a plan for dealing with a rumor of this kind:

*This event was not part of our crisis plan. We had policy procedure and language written for hijacking but we had NOTHING about rumors.*

**WestJet’s Response from Their Own Point of View**

The rumored hijacking occurred on a Saturday evening, when there was no employee officially on duty. However, a member of their social media team, Darren, managed to catch the rumor while online at home about 20 minutes after it started. He quickly contacted other team members and logged on to the WestJet account, noting that the number of tweets about the company was escalating quickly. WestJet’s timeline of the event indicates that within 30 minutes of the initial rumor tweet, news networks began to tweet at them and to contact them directly via email to inquire about the rumor. At that time, some ambiguity remained in the information space—i.e. though they were close to being certain that the signal was an error, they did not yet know for sure, and because the plane was in its final descent, direct communication was not allowed at that time.

*The biggest question for us was “do we respond now with almost confirmed information or wait five minutes to get confirmed info?” We chose, let’s get it out now and then 5 minutes later confirmed.*

In other words, they recognized that they needed to get the best information out as fast as they could, and in this case, that decision appears to have been a good one. Using two social media monitoring tools (SparkCentral and Sysomos), WestJet employees monitored the impact of their tweets, noting that their denial corresponded with a rapid drop in

rumor activity, and that everything was “back to normal” after about two hours.

#### *Updating a Social Media Strategy after a Crisis Response*

Our analysis of tweets related to the WestJet rumor shows that the @WestJet account was quite effective in its attempt to stop the spread of the rumor. On their side, the WestJet social media team has used this event as a learning opportunity. Indeed, by the time we spoke to company representative, they had already spent a considerable amount of time reflecting upon their response to this rumor crisis and had updated their protocols for future events.

WestJet explained that, due to the speed with which information travels on Twitter, the amount of time afforded to issue an official statement before the situation escalates is small; and stopping rumors quickly is extremely important. Thus, although they knew conceptually that with social media they had to move quickly, this rumor crisis illustrated it. Though WestJet already had some tweet templates prepared for certain types of crises, they realized that they needed to expand that inventory to include statements that would not require managerial approval in the moment and therefore speed up the response process. They now have 100 pre-crafted “stock” tweets, approved by their executive team, designed for various events. Although these are essentially ready to be sent, Darren explained that he would still eventually seek out input, if available, before posting. For Twitter responses specifically, they have also established different sets of rules to adapt the message to the specificity of each situations:

*If a Twitter account tweeting about WestJet with more than 100k followers tweets this, then we can say this. If we are the number one trending topic in Twitter in Canada, then we can say that.*

WestJet views this event as a positive experience, an opportunity to test their existing protocols and improve them for future events.

*The event was a good test of our emergency response procedures. [...] This would never have been a mock because we couldn't have imagined it. It was good, because everyone was safe and it didn't affect our business. And we made changes to the emergency response procedure because of it.*

## **DISCUSSION**

### **Impact of the “Official” Accounts on Rumor Correction**

Through the analysis of Twitter data related to two rumors spreading in two different crisis situations, this paper illustrates the impact that “official” sources—such as emergency responders and organizations—can have on the information being propagated around an event.

Not only does our analysis show that an official source can revitalize conversation and correct misinformation after rumoring has slowed, as was the case with the Sydney Siege “Lakemba” rumor, it also shows that they can

influence rumoring as it is occurring, as evidenced in the WestJet potential hijacking rumor.

The Twitter record of both events shows that official corrections encourage some of those who were involved in rumoring to correct themselves. However, for accounts participating in both affirming and denying behavior, denials received about half the retweets that their affirms had—suggesting that some members of the crowd are more likely to pass along affirmations (perpetuating the rumor) than corrections. Conversely, we also see evidence, especially in the WestJet case, that the official denial may have influenced some Twitter users to stop spreading the rumor. In other words, though an official denial may not induce a rumor-spreading account to publicly correct itself, it may still reduce the likelihood of that account further spreading the rumor, thus producing a dampening effect.

Our findings support previous arguments that having a dependable source for information during a crisis is important to shape the flow of information [29]. Though the Twitter platform is vulnerable to the spread of misinformation [18,23], official sources have the capability to harness the virality of online information to correct rumoring. However, when the account affiliated with the official source is non-existent or absent from the conversation, the people of the Twittersphere may look elsewhere for information, such as mainstream media and “breaking news” sources.

### **Role of Mainstream Media in Rumor Propagation**

The traditional media is often put in contrast to social media channels in how they treat and affect a crisis event. This study provides insight into how traditional and trusted media online affect the conversation in an information sphere that is recognized to be imperfect. Evidence that mainstream media can play a significant role in the spread of rumors on Twitter is seen in both case studies. In the Lakemba rumor, 47% of all tweets affirming the rumor were retweets of posts from local affiliates of media conglomerates that may have been considered trusted accounts. Of these accounts, only one (@9NewsSyd) came back and corrected the false rumor after the official source issued their statement. For other participating media accounts, there is no evidence that they corrected their initial misinformation once the truth was revealed. Some media sources who were not part of the rumoring (two reporters and one official news account) did join the conversation to tweet denials of the rumor after the official account (the Australian Federal Police) had tweeted its denial. These accounts made up a significant volume of denials, accounting for 15% of them.

In the WestJet potential hijacking rumor, though professional journalists were monitoring the event (according to Darren), mainstream media sources accounted for a relatively small amount of the affirming volume. On the other hand, they did influence denials, accounting for approximately 10% of all tweets denying the rumor.

### **Effects of “Breaking News” Sites on Rumor Propagation**

One notable feature of both rumors is the participation and impact of “breaking news” accounts—i.e. accounts with those words in the profile—on the spread of the rumor itself. The five most influential accounts in the WestJet hijacking rumor were all either flight tracking or “breaking news” accounts. The former’s presence is certainly related to the nature of this particular rumor, though it may be apt to characterize them as a domain-specific subset of the latter. Regarding the latter, these accounts gain the trust of Twitter users by mimicking the appearance of legitimate sources of information, often mirroring the look of a trusted media or official account. They may also appeal to the fast-moving landscape of Twitter by appearing to have their fingers on the pulse of a given event and, because of this facade, garner large audiences to which they broadcast information with a tone of factuality and immediacy. For example, according to representatives of WestJet who were following this story, Flightradar24’s Twitter account had approximately 180,000 followers at the time of this event, and even though their tweet conveyed some uncertainty about an actual hijacking, it functioned to spread what turned out to be a false rumor.

That these “breaking news” accounts are highly retweeted is in line with existing research showing Twitter users attribute credibility to certain kinds of user names, “assuming that topically-relevant user names were associated with credible information” [28, p. 445]. In other words, according to the Twittersphere, if an account says they are official and they look official they must be so. Recent research shows that these accounts might actually be more trusted than mainstream media sources [35].

### **Emerging Best Practices for Managing Online Communication during Crisis**

Our data demonstrate that WestJet’s response was relatively fast—their official denial was posted within 45 minutes of the first rumor tweet. Of the thirteen crisis-related rumors we have studied, this was by far the fastest and most effective correction. However, the company still strives to do better and saw this event as a learning opportunity.

Our results validate existing research [2], showing that the presence of an official source indeed affects the propagation and/or resolution of online rumors. Contrary to other findings suggesting that official sources are buried in the noise of the many [11], this study shows that messages of official communicators can rise above the noise of the many. In fact, the many adopt the official information. This should provide further rationale to organizations and emergency management agencies, which have expressed fear of misinformation and lack of trustworthiness [18] to join the social media conversation. Their (active) presence can be effective in shaping the flow of information and controlling potential rumors.

These findings also provide empirical evidence supporting a growing argument that emergency responders and other

official actors in safety-critical domains should include specific protocols for identifying and addressing rumors in their social media strategies and crisis plans. The WestJet case shows the value of real-time social media monitoring, and suggests that one tractable method of doing this consistently (24 hours a day, seven days a week) involves empowering multiple employees to follow the social media conversations to detect rumors or other issues. WestJet’s ongoing work to pre-approve a set of messages for different kinds of situations demonstrates one potential strategy for dealing with the need to respond quickly in situations that require careful management of messaging. Protocols like these could result in shorter response times to rumors as well as other important crisis-related information. Considering the demonstrated value of the “official” response to online rumors in terms of dampening rumoring behavior and promoting corrections, shorter response times and effective communication within those responses could reduce the overall impact of rumoring during crisis events.

### **CONCLUSION**

This research uses the digital record of crisis-related rumors that spread on Twitter to enhance our understanding of how “official” sources—such as news media, emergency management agencies and organizations—impact both the propagation and correction of online rumors. This paper offers methodological and empirical insights for social media researchers and practical implications for crisis communicators. We describe a mixed-method approach based on the development and analysis of “retweet signatures” and show how this approach revealed the role of official accounts helping to correct and, in the WestJet hijacking case, actively stop the spread of false rumors.

Significantly, this research demonstrates—using empirical evidence from the digital record—that emergency responders and other crisis communicators can effectively shape social media discussions and dampen the spread of rumors by engaging in the online conversation. However, this study also suggests that to do this requires keeping pace with the rapid speed of social media. The actions taken by WestJet and the resulting changes they made to their social media protocols demonstrate emerging best practices for managing online communication during crisis.

This work also shows how mainstream media play an active role in both rumor propagation and correction, and reveals the influence of “breaking news” accounts on rumor propagation. Our findings suggest that a small number of accounts are responsible for driving a large portion of overall volume for some online rumors. Complementing existing literature, these analyses contribute to an enriched understanding of the role of “official” accounts in rumoring on social media.

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