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Sourcing the Arab Spring: A Case Study of Andy Carvin's Sources on Twitter During the Tunisian and Egyptian Revolutions*

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News sourcing practices are critical as they shape from whom journalists get their information and what information they obtain, mostly from elite sources. This study evaluates whether social media platforms expand the range of actors involved in the news through a quantitative content analysis of the sources cited by NPR's Andy Carvin on Twitter during the Arab Spring. Results show that, on balance, nonelite sources had a greater representation in the content than elite sources. Alternative actors accounted for nearly half of the messages. The study points to the innovative forms of production that can emerge with new communication technologies, with the journalist as a central node trusted to authenticate and interpret news flows on social awareness streams.

Key words: Andy Carvin, Arab Spring, gatekeeping, journalism, sourcing, Twitter.

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This paper presents a case study on the use of sources by National Public Radio's Andy Carvin on Twitter during key periods of the 2011 Tunisian and Egyptian uprisings. Carvin, a social media strategist at NPR in the US, emerged as a key broker of information on Twitter during the Arab Spring.[1] Through Twitter, Carvin would often link to images from demonstrators, curate a range of discussion and opinion about events, and frequently ask his followers (then about 50,000 strong) to help him make sense of the bits of information he encountered. This study examines the different actor types on the social media platform to reveal patterns of sourcing of information used by Carvin in order to further an understanding of how sourcing is evolving in an era of networked digital media—a space that, by its nature, allows for new research possibilities in tracking the influence of sources.

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The interplay between journalists and sources is a significant factor in affecting what and who makes the news. Sources help to shape how events and issues are reported, influencing the public's understanding of the world. Studies on journalistic practices have highlighted key challenges in news routines, including a limited diversity of news sources and a reliance on those with institutional power, such as government officials, police officers or business leaders. The open nature of social media technologies could, in theory, foster greater pluralism in media discourse by providing channels for a greater number and diversity of news sources.

The availability of the messages sent by Andy Carvin on Twitter offers an opportunity to analyze his choice of sources on the Arab Spring, investigate the dynamics of discourse across institutional and alternative sources, and chart the predominance of voices on Twitter. This case study, built on a quantitative content analysis of his most frequently cited sources, provides insight into the process through which Carvin, as a member of the professional news media, negotiates information gathering and dissemination in this emerging social environment.

The Gatekeeping of News Sources

News sources are a critical element in the practice of journalism as it shapes from whom journalists get their information and what type of information they obtain (Carlson, 2009; Gans, 1979). Sourcing involves making decisions on who is included or excluded as an actor in the media. The sources cited in the media do more than denote events and issues. They ascribe meaning to events, shaping public perception and understanding. Studies into the production of news have shown that journalists seek to cite sources considered authoritative as they hold certain credentials in society (Ericson, Baranek, & Chan, 1989; Gans, 1979; Tuchman, 1978). These credentials stem from bodies holding positions of power, such as government or police, or representing significant segments of society, such as in business. Numerous studies have identified how government officials dominate sources (Brown, Bybee, Wearden, & Straughan, 1987; Sigal, 1973). Hall, Critcher, Jefferson, Clarke, & Roberts (1978) argue that elite sources are at the top of a hierarchy of credibility, and as a result, are primary definers who shape the news agenda and interpretative approach used by journalists. For Hall et al., the deadlines of news production and the professional commitment to impartiality and objectivity "combine to produce a systematically structured over-accessing to the media of those in powerful and privileged institutional positions" (1978, p. 58). Not only do nonelite sources make up a small minority of news sources, Ericson et al. argue they are used to inspire "fear and loathing" (1989, p. 1), reinforcing the authority of elites.

The use of elite sources by journalists further enhances the credibility of these sources. As Tuchman (1978, p. 210) notes, "by identifying centralized sources of information as legitimated social institutions, news organizations and newsworkers wed themselves to specific beats and bureaus. Those sites are then objectified as the appropriate sites at which information should be gathered." The hierarchy of sources is replicated in alternative media, where a counterelite of source types "preserves the dominant model of sourcing in its assumptions about power, legitimacy and authoritativeness" (Atton & Wickenden, 2005, p. 357).

News practices reinforce what Becker defines as a hierarchy of credibility, where elites are presumed to have greater authority in defining "the way things really are" (1967, p. 241). Reporters develop routines to manage organizational limits and maximize efficiency (Gans, 1979; Tuchman, 1978). Journalists are expected to have a range of sources, yet come across operational impediments, including the geographic and social proximity of the source. Recent developments, such as the acceleration of the news cycle and the corresponding shortening of the publication cycle, have affected sourcing, with greater reliance on secondhand sources, such as news agency content or already published news stories (Boczkowski, 2010;

Thurman & Myllylahti, 2009). Shrewd sources understand the limitations facing journalists and employ tactics to satisfy a reporter's need for information, hence increasing their chances of being cited. Gans (1979) describes the process as a tug-of-war between sources seeking to shape the content and direction of news, and journalists striving to obtain the details needed.

The credibility, or perceived credibility, of a source is a key determinant in the tug-of-war (Gans, 1979; Reich, 2011). While source type and affiliation affect how journalists assign credibility, operational limitations mean reporters develop ongoing relationships with sources. The more familiar journalists are with a source, the more likely they are to be considered credible. Engagement influences credibility and the likelihood of being used as a source. As Gans notes, "those they talk with frequently can be evaluated over time, which is another reason why story selectors prefer regular sources" (1979, pp. 129–130). In his study on sourcing and credibility, Reich (2011) found that journalists tended to depend almost exclusively on a core set of sources who had proved their trustworthiness in the past.

The selection of news sources, therefore, is an essential form of gatekeeping—the process through which journalists filter vast quantities of information to distill a narrow set of news reports for a given day (Shoemaker, 1991). The gatekeeping metaphor (White, 1950) has formed the theoretical basis for a wide range of mass communication scholarship, including many contemporary accounts of journalists' efforts to "guard open gates" (Singer et al., 2011) as news organizations increasingly engage participatory forms of news (Lewis, Kaufhold, & Lasorsa, 2010). In their seminal meta-analysis, Shoemaker and Vos (2009) propose that scholars examine the influences shaping gatekeeping at five levels of analysis: individual (e.g., personal background), routines (e.g., work patterns), organizational (e.g., media ownership), social institutional (e.g., extraorganizational forces such as public relations), and social system (e.g., ideology) (cf., Shoemaker & Reese, 1996). Moreover, Shoemaker and Vos suggest that a revised version of the gatekeeping model should give primacy not only to journalists (media channel) and their information (source channel) but should acknowledge the growing impact of user-driven information (audience channel) in shaping the media and source channels (see Figure 9.1 on p. 125). Additionally, Shoemaker and Vos contend that research should better account for the agency of individual gatekeepers, given that "the sociological turn in gatekeeping studies has left Mr. Gates as a minor character in the selection of news" (p. 134). This study attempts to address this concern and build upon their framework by (1) examining an individual gatekeeper whose agency is manifest in his publishing to Twitter without oversight from senior editors; (2) simultaneously addressing the social institutional level of influence from sources; and (3) exploring the extent to which journalists operating on social media may perform their gatekeeping function differently in relation to traditional or nontraditional types of sources.

Journalistic Sourcing and the Social Web

Web 2.0 technologies, often referred to as social media, offer broad opportunities for individuals to participate in the observation, filtering, distribution and interpretation of news. The negotiation between journalism and social media as structuring and/or shaping technology is a key point for understanding its role in influencing established norms, practices and routines. Social media allow for new relations that potentially disrupt hierarchical structures and erode the traditional distinction between the producer and consumer of news and information.

Services like Twitter facilitate the instant, digital dissemination and reception of short fragments of data from sources both inside and outside the framework of established journalism. The free service has grown as a network for real-time news and information since its creation in 2006, shaping how news is gathered, distributed, and received (Bruno, 2011; Hermida, 2010; Lasorsa, Lewis, & Holton, 2012; Newman, 2009). In its short lifespan, Twitter has attracted attention for its role in the reporting of major events, such as the terrorist attacks in Mumbai in November 2008, the protests following the Iranian

election in June 2009, the earthquake in Haiti in 2010, and uprisings in Middle East (Bruno, 2011; Kwak, Lee, Park, & Moon, 2010).

Twitter describes itself as "a real-time information network that connects you to the latest information about what you find interesting" (Twitter, n.d.). By March 2012, it reported 140 million active users and 340 daily million messages (Twitter, 2012). Hermida (2010) has described the flows of news and information on Twitter as ambient journalism. Ambient journalism frames Twitter as a social awareness system that delivers a fragmented mix of information, enlightenment, entertainment, and engagement from a range of sources. In certain types of situations, Twitter users take on the role of social sensors of the news (Sakaki, Okazaki, & Matsuo, 2010), with the network serving a channel for breaking news alerts and subsequently for a stream of real-time data as events unfold.

As a result, Twitter has been promptly adopted in newsrooms as a mechanism for user-generated content, often filling the news vacuum that can follow the immediate aftermath of a breaking news event by sourcing eyewitness accounts, photos, and video from social media. This has given rise to the role of the journalist as curator who filters, selects and contextualizes copious amounts of real-time information on the fly (Bruno, 2011; Newman, 2009). The role of the journalist is reframed as a professional who "lays bare the manner through which a news story is constructed, as fragments of information are contested, denied or verified" (Hermida, 2012, p. 8). The technical architecture of Twitter presents distinct research opportunities to study the relationship between the journalist and sources, offering insights into the engagement with sources and the subsequent broadcast of information from these sources. The interactions between a journalist and a source are traditionally hidden from public view, making it difficult to assess whom a journalist has engaged with in the process of collecting information. Research on sourcing focuses on who is quoted by journalists as this can be measured by counting the number of citations in a news article or broadcast. However, the interactions between a journalist and a source are captured by the @mentions mechanisms on Twitter, revealing how a reporter engages with sources to gain information, background, and context. The sources cited are captured by the retweet mechanism, when a journalist broadcasts a message from a source.

Networked and distributed social media platforms potentially expand the range of actors involved in the construction of the news. Yet studies indicate that the ability of media audiences to participate in the processes of news production within professional publications has been severely circumscribed (Lasorsa et al., 2012; Lewis, 2012; Singer et al., 2011). Bruno's study of the coverage of three major news outlets of the 2010 Haiti earthquake suggests an opportunistic model at play, rather than a desire to represent a broad spectrum of voices. Bruno found a significant reliance of social media content by the BBC, *The Guardian*, and CNN in the first 24 hours of the natural disaster. But the use of social media content fell dramatically once the BBC and CNN had their own teams in Haiti. Bruno concluded that only "*The Guardian* seems to have embraced an editorial policy more open and consistent with regard to the diversity of online voices" (2011, p. 63).

Social media are attractive to activists as they can offer alternative platforms for public communication that bypass the gatekeeping of traditional media (Bruns, 2008). In the coverage of protest movements, the sourcing practices of the mainstream media shape the nature and tone of coverage. Journalists rely on institutional actors perceived as authoritative sources, such as police and officials, marginalizing alternative voices that are seen as deviant (Bennett, 1988; Hall et al., 1978). In their study on social media during the G20 protests in Toronto in 2010, Poell and Borra (2011) suggested that Twitter held the most promise for crowdsourced alternative reporting. However, they noted that the reporting was led by a small number of users who had emerged as an elite set of voices through the practice of retweeting. Moreover, Poell and Borra noted that the narrative on social media mirrored mainstream reporting on the violence during the protests as though activists focused on reports of violence by the police, rather than protesters.

Emerging research suggests that social media, and more specifically Twitter, provides a platform for the coconstruction of news by journalists and activists. In a study of tweets during the Tunisian and Egyptian uprisings, Lotan et al. (2011) found that both journalists and activists were key information sources. Activists were the top type of source cited on Twitter for Tunisia, whereas journalists became the main type of source for Egypt. The findings suggest that activists filled a news vacuum in Tunisia, a traditionally unreported country, as the protests unfolded and the international media started to play more attention. Egypt, in contrast, has tended to be better covered in the mainstream media in the past, and the protests garnered greater attention as they followed the ones in Tunisia.

Other studies of the protests that reshaped the Middle East in 2011 have highlighted how social media can give voice to a set of alternative sources. In their study of tweets using the #Egypt hashtag, Papacharissi and de Fatima Oliveira (2012) found that the more prominent voices on the Egyptian uprising belonged to elite news organizations and specific individuals. They found that, together with mainstream media journalists, there was a parallel and significant set of voices consisting of bloggers, activists and intellectuals involved in advocacy. This alternative set of elite voices was crowdsourced through the mechanisms of social media "that reward those more involved in mobilization, and the reporting and curating of information, online and offline," (2012, p. 14). Papacharissi and de Fatima Oliveira suggest that the stream of news on Twitter combined news, opinion and emotion, pointing to a mix of old and newer news values.

The Case of Andy Carvin

To examine journalistic sourcing dynamics in a fluid news space like Twitter, and in particular how these dynamics played out in the Arab Spring, we have chosen to study Carvin's work at the height of the Tunisian and Egyptian uprisings. His coverage on Twitter — spanning upwards of 16 hours a day, 7 days a week — featured hundreds of tweets per day (Farhi, 2011). As Carvin emerged as a central node in the information network on the Arab Spring, his peers took notice. Summing up the reaction in media coverage after Carvin was featured in *The New York Times*, the *Guardian*, and *The Washington Post*, the *Columbia Journalism Review* called Carvin's Twitter feed a "living, breathing real-time verification system" and a "must-read newswire" (Silverman, 2011, para. 1). His prominence on Twitter resulted in a 2012 Shorty Award, which recognizes the best producers of short-form content on social media (PRWeb, 2012).

The literature on journalism and sourcing, the emergence of social media, and the particular case of Andy Carvin raise significant questions. First, given how the choice of sources influence how events are reported, our research seeks to understand how certain actors gain more attention than others in the process of gathering and filtering news. Second, the transparency of digital networks, and Twitter in particular, facilitate the work of identifying how such sourcing occurs. Third, the unique context of Carvin's role may point to a new kind of journalistic style emerging in social spaces, where reporters rely on a potentially broader array of sources, from citizens to individual activists to institutional bodies. The first two items are addressed in the research questions that follow; the third is the focus of the Discussion section that follows our findings.

Research Questions

Our primary concern is the nature of Carvin's sources: the type of actors involved, and the prominence that certain actors achieve relative to others. This leads us to ask:

> RQ1. What types of sources are most prominent in Carvin's coverage of the Egyptian and Tunisian revolutions?

Secondly, because the networked and public architecture of Twitter presents an opportunity to observe the online interactions between journalists and sources—e.g., @mentions as a form of engagement, and retweets as a form of broadcasting—we seek to investigate the nature of Carvin's sourcing activity, and assess how such activity is associated with source type prominence.

RQ2. How does the relative prominence of source types vary according to the sourcing practices that Carvin employed during these periods?

Methods

Sample

The data for this study came from a dataset, provided by Carvin and obtained from Twitter, that included all of Carvin's tweets—more than 60,000 of them—posted between December 1, 2010 and September 16, 2011. The researchers developed a computer program to parse this data and systematically categorize them based on several criteria (for details, see Lewis, Zamith, & Hermida, 2013).[2] All of the tweets appearing between January 12 and January 19, and from January 24 to February 13, were subsequently isolated by the researchers. The first period covers the major portion of Tunisian demonstrations leading to the fall of President Ben Ali, and the second covers the Egyptian protests and subsequent resignation of President Hosni Mubarak. These choices of dates were made according to an analysis of news timelines for major events during the Arab Spring,[3] and to correspond with similar time frames used in previous research of this kind (e.g., Lotan et al., 2011). Carvin tweeted a total of 411 times during the Tunisian time period, including in his tweets 191 unique sources. During the Egyptian time period, Carvin tweeted 5,290 times and included 1,156 unique sources in his tweets.

To create a comparable and sufficiently large, yet manageable, sample, the researchers opted to code all profiles that accounted for 0.09% or more of the retweeted sources or 0.25% or more of the non-retweeted sources.[4] This yielded 330 unique sources, with 190 sources appearing in the Egypt sample, 172 in the Tunisia sample, and 32 sources overlapping both samples. The Twitter profiles for these sources were then systematically downloaded by the researchers on December 6, 2011. A total of eight profiles could not be obtained since they had been either deleted or protected from public view, resulting in a final sample of 322 sources: 185 for Egypt and 168 for Tunisia, with 31 sources overlapping.

Coding Instrument

This study was primarily concerned with two key variables: (a) the type of interaction that occurred in a tweet and (b) the type of source being interacted with. To determine the type of interaction occurring in each of Carvin's tweets, a computer program was used to systematically ascertain whether tweets were broadcasting information or engaging sources. Tweets deemed to be broadcasting information were those that included a retweet, and were identified through the presence of the text "RT @" in the tweet, with the source being retweeted determined as the handle immediately adjacent to the expression. In cases where the text "RT @" appeared multiple times in one tweet, the first instance was given priority. Tweets that did not include the text "RT @" but did include a source ("@") were deemed to represent engagement, with all sources appearing in the tweet listed as having been engaged by Carvin. Thus, retweets were classified as *broadcasting* and non-retweets as *engaging*.

The source type variable was initially assessed by two independent coders, who were blind to the research questions, and later re-evaluated by the researchers. All sources were coded using a customized electronic coding interface developed by one of the researchers. In this system, the source's Twitter profile page appeared adjacent to the electronic code sheet. This eliminated data entry error by

automatically transferring entries into a relational database, removing the need for human intervention. It also helped reduce coder error by having options and categories presented as labels, with the system automatically converting selections into numerical values after each submission. Coders were instructed to rely primarily on the data from the source's stored profile, although they were also permitted to access external sources like the source's current Twitter profile, associated blogs and personal websites, and LinkedIn profile.

The source type classifications were adapted from Lotan et al. (2011). They included: affiliated activists, nonaffiliated activist, bloggers, bots, celebrities, digerati, mainstream media employees, mainstream media organizations, mainstream new media organizations, nonmedia activist organizations, nonmedia nonactivist organizations, political actors, researchers, and any other type of account. For a description of each source type, see Table 1.

Intercoder Reliability

To assess intercoder reliability, the independent coders double-coded 46 randomly selected sources (14.3% of the sample) that appeared within the dataset but outside of the sample. To determine reliability, the researchers used Scott's Pi, which corrects for chance agreement (Scott, 1955). The coefficient for the source type variable was .72, thereby exceeding the minimum bound of .70 suggested by Riffe, Lacy, and Fico (2005).

In light of the complexity of the source type variable — indeed, as in the Lotan et al. (2011) study, several sources were found to span several categorizations, presenting significant challenges — all profiles were subsequently reviewed by the researchers to ensure validity. When a researcher disagreed with a coder's classification — which occurred almost exclusively in the more ambiguous cases — that profile was reviewed by all three researchers simultaneously and recoded through consensus-building. A total of 60 sources (18.6%) were recoded in this manner.

Results

Source Type Prominence

The relative prominence of source types (RQ1) was determined first by examining source representation in the sample (see Table 2). For instance, in the overall population of individual sources, mainstream media employees accounted for the largest group by far (26.7%). They were likewise the largest group by proportional representation within the Egypt (33.0%) and Tunisia (20.2%) subsamples. A closer look at proportional differences between countries reveals subtle changes as Carvin moved from the Tunisian revolution to the Egyptian revolution. For example, there was a substantial uptick in the representation of mainstream media employees and nonaffiliated activists, and a decline in the representation of digerati.

Proportional representation in the sample, however, is just one form of prominence; a more important measure is the relative frequency of tweet mentions given to source types (see Table 2). On this score, a different picture emerges: Compared to other individual source categories, nonaffiliated activists accounted for the greatest single share of tweet mentions, overall (35.3%) and for Egypt (37.5%). Meanwhile, mainstream media employees had the second-largest proportion for Egypt (30.1%) and the most for Tunisia (23.2%). Notably, digerati had a 16.3% share for Tunisia, but that fell to 3.8% in the Egypt sample.

A third step in this analysis of source type prominence was to organize the discrete source type categories originally deployed (see Table 1) into a more coherent, three-part scheme: Mainstream Media, Institutional Elites, and Alternative Voices (see Table 2). This arrangement allowed for a more focused comparison of the extent to which Carvin drew upon traditional sources for news (fellow journalists,

Table 1 Source Type Definitions

Source Type	Description	Example
Activist (Affiliated)	Individuals who either self-identify as an activist or who appear to be tweeting purely about activist topics, and affiliate themselves with an advocacy group or organization.	@RachelPerrone
Activist (Non-Affiliated)	Individuals who either self-identify as an activist or who appear to be tweeting purely about activist topics, but do not affiliate themselves with an advocacy group or organization.	@Elazul
Blogger	Individuals who post regularly to an established blog, and who appear to identify as a blogger on Twitter.	@paulseaman
Bots	Accounts that appear to be an automated service tweeting consistent content, usually in extraordinary volumes.	@toptweets
Celebrity	Individuals who are famous for reasons unrelated to technology, politics, or activism.	@Alyssa_Milano
Digerati	Individuals who have worldwide influence in social media circles and are, thus, widely followed on Twitter.	@ev
Mainstream Media Employees	Individuals employed by MSM organizations, or who regularly work as freelancers for MSM organizations.	@camanpour
Mainstream Media Organization	News and media organizations that have both digital and non-digital outlets.	@NYTimes
Mainstream New Media Organization	Blogs, news portals, or journalistic entities that exist solely online.	@visionOntv
Non-Media Organization (Activist)	Groups, companies, or organizations that are not primarily news-oriented and openly advocate a point of view or support a cause.	@amnesty
Non-Media Organization (Non-Activist)	Groups, companies, or organizations that are not primarily news-oriented and do not openly advocate a point of view or support a cause.	@instagram
Political Actor	Individuals who are known primarily for their relationship to government.	@jeanmarcayrault
Researcher	An individual who is affiliated with a university or think-tank and whose expertise seems to be focused on Middle East issues.	@jeffjarvis
Other	Accounts that do not clearly fit into any category.	@AngelinesMoncha

Note: Source type categories adapted from Lotan et al. (2011).

Table 2 Relative Prominence of Source Types—by Individual Source Type and Recoded Group Source Type—in Andy Carvin's Tweets During the Egyptian and Tunisian Uprisings in 2011

Source Type (organized by group categorization)	Overall proportion (N = 322)	Egypt proportion (N = 185)	Tunisia proportion (N = 168)	Proportion of mentions in Carvin tweets in the sample: Overall (N = 3,623)	Egypt (N = 3,291)	Tunisia (N = 332)
Mainstream Media Employees	26.7%	33.0%	20.2%	29.4%	30.1%	23.2%
Mainstream Media Org.	4.3%	4.3%	4.8%	2.0%	1.8%	3.6%
Mainstream New Media Org.	1.2%	1.6%	.6%	1.2%	1.3%	.3%
Mainstream Media (group subtotal)	*32.3%*	*38.9%*	*25.6%*	*32.6%*	*33.2%*	*27.1%*
Digerati	12.4%	9.7%	17.9%	4.9%	3.8%	16.3%
Researchers	6.8%	7.0%	7.1%	5.6%	5.3%	7.8%
Non-Media Org (Non-Activist)	2.5%	.5%	4.8%	.5%	.1%	4.2%
Celebrities	1.2%	1.6%	1.2%	.5%	.5%	.9%
Political Actors	.9%	.5%	1.2%	.2%	.1%	.6%
Institutional Elites (group subtotal)	*23.9%*	*19.3%*	*32.1%*	*11.7%*	*9.8%*	*29.8%*
Non-Affiliated Activist	14.6%	18.4%	10.1%	35.3%	37.5%	13.6%
Bloggers	6.5%	4.3%	7.7%	7.6%	7.5%	9.0%
Affiliated Activist	3.4%	2.7%	4.2%	3.9%	3.5%	7.8%
Non-Media Org (Activist)	1.9%	2.2%	1.2%	1.5%	1.6%	.6%
Alternative Voices (group subtotal)	*26.4%*	*27.6%*	*23.2%*	*48.3%*	*50.1%*	*31.0%*
Other	17.4%	14.1%	19.0%	7.3%	6.8%	12.0%
Sample (Total)	100.0%	100%	100%	100%	100%	100%

Note: Totals may not add to 100% because of rounding error. The *N*s for Egypt proportion and Tunisia proportion exceed the Overall proportion because of source overlap.

researchers, institutions, and other elite actors) and nontraditional sources (activists and bloggers). This group-level comparison makes it clear that Alternative Voices enjoyed an outsized influence in Carvin's coverage; while they accounted for barely a quarter of his sources overall, they nonetheless received roughly half of all tweet mentions in the sample—far more than either Mainstream Media (32.6%) or Institutional Elites (11.7%).

Sourcing Practices and Prominence

The second research question sought to examine the nature of Carvin's sourcing practices—whether in the form of broadcasting (RTs) or engaging (non-RTs)—and assess how such activities are associated with source type prominence. The data were broken down by revolutionary period and by sourcing practice within each period (i.e., Egypt RTs, Egypt non-RTs, Tunisia RTs, Tunisia non-RTs). Sources in

Table 3 Top-25 Retweeted Sources, Egypt

#	Handle	Name	Source Category	# of Tweets
1	@sultanalqassemi	Sultan Al Qassemi	Alternative Voices	161
2	@bencnn	Ben Wedeman	Mainstream Media	99
3	@monasosh	Mona Seif	Alternative Voices	92
4	@mosaaberizing	Mosa'ab Elshamy	Alternative Voices	87
5	@evanchill	Evan Hill	Mainstream Media	80
6	@dima_khatib	Dima Khatib	Alternative Voices	72
7	@riverdryfilm	Omar Robert Hamilton	Alternative Voices	66
8	@3arabawy	Hossam el-Hamalawy	Alternative Voices	65
9	@weddady	Nasser Weddady	Alternative Voices	64
10	@alaa	Alaa Abd El Fattah	Alternative Voices	63
11	@ramyyaacoub	Ramy Yaacoub	Institutional Elites	56
12	@zeinobia	"Zeinobia"	Alternative Voices	56
13	@ghonim	Wael Ghonim	Alternative Voices	52
14	@nickkristof	Nicholas Kristof	Mainstream Media	52
15	@sharifkouddous	Sharif Kouddous	Alternative Voices	51
16	@laraabcnews	Lara Setrakian	Mainstream Media	49
17	@monaeltahawy	Mona Eltahawy	Mainstream Media	48
18	@gsquare86	Gigi Ibrahim	Alternative Voices	47
19	@egyptocracy	"Egyptocracy"	Alternative Voices	43
20	@nadiae	Nadia El-Awady	Alternative Voices	42
21	@waelabbas	Wael Abbas	Alternative Voices	38
22	@bloggerseif	Ali Seif	Alternative Voices	37
23	@jan25voices	"Jan25 Voices"	Alternative Voices	36
24	@sandmonkey	Mahmoud Salem	Alternative Voices	35
25	@sherinet	Sherine Tadros	Mainstream Media	35

Note: The Mainstream Media category comprises of mainstream media organizations, mainstream new media organizations, and mainstream media employees. The Alternative Voices category comprises of bloggers, non-media activist organizations, affiliated activists, and non-affiliated activists. The Institutional Elites category comprises of non-media non-activist organizations, political actors, celebrities, researchers, and digerati. The Other category comprises of bots and all other source types.

this context were considered at the level of the individual (single Twitter user) and the recoded three-part group structure noted above.

For prominence among individual sources, Tables 3–6 display a list of the top 25 sources for each of the four periods and sourcing practice classifications. Overall, there was little overlap across the lists,[5] suggesting that, at least among go-to individuals, Carvin turned to a different set of sources for each revolutionary period—and even, it would appear, different leading sources.[6] These lists also serve to illustrate the dramatic increase in Carvin's use of Twitter between the Tunisian and Egyptian periods, judging by the number of mentions required to crack the top 25 groups for each country. These tables also reveal the outsized influence of certain individuals, such as Sultan Al Qassemi (@sultanalqassemi), whose relative prominence among Egypt retweeted sources was unrivaled across the entire sample.

Table 4 Top-25 Non-Retweeted Sources, Egypt

#	Handle	Name	Source Category	# of Mentions
1	@ghonim	Wael Ghonim	Alternative Voices	26
2	@alaa	Alaa Abd El Fattah	Alternative Voices	19
3	@sultanalqassemi	Sultan Al Qassemi	Alternative Voices	19
4	@pubmedia	"#PubMedia Chat"	Mainstream Media	18
5	@shanestolar	Shane Stolar	Other	18
6	@wjchat	"wjchat"	Mainstream Media	18
7	@evanchill	Evan Hill	Mainstream Media	17
8	@mathewi	Mathew Ingram	Mainstream Media	15
9	@webjournalist	Robert Hernandez	Institutional Elites	13
10	@weddady	Nasser Weddady	Alternative Voices	13
11	@mosaaberizing	Mosa'ab Elshamy	Alternative Voices	12
12	@3arabawy	Hossam el-Hamalawy	Alternative Voices	11
13	@dima_khatib	Dima Khatib	Alternative Voices	11
14	@monasosh	Mona Seif	Alternative Voices	10
15	@yayayarndiva	P. Mimi Poinsett	Other	10
16	@manal	Manal Hassan	Alternative Voices	9
17	@sandmonkey	Mahmoud Salem	Alternative Voices	9
18	@monaeltahawy	Mona Eltahawy	Mainstream Media	8
19	@ramyyaacoub	Ramy Yaacoub	Institutional Elites	8
20	@ajenglish	Al Jazeera English	Mainstream Media	7
21	@antderosa	Anthony De Rosa	Mainstream Media	7
22	@ivancnn	Ivan Watson	Mainstream Media	7
23	@jan25voices	"Jan25 Voices"	Alternative Voices	7
24	@jeffjarvis	Jeff Jarvis	Institutional Elites	7
25	@jilliancyork	Jillian C. York	Alternative Voices	7

Note: The Mainstream Media category comprises of mainstream media organizations, mainstream new media organizations, and mainstream media employees. The Alternative Voices category comprises of bloggers, non-media activist organizations, affiliated activists, and non-affiliated activists. The Institutional Elites category comprises of non-media non-activist organizations, political actors, celebrities, researchers, and digerati. The Other category comprises of bots and all other source types.

Furthermore, by comparing relative proportions among source categories in these tables, additional distinctions come into focus. Whereas the spread of actor types is more mixed in the case of Tunisia, Alternative Voices dominate the top 25 for Egypt, accounting for 18 on the list of RT sources and 12 on the list non-RT sources. On the flip side, Institutional Elites were top among Tunisia non-RT sources, with 9 spots, but accounted for only 3 of the top 25 non-RT sources in Egypt—and only 1 of the top 25 for Egypt RT.

To gauge the prominence of source type groups across the whole sample, descriptive statistics were analyzed (see Table 7). These reinforce the relative outsized impact of Alternative Voices in Egypt. This is particularly true in the dramatic differences across median number of tweet mentions for different groups on the Egypt RT dimension, as revealed in a median test: $\chi^2\ (2, N = 141) = 20.12, p < .001$,

Table 5 Top-25 Retweeted Sources, Tunisia

#	Handle	Name	Source Category	# of Tweets
1	@dima_khatib	Dima Khatib	Alternative Voices	6
2	@jrug	Jonathan Rugman	Mainstream Media	6
3	@nawaat	Nawaat de Tunisie	Alternative Voices	4
4	@sultanalqassemi	Sultan Al Qassemi	Alternative Voices	4
5	@achrisafis	Angelique Chrisafis	Mainstream Media	3
6	@brian_whit	Brian Whitaker	Mainstream Media	3
7	@ibnkafka	"ibnkafka"	Alternative Voices	3
8	@ifikra	Sami Ben Gharbia	Alternative Voices	3
9	@lukebozier	Luke Bozier	Institutional Elites	3
10	@shadihamid	Shadi Hamid	Institutional Elites	3
11	@alanfisher	Alan Fisher	Mainstream Media	2
12	@bengacem	Leila Ben-Gacem	Other	2
13	@edwebb	Ed Webb	Institutional Elites	2
14	@harhour_l	"Harhour"	Other	2
15	@jeffjarvis	Jeff Jarvis	Institutional Elites	2
16	@jilliancyork	Jillian C. York	Alternative Voices	2
17	@mmm	Moh'd M. Meddah	Alternative Voices	2
18	@monaeltahawy	Mona Eltahawy	Mainstream Media	2
19	@niemanlab	Nieman Lab	Institutional Elites	2
20	@nprnews	"NPR News"	Mainstream Media	2
21	@sgardinier	Suzanne Gardinier	Alternative Voices	2
22	@simsimt	Usamah M.	Other	2
23	@techsoc	Zeynep Tufekci	Institutional Elites	2
24	@weddady	Nasser Weddady	Alternative Voices	2
25	@_niss	Aniss Bouraba	Other	1

Note: The Mainstream Media category comprises of mainstream media organizations, mainstream new media organizations, and mainstream media employees. The Alternative Voices category comprises of bloggers, non-media activist organizations, affiliated activists, and non-affiliated activists. The Institutional Elites category comprises of non-media non-activist organizations, political actors, celebrities, researchers, and digerati. The Other category comprises of bots and all other source types.

Cramer's $V = .38$. The picture for Tunisia is more muddled, primarily because of the small number of tweets posted during the period (see the Sum column).

In the absence of normal distributions,[7] a Kruskal-Wallis test was conducted to evaluate differences among the three group types (Mainstream Media, Institutional Elites, and Alternative Voices) on median change in the dependent variable (the number of tweet mentions across each of the four sourcing activity clusters). Results are displayed in Table 7. The test was significant for Egypt RT and non-RT. For the Egypt retweet cluster, the effect size, or the proportion of the variability in the ranked dependent variable accounted for by source type independent variable, was .12, indicating a moderate relationship between source type and change in the number of tweet mentions. The effect size for Egypt non-retweet was weaker, but still noteworthy, at .06.

Follow-up tests were conducted to assess pairwise differences among the three groups in each of the two Egypt clusters, controlling for Type I error across the tests by incorporating the Bonferroni

Table 6 Top-25 Non-Retweeted Sources, Tunisia

#	Handle	Name	Source Category	# of Mentions
1	@weddady	Nasser Weddady	Alternative Voices	11
2	@mathewi	Mathew Ingram	Mainstream Media	10
3	@jilliancyork	Jillian C. York	Alternative Voices	9
4	@ifikra	Sami Ben Gharbia	Alternative Voices	7
5	@natashatynes	Natasha Tynes	Mainstream Media	7
6	@nawaat	Nawaat de Tunisie	Alternative Voices	7
7	@wjchat	"wjchat"	Mainstream Media	7
8	@storify	"Storify"	Institutional Elites	6
9	@ethanz	Ethan Zuckerman	Institutional Elites	5
10	@monaeltahawy	Mona Eltahawy	Mainstream Media	5
11	@jeffjarvis	Jeff Jarvis	Institutional Elites	3
12	@lukebozier	Luke Bozier	Institutional Elites	3
13	@marocmama	Amanda Mouttaki	Alternative Voices	3
14	@tunisianfreedom	"Tunisian Freedom"	Alternative Voices	3
15	@amsika	Antoine Msika	Institutional Elites	2
16	@basti	Bastian Lehmann	Other	2
17	@brian_whit	Brian Whitaker	Mainstream Media	2
18	@butwait	Shelley Krause	Other	2
19	@charliejane	Charlie Jane Anders	Alternative Voices	2
20	@chrisheuer	Chris Heuer	Institutional Elites	2
21	@digiphile	Alex Howard	Institutional Elites	2
22	@dima_khatib	Dima Khatib	Alternative Voices	2
23	@evgenymorozov	Evgeny Morozov	Institutional Elites	2
24	@f6x	Stephen R. Fox	Institutional Elites	2
25	@globalvoices	"Global Voices"	Alternative Voices	2

Note: The Mainstream Media category comprises of mainstream media organizations, mainstream new media organizations, and mainstream media employees. The Alternative Voices category comprises of bloggers, non-media activist organizations, affiliated activists, and non-affiliated activists. The Institutional Elites category comprises of non-media non-activist organizations, political actors, celebrities, researchers, and digerati. The Other category comprises of bots and all other source types.

approach. The results of these tests, found in Table 7, suggest that chance cannot be ruled out in the differences observed between Alternative Voices and Mainstream Media across both RT and non-RT, even though the original mean and median observations indicate that Carvin preferred atypical sources during the Egypt period. However, the differences between Alternative Voices and Institutional Elites were significant for both clusters, reinforcing the observation that nontraditional sources were favored relative to elite actors who typically dominate the sourcing patterns of journalists.

Discussion

The routines used by journalists to sort out fact from fiction are rooted in evaluating the credibility of a source based on assumptions about power, legitimacy, and authoritativeness. The result is a hierarchy

Table 7 Descriptive Statistics for Sourcing Activity, According to Country and Source Type

Period	Sourcing Activity	Source Type	N	Mean	Med.	Std. Dev.	Max.	Sum	χ^2	Group mean rank
Egyptian revolution	*Retweets (Broadcasting)*	Mainstream Media	62	13.94	3.5	18.48	99	864	16.68 ***	70.72_a
		Institutional Elites	32	6.97	3.5	10.84	56	223		48.59
		Alternative Voices	47	29.79	22	32.30	161	1400		86.63_a
	Non-retweets (Engaging)	Mainstream Media	52	4.38	3	4.20	18	228	6.91 *	52.49_a
		Institutional Elites	26	3.92	3.5	2.62	13	102		53.56
		Alternative Voices	38	6.55	5	5.45	26	249		70.11_a
Tunisian revolution	*Retweets (Broadcasting)*	Mainstream Media	26	1.46	1	1.104	6	38	1.26	36.83
		Institutional Elites	24	1.33	1	0.637	3	32		36.96
		Alternative Voices	26	1.73	1	1.282	6	45		41.60
	Non-retweets (Engaging)	Mainstream Media	22	2.36	1	2.517	10	52	.30	41.73
		Institutional Elites	40	1.68	1	1.071	6	67		41.01
		Alternative Voices	21	2.76	1	3.015	11	58		44.17

Notes.

1. The "Other" source-type classification has been dropped from this stage of the analysis.

2. Sum = number of tweet mentions

3. χ^2 corresponds to the chi-square statistic on a Kruskal-Wallis test. * = $p < .05$

4. Group mean ranks correspond to a Kruskal-Wallis test. Means within each distinct sourcing activity cluster that share ***no*** common subscript differ at $p<.05$ by Bonferroni procedure (i.e., $p<.0167$), according to Mann-Whitney U post-hoc tests. Because neither of the Tunisia clusters was significant, pairwise comparisons among the three groups were not considered.

of sources that favors those in positions of power and shapes how issues and events are subsequently represented in the media. Our study shows that in the cases of both Tunisia and Egypt, mainstream media and institutional elites accounted for a substantial percentage of Carvin's sources. With Egypt, journalists and their organizations made up the single largest number of sources, just over 30%, indicative of the proclivity of reporters to follow the work of their rivals. But this is only one side of the story, and a potentially misleading one.

While Carvin was in contact with a considerable number of journalists, our analysis indicated that he favored nonelite sources, particularly in Egypt. Tweets by nonelite sources accounted for just under 50% of all the messages in our sample, meaning that alternative voices had a greater influence over the content flowing through Carvin's Twitter stream than journalists or other elite sources. The priority given to alternative voices is particularly strong in Egypt, making up 50% of the 3,291 tweet mentions in that period, though our data suggests that he also showed a slight propensity for alternative sources in Tunisia. Our findings are at odds with the literature that indicates that journalists rely primarily on elite sources and belittle or discredit alternative voices. Research indicates that mainstream media turn to social media content when there is no alternative (Bruno, 2011). This rationale might apply in the

case of Tunisia, a country traditionally underreported in the Western media, but not in the case of Egypt given the number of mainstream media organizations that covered the protests. Overall, a proportional analysis of Carvin's tweet mentions suggest that as he transitioned from covering Tunisia to Egypt, he nearly doubled his emphasis on alternative voices, gave slightly more attention to mainstream media, and turned away from institutional elites.

The results lend some support to the premise that social media serve as a means to broaden the range of voices in the news. In his coverage, Carvin gave a higher priority to the messages from citizens who were expressing their demands for social change, recording and sharing their experiences on Twitter. Such an approach to reporting could be considered as a more representative form of journalism, addressing concerns about an overreliance on powerful, institutional elites as sourcing. But at the same time, it challenges long-held ethical norms of balance, fairness and objectivity in journalism, as they point to the considerable impact of one group, nonelite sources, in the construction of the news on Carvin's Twitter feed.

Our findings raise a question of the potential impact of these messages on the content and tone of other media reporting, given the large number of journalists, editors, and news outlets who monitored his feed. The feed developed into a central node in information cascades on the Arab Spring on Twitter through Carvin's practice of reposting content and referencing its source. Our findings raise questions as to how far this style of reporting on Twitter can reshape the news, by giving voice to the voiceless and challenging institutional elites. How far Carvin's preference for what may be considered rebel voices could have influenced the framing and coverage of the events of the Arab Spring was beyond the scope of our research, however.

Our analysis found that Carvin relied on relatively distinct sets of leading sources depending on the country context and the type of sourcing activity (broadcasting vs. engaging). This difference appears to be related to the nature of Carvin's work on Twitter: His retweets, arguably a better measure of journalistic work because they represent information he deemed worthy to disseminate, reveal an ever-greater disproportionate preference for alternative voices, as compared to non-retweets. For example, in the case of Egypt, more than 70% of the most prominent retweeted sources were alternative voices, and the mainstream media voices on the same top 25 list generally were journalists on the ground (e.g., @benncnn). Compare that to the list of the top 25 non-retweeted sources for Egypt, where the prominent representation of media discussion groups (e.g., @pubmedia and @wjchat) and journalists *not* on the ground (e.g., @mathewi) suggests that much of Carvin's non-retweets included him conversing with others about his work. Previous research has found that journalists on Twitter commonly engage in this kind of "job talking" (Lasorsa et al., 2012). Because Carvin's use of Twitter spurred an ongoing metadiscussion on Twitter about digital journalism and his role in re-shaping it (e.g., see Silverman, 2011), we can surmise that his use of @mentions might be more reflective and conversational in nature—rather than a form of newsgathering as such. The retweet function, therefore, is a better gauge of the actor types that influenced his reporting. But ultimately, regardless of the sourcing activity being used, our data show that his preference for alternative voices relative to elites was demonstrably stronger overall.

Carvin's use of an emerging communications platform diverged from the established paradigm of journalistic reporting and its reliance on official sources. In contrast, a study of the coverage of the Egyptian uprising in six mainstream newspapers found that journalists preferred to rely on more conventional sources, rarely citing social media sources (AlMaskati, 2012). Studies into the adoption of new media by the mainstream media point to a process of normalization, as journalists transfer established ways of working to digital technologies (Lasorsa et al., 2012; Singer, 2005; Singer et al., 2011). In his analysis of how international news outlets such as the BBC, the *Guardian* and the *New York Times* were using social media, Newman (2009, p. 39) concluded that "so far at least, the use of new tools has not led to any fundamental rewrite of the rule book—just a few tweaks round the edges." Our results suggest that

Carvin adapted journalistic practices in his reporting of the uprising using Twitter, at least when it came to the selection of sources, rather than transferring existing practices to new tools.

This turn against the paradigm of new media normalization, evident in Carvin's preference for alternative voices, can be seen as a revised form of gatekeeping, lending support for Shoemaker and Vos' (2009) proposed model that better accounts for the digital media environment. In this rendering, there is a more direct and dialogical relationship between the media gatekeeper and his audience, and audiences play a key role in enlarging and diversifying the range of source material available to the gatekeeper. Altogether, this contributes to a milieu that Bruns (2005, p. 2) describes as "gatewatching," signaling a shift from merely publishing newsworthy content to *publicizing* of relevant information elsewhere, as well as the evaluation of such external information by means of participation from audience members. Our study suggests that Carvin engaged in gatewatching by pointing his followers to source material provided by a diverse set of actors online, contributing to a "real-time verification system" (Silverman, 2011, para. 1).

While we did not analyze Carvin's selection process, the literature indicates that journalists tend to cite sources they are familiar with, as past reliability is taken as an indicator of credibility. Our findings indicate that Carvin rewarded those involved in documenting events by citing them a significant number of times in the period analyzed. But the architecture of Twitter may have played a part, too. The retweeting functionality means information can be easily amplified and cascade through the network as the reach of a message grows exponentially every time a tweet is rebroadcast. Twitter operates as a socially connected information-sharing network where well-positioned influencers can shape information flows (Kwak et al., 2010). Previous studies have identified how a set of influencers emerged on Twitter during the Egyptian uprising. Papacharissi and de Fatima Oliveira (2012) noted the appearance of an organically crowdsourced set of opinion leaders of bloggers, activists, and informed citizens on Twitter.

Interestingly, there is some crossover between the alternative sources cited by Carvin and those identified by Papacharissi and de Fatima Oliveira. They include activists such as Mona Seif (@monasosh) and Gigi Ibrahim (@gsquare86) who rose to prominence by documenting the protests. The overlap raises questions about how and when certain voices rise above others through a process of preferential attachment on Twitter. We did not examine the interplay of forces that determine prominence, whether they were prominent before Carvin cited them or how far the actions of influential actors such as journalists served to legitimize these voices.

A further question is how far the selection of sources was shaped by Western interpretations of the events in Tunisia and Egypt as a struggle for freedom or by Carvin's specific career track. AlMaskati (2012) found that *Guardian International* (UK) and *International Herald Tribune* (US) tended to cite more pro-opposition sources than progovernment ones, suggesting they were following a lead set by Western officials who regarded the protests as peaceful and democratic. Carvin may similarly have been influenced. Furthermore, the professional background of the NPR social media strategist is far from the path followed by the traditional foreign correspondent. Before joining NPR in 2006, he worked on issues of technology, education, and community (Farhi, 2011). Given his background, Carvin may have already had an inherent predisposition towards alternative voices. In his professional work before NPR, he grew familiar with the Global Voices network of bloggers that represents voices usually excluded from the mainstream media and developed a large number of contacts (Janssen, 2012).

These questions point to some limitations of this study. Obviously, to engage a more thorough study of journalistic sourcing and its evolution via social media would require looking beyond the case of Andy Carvin alone — salient though it is — to examine other journalists actively conducting much of their work in these spaces online. Moreover, a networked analysis that more richly captured the spatial dynamics of information-sharing and user-to-user influence in a social medium like Twitter would reveal nuances that cannot be accounted for entirely through traditional research methods such as quantitative and

qualitative analyses of text. To the extent that such data — on a greater number of journalists and sources, across a wider number of critical incidents like the Arab Spring, all represented in a more networked fashion — can be obtained and analyzed, future research can work to build on this case study of Carvin.

Conclusion

The role of media, especially networked digital technologies, in the wave of protests across the Middle East has provoked much debate. Cottle (2011) has noted that media and communication are "inextricably infused" (p. 648) with the Arab Spring, while Castells (2011) talked of the birth of "a new system of mass communication built like a mix between an interactive television, Internet, radio and mobile communication systems. The communication of the future has already been used by the revolutions of the present" (n.p.). Andy Carvin offers a case study of how a media professional operates within such a complex and fluid media system. Newman describes such professionals as "multi-media writers and curators, who can synthesize events in real-time with the best of the backchannel from social media" (2009, p. 10). Carvin's use of Twitter, while perhaps unique to him in some respects, points to the innovative forms of production that emerge in the initial stages of new communication technologies. The analysis of his choice of actor types and the frequency of citation suggest there was a new paradigm of sourcing at play.

Our study contributes to gatekeeping theory by combining multiple levels of analysis — the individual (Carvin) and social institutional (sources) — and acknowledging the agency and influence of key individual gatekeepers (Shoemaker & Vos, 2009, p. 134). Future studies would do well to take this further with an assessment of individual gatekeepers' sourcing routines, a la Mr. Gates (1950), in a digital media context. Our findings point to the emergence of a new style of near real-time gatekeeping, where journalists cite a potentially broader set of sources through social media. Other research into real-time reporting, in this case at Guardian.co.uk, found a greater use of primary sources than named media sources on live blogs compared to more established online hard news formats (Thurman & Walters, 2013). The open, distributed, and instantaneous nature of social media raises questions for the way journalists work, as they have limited time to process information and are unlikely to be the first to report the news. Papacharissi and de Fatima Oliveira posit that the conditions in which news flows on Twitter indicate the "presence of not just one, but several different paradigms of news reporting and journalism" (2012, p. 24).

Twitter is one of a range of social media technologies that privileges contribution, conversation, community and connectivity, compared to the hierarchical structures within established news organizations that set the parameters for most news work. Carvin, himself, has described his Twitter network as "my editors, researchers & fact-checkers. You're my news room" (Carvin, 2012). He has said his work is "another flavor of journalism," seeing himself as "another flavor of journalist" (quoted in Farhi, 2011). Our results lend some support to his comments, pointing to the potential of social media platforms to allow for different approaches to news reporting, reshaping journalism practices and influencing what is defined as journalism. In light of our findings, Carvin emerges as a central node in a networked media environment — one trusted to authenticate, interpret, and contextualize information flows on social awareness streams, drawing on a distributed and networked newsroom where knowledge and expertise are fluid, dynamic, and hybrid.

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Notes

1 Andy Carvin left NPR on December 27, 2013: http://www.andycarvin.com/?p = 1998

2 The dataset obtained from Carvin was a 199-megabyte text file that only offered limited adherence to CSV conventions, thereby preventing us from simply importing it into a statistical analysis package. After studying the file for patterns, we developed a Python script to isolate each individual tweet based on a set delimiter and create a separate file that included the date of the tweet (from Twitter), the body text of the tweet (from Twitter), the usernames of the sources mentioned in each tweet (text adjacent to each instance of the "@" character), whether a tweet was a retweet or not (based on the presence of "RT @"), and, if it was a retweet, the username of the source being retweeted (text adjacent to "RT @"). The resulting file was easier to analyze and import into spreadsheet software and statistical packages, and provided the researchers with insight not readily apparent in the dataset provided by Carvin. This approach is described in greater detail in another paper by Lewis, Zamith & Hermida (2013).

3 The Guardian offers a helpful timeline of these events: http://www.guardian.co.uk/world/interactive/2011/mar/22/middle-east-protest-interactive-timeline.

4 Because Carvin tweeted far more over the course of the Egyptian protests than he did throughout the Tunisian demonstrations, we opted to use a proportional threshold that would be indicative of the prominence of a source relative to the other sources mentioned in the given time period. A higher threshold would have resulted in a disproportionately low number of sources in the Egyptian sample, whereas a lower threshold would have resulted in a disproportionately high number of sources in the Egyptian sample. Thus, the 0.09% and 0.25% thresholds were found to yield the most comparable samples.

5 Only 3 sources appeared on all four top 25 lists: @dima_khatib, @monaeltahawy, @weddady. Eight sources appeared in some capacity (either as RT or non-RT) in both the Egypt and Tunisia list sets: @dima_khatib, @jeffjarvis, @jilliancyork, @mathewi, @monaeltahawy, @sultanalqassemi, @weddady, @wjchat.

6 For example, Ben Wedeman (@benncnn) was the second-most retweeted source for Egypt but did not make the top 25 of non-RT sources for the same period.

7 The distributions were skewed to the right on account of outliers; even with the removal of these outliers, along with other transformations, it was determined that the data would not meet the requirements for parametric statistical tests such as one-way ANOVA.

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