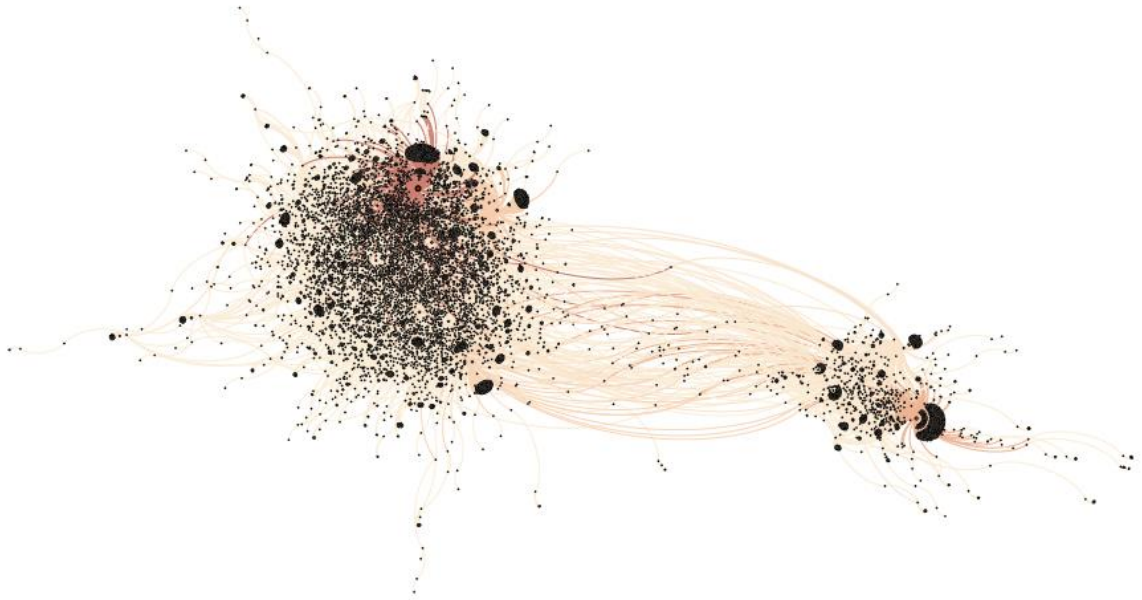
White S. Information Warfare in the Digital Age: A Study of #SyriaHoax. *Technology Science*. 2018111302. November 13, 2018. http://techscience.org/a/2018111302

Information Warfare in the Digital Age: A Study of #SyriaHoax

Sarah P. White

Highlights

- Examines the spread of two competing narratives on Twitter following the sarin gas attack in Syria in April 2017
- Finds that false narratives tend to spread via widely networked distribution nodes, many of which are amplifier accounts created for the express purpose of increasing activity around a particular hashtag
- Russian digital disinformation efforts are the result of new methods applied to old tactics, and tend to target online communities which have the greatest latent potential for agitation
- Future research would do well to explore the actual impact of such disinformation efforts on either popular opinion or leader decision-making



A Gephi visualization diagram showing the viral and explosive transmission of the #SyriaHoax story on Twitter over a four-day period

Abstract

This project documents the anatomy of a 21st-century influence operation through an examination of the spread of two Twitter hashtags, #SyriaHoax and #syriangasattack, in the aftermath of the sarin gas attack in Syria in April of 2017. Influence operations are intended to affect the perceptions and behaviors of leaders, groups, or entire populations through the manipulation and dissemination of information [1]. One of these hashtags originated with first responders in Syria, while the other originated within the Russian state media apparatus. What can we learn about information warfare in the 21st century by studying the proliferation of these two competing narratives on Twitter? Using R and the Twitter API, I collected tweets associated with the two competing hashtags #SyriaHoax and #syriangasattack from April 4th through April 8th. I then used Gephi, a data visualization and exploration program, to analyze the collected dataset, with an emphasis on understanding the most important distributive nodes in the spread of each narrative.

Results summary: The results of this experiment demonstrate that the false #SyriaHoax narrative spread more widely and more rapidly than its alternative. Russian-sponsored Twitter accounts played a significant role in the distribution pattern of the false narrative by directing the narrative toward conspiracy-minded, anti-globalist online communities that largely coincided with the American Alt-Right. This tactic is consistent with historic uses of Russian active measures, which foment discord by exploiting existing social and political fissures within targeted societies. As an example of contemporary Russian information

warfare, this project has significant implications for helping us understand how inform and influence campaigns proliferate in the digital age. Ultimately, while influence operations have been a part of politics and warfare since time immemorial, the digital media and individual communication devices of the present have created an expanded attack surface that allows nations, groups, and individuals to reach across borders and into populations in historically unprecedented fashion.

Introduction

At dawn on April 4th, 2017, Syrian fighter jets dropped chemical munitions on the Syrian town of Khan Al Shekhoun, injuring over 200 people and killing over 80 [2]. The attack sparked a Twitter storm that revolved around two competing narratives. One, represented by the #syriangasattack hashtag, supported the narrative that has since become international consensus, in which Syrian president Bashar al Assad ordered the use of a nerve agent against his own people [3][4]. The other, represented by the #SyriaHoax hashtag and supported by both the Russian and Syrian governments, claimed that the gas attack was a hoax perpetrated under a false flag. However, while international consensus was near-unanimous regarding the gas attack narrative, the #SyriaHoax hashtag spread at a significantly higher rate, and to significantly more people, than its more truthful counterpart, receiving over 40,000 interactions as compared to just over 3,600 over a 72-hour period. What accounts for the radically different proliferation patterns between these two narratives? How did the false narrative spread so much more widely and quickly than the true one? Moreover, what can this episode teach us about the latent potential of information warfare in the digital age?

Information warfare as a concept is as old as war itself, and yet its lack of definitional precision has lent confusion to nearly every attempt to systematically study it [5][6]. For the purposes of this paper, information warfare concerns the dissemination of propaganda in order to gain a competitive advantage over an opponent [7]. Information warfare typically involves the manipulation and dissemination of information to affect the perceptions and behaviors of leaders, groups, or entire populations. Information warfare therefore has both a technological component and a human component, with the former concerning the infrastructure used to store, transmit, and receive information and the latter concerning the perceptions surrounding information content.

Brunner and Cavelty broadly categorize the role of information in war into two different conceptual understandings: information as data processed and received through information technology, and information as a resource for shaping perception [8]. Both functions are well documented within the history of warfare. The ancient Greeks, for example, empowered with their vibrant civil society and rich mythological history, were among the first to master the art of information as propaganda to promote public support for specific military campaigns [9]. The famous episode of the Trojan horse was an early and masterful example of information

as deception, less for the horse itself than for the extensive web of lies that the Greeks had to weave in order to make the horse believable to the Trojans [10].

Information for the purpose of intelligence and communication — complementary principles that form today's concept of situational awareness — was practiced in noteworthy fashion by the 13th-century Mongols. Regularly outnumbered by their opponents in ratios as high as four to one, the Mongols nevertheless built the largest continental empire the world has ever seen by pursuing a complete dominance of battlefield information through superior speed of communication [11]. In the American Civil War, Union and Confederate generals employed practices of disinformation by using telegraph machines to send false orders to the enemy [12]. The advent of mechanized warfare in the early 20th century elevated the importance of disrupting the enemy's command, control, and communications as both a strategic and a tactical goal, a practice that the German *Blitzkrieg* doctrine exemplified [13].

While the advent of mechanized warfare brought an increased emphasis on targeting communications, it did so without fundamentally altering the historic role of information in war, or the purpose of information to war. In contrast, the information revolution of the latter half of the 20th century brought about a series of technological changes that dramatically altered the speed and the scope with which information could be collected, stored, processed, communicated, and presented. From approximately the late 1970s onward, information itself became a major strategic resource that restructured politics, economics, society, and war [14]. As communication technologies proliferated, the production and consumption of information decentralized, resulting in a diffusion of power well beyond traditional state borders and institutions that carried significant implications for the conduct of war [15].

This diffusion of communication technology threatened to change warfare in the same way that it changed society, through the proliferation of an information medium that is ubiquitous, instantaneous, and manipulable at the end-user level. As one scholar writes, "empowered by online tools and the emerging information ecosystems, people can now seek out their own information without relying upon journalists to filter, synthesize, and edit that content" [16]. The erosion of the media's traditional role as gatekeepers and the absence of credibility cues to differentiate true from false has led this alternative news ecosystem to become vulnerable to the spread of propaganda and disinformation. For example, Emilio Ferrara, a research assistant professor of computer science at the University of Southern California, concluded that more than 400,000 social bots posted more than 4 million tweets on the U.S. election between 16 September and 21 October of 2016 [17]. Researcher Sam Woolley of Oxford University found that "around 19 million bot accounts tweeted in support of either Trump or Clinton in the week leading up to Election Day" [18].

Evidence suggests that some countries have grasped this principle more quickly than others. For example, Russian use of digital technology to spread state-sponsored disinformation is well documented in security studies literature, with its meddling in the U.S. 2016 presidential

elections the most prominent example [19][20]. Russia's digitally enabled information warfare follows in the spirit of its historic doctrine of Active Measures, which are described as "semi-covert or covert intelligence operations to shape an adversary's political decisions" [21][22]. Relying upon Twitter bots and paid armies of trolls, these disinformation techniques represent a new form of information warfare that has allowed Russia to achieve strategic objectives in its former Soviet periphery and to reassert influence abroad [23]. While Western countries are eager to decry social-media manipulation and mass digital disinformation as part of a new "cyber" threat, it is noteworthy that the Russian conceptual framework does not have an equivalent phrase to this Western idea of cyberspace operations, nor even an independent word for "cyber" [24][25]. The concept is instead nested within the holistic umbrella of information warfare and special operations and is described in a type of forceful language — with explicit goals to "undermine," "destabilize," and "force" — that sharply contrasts with corresponding Western ideas of strategic influence [26]. Furthermore, Russia relies heavily on the use of nationally inspired civilians, loosely affiliated criminal syndicates, and armies of social media bots to increase the depth and breadth of its offensive cyber activity, a tactic of mass digital deception which Western nations have understandably been averse to embrace [27][28]. These relationships create a widely dispersed attack surface that has helped Russia expand its digital influence while circumventing the traditional problems of military inflexibility and personnel shortages that are common to national militaries [29].

Recent history is replete with examples of Russia exploiting this method [30][31][32][33][34][35][36]. During the 2014 annexation of Crimea, the Russian government spent more than $19 million to fund 600 people to constantly comment on news articles, write blogs, and operate throughout social media [37]. This online army was intended to generate an image of online popular support for Russian intervention by overwhelming the voices of dissidents and amplifying messages of pro-Russian solidarity. The state leveraged multiple media platforms to reach a cross-generational target population, with state-sponsored media outlets publishing stories that reinforced the fabricated viral videos and eyewitness accounts depicted on social media. In conjunction with this manipulation of narrative, Russian cyber attackers used distributed denial of service (DDoS) operations to create a communications blackout in the region. By cutting off the Ukrainian population from the rest of the world, this DDoS increased the prominence and the potency of the fabricated Russian narrative. Furthermore, the Russians employed a time-honored Soviet propaganda technique of using stories that exacerbated existing ethnic cleavages. In this case, the Russians created manufactured stories to fan the flames of hatred that the pro-Russian population of Crimea already held for their alleged Ukrainian occupiers.

In Crimea, Russia showed the effectiveness of social media as a weapon system in the cyber domain. Russian information operations waged through social media supported the achievement of a conventional occupation of Crimea with minimal outside interference or opposition [38][39]. The Russians demonstrated that, with proper methods, targets, and tempo, social media have the potential to manipulate the outcome of a complex engagement. The recent Syrian gas attack, and the subsequent Twitter storm that followed,

is the latest in a long campaign of Russian digital influence, and as such offers an insightful look into the anatomy of information warfare in the internet age.

Background

Numerous scholars and research groups have studied how narrative spreads on Twitter and other social media platforms. One of the foundational works from a methodological standpoint was the 2013 paper published by Gary King, Jennifer Pan, and Molly Roberts [40]. Examining the purpose of Chinese censorship, these researchers devised a system to locate, download, and analyze the content of millions of social media posts originating from nearly 1,400 different social media services in China before the Chinese government was able to censor them. They determined that the purpose of Chinese censorship is not to suppress criticism of the Communist Party, but rather to reduce the probability of collective action. Of note, the data-scraping methods used in this project were able to overcome two significant limitations in any study of Chinese social media: the Great Fire-wall of China, which disallows entire websites from operating inside the country, and "keyword blocking," which stops a user from posting text that contains certain banned words or phrases. King et al. were able to bypass these censorship methods by employing highly automated collection procedures, the details of which were not disclosed in their paper for obvious reasons.

Kate Starbird, of the University of Washington, has also published research on what she has termed the "alternative media ecosystem," in which she looks specifically at how alternative narratives are created, shared, and consumed [41]. Starboard defines "alternative narrative" as an explanation of the causes of man-made disaster that runs counter to the mainstream narrative. Also called conspiracy theories, such narratives prove difficult to dislodge once believed. Using the Twitter Streaming API over a ten-month period, Starbird's team collected 58 million total tweets, then further scoped the data to include only tweets related to alternative narratives of an event. The alternative narrative data set contained 99,474 tweets. Starbird determined that many of the alternative tweets followed a particular format, in which they leveraged uncertainty through the form of a leading question to present a counter-factual theory. Starbird also found that different alternative narratives were connected across different users and sites, with the suggestion that the "production of these narratives is a distributed activity where successful elements of one narrative are combined with others in a mutually reinforcing manner." For example, Starbird determined that the two most highly tweeted domains, The Real Strategy and InfoWars, were both associated with significant "bot" activity. Starbird also found that alternative narratives spread among domains from both sides of the U.S. left-right political spectrum, united by anti-globalist themes with varying degrees of social liberalism or conservatism.

Finally, the Atlantic Council's Digital Forensics Research Lab (DFR) is engaged in an ongoing effort to follow conflicts in real time. Using publicly available information , the DFR Lab traces patterns of disinformation through forensic analysis of related activity on Twitter [42]. Most recently, the lab connected trending support for France's Marine Le Pen on Twitter to just a

handful of hyperactive accounts that have cleverly disguised their activity to look like a grassroots movement [43]. These accounts, some of which are either partially or fully automated bots, rapidly flood Twitter with pre-prepared memes and hashtags. Of note for this project, DFR was also the first to publicly document the connection between U.S. Alt-Right accounts and the Syria hoax narrative [44].

Methods

This project employed a mixed-method approach to analyzing data, blending qualitative, quantitative, and visual methods to identify themes and patterns within my dataset. My research proceeded in three phases: data collection, data visualization, and data analysis. I relied on R Studio, Gephi, and the Twitter API to collect and analyze the dataset.

Phase 1: Data Collection

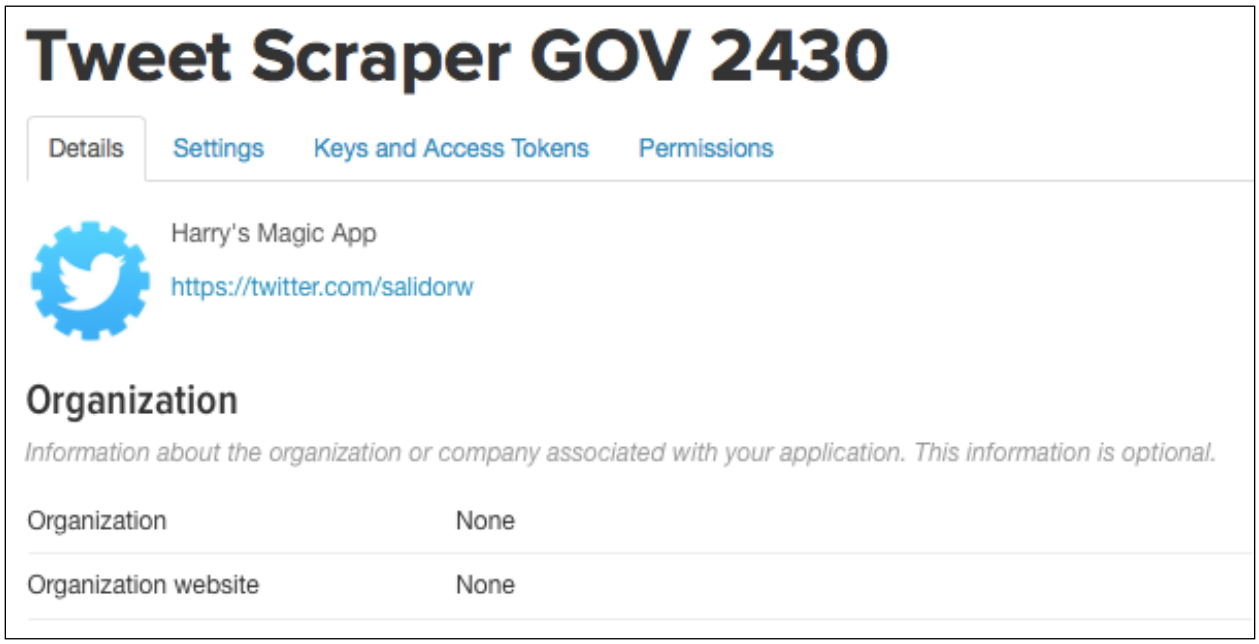


Figure 1. Twitter API

For data collection, I used the Twitter API to create a Tweet scraper [45]. Using the R packages "twitteR" and "ROAuth," I first collected all tweets associated with #SyriaHoax between the morning of April 4th and the evening of April 7th. This was an iterative process, as the Twitter API restricts the maximum number of tweets one may collect at a time to approximately 5,000. I compiled these tweets into data frames with several different columns of variability: text, favorited, favoriteCount, created, id, statusSource, screenName, retweetCount, isRetweet, and retweeted. I then converted the data frames into .csv files for longer-term storage and analysis. I repeated this process for #syriangasattack over the same

time period. This method resulted in the collection of 40,325 total #SyriaHoax tweets and 3,619 #syriangasattack tweets. See appendix for R code.

```r
setwd("~/Dropbox/Projects/Text Analysis")
install.packages("twitteR")
install.packages("ROAuth")
library(twitteR)
library(ROAuth)

# Set API Keys
#For searches
api_key <- "YtG4gpHzWEgGqdCr1DW4xYpl4"
api_secret <- "P5kUZ8YylljPLeQhf5xLEyDjwnqHESQzIpoJ070hLFchRuwDjQ"
access_token <- "747597911786127360-hozUozIvhVXJRmQoO51NuKUla2F2Qz7"
access_token_secret <- "7fcfUMwVYMgsguknZ3VWvWIBzRpM0IVJSg3ROhadEwh0r"
setup_twitter_oauth(api_key, api_secret, access_token, access_token_secret)
```

```r
# DF Method

tweets.df2 <- twListToDF(tweets2)
tweets.df22 <- twListToDF(tweets2)
tweets.df222 <- twListToDF(tweets2)
tweets.df2222 <- twListToDF(tweets2)

# GOVERNMENT ACCOUNTS
tweets.df.hoax <- rbind(tweets.df, tweets.df1)
tweets.df.gas <- rbind(tweets.df2, tweets.df22, tweets.df222, tweets.df2222)

# create csv files for data frames
write.csv(tweets.df.hoax, "hoax.csv")
write.csv(tweets.df.gas, "gas.csv")
```

```r
# Create a dataframe with only the retweets
hoaxrt <- tweets.df.gas[which(tweets.df.gas$isRetweet==T),]

# Create an empty dataframe for the info you want about the rts, can change ncol if want to add more info
rt.df <- as.data.frame(matrix(ncol=4, nrow=nrow(hoaxrt)))

require(stringr)
for (i in 1:nrow(hoaxrt)){
  # get tweet text for the tweet
  twit <- hoaxrt$text[i]
  # get retweet source, this extracts the handle for the retweeted account
  poster <- str_extract_all(twit,"(RT|via)((?:\\b\\W*@\\w+)+)")
  #remove ':', often in the retweet
  poster <-  gsub(":", "", unlist(poster))[1]
  # put the name of retweeted user in the first columns of the dataframe
  rt.df[i,1] = gsub("(RT @|via @)", "", poster, ignore.case=TRUE)
  # screenname for the sender of the retweet
  rt.df[i,2] <- as.character(hoaxrt$screenName[i])
  # time that the retweet was sent
  rt.df[i,3] <-  as.character(hoaxrt$created[i])
  #The number of retweets that the retweet received
  rt.df[i,4] <-  as.character(hoaxrt$retweetCount[i])
}

# Target = the original tweeter (the person who was retweeted)
# Source = the retweeter (did not author the original tweet)
colnames(rt.df)[which(names(rt.df) == "V1")] <- "Target"
colnames(rt.df)[which(names(rt.df) == "V2")] <- "Source"
colnames(rt.df)[which(names(rt.df) == "V3")] <- "created"
colnames(rt.df)[which(names(rt.df) == "V4")] <- "NRts"

# Write it as a csv so you can grab later
write.csv(rt.df, "gasRT2.csv")
```

Figure 2. R Code

Phase 2: Data Visualization

After collecting nearly 44,000 tweets and separating them by hashtag, I created data visualization products using a combination of R and the Gephi software. First, I created a new data frame for each hashtag that contained only the captured retweets, thus eliminating any singular tweets that did not propagate beyond their original user. This culling allowed me to focus my analysis on the key nodes of distribution for each narrative, without distraction from those tweets that did not spread. I then created an empty data frame that contained the four pieces of information of greatest concern to my analysis: the owner of the original tweet ("target"), the source of the retweet ("source"), when the retweet happened ("created"), and the number of times it was retweeted ("NRTs"). After converting the new data frame into a .csv file, I imported it into Gephi to begin nodal analysis.

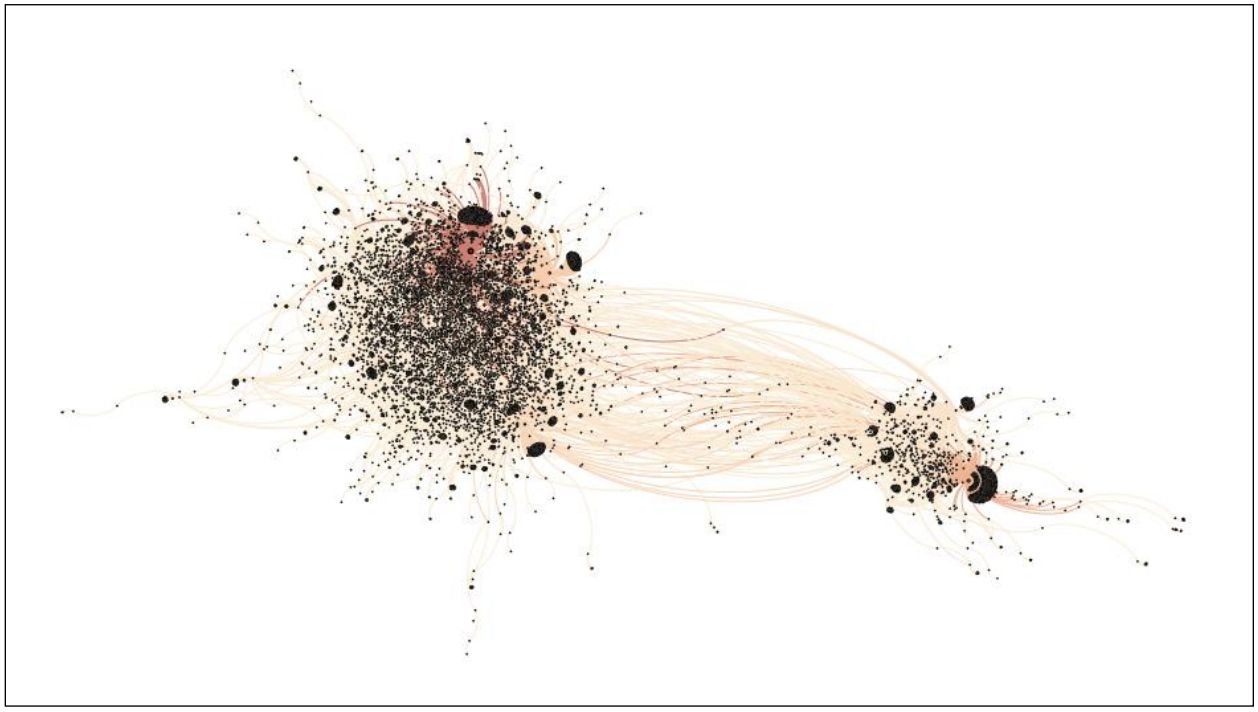


Figure 3. Gephi Visualization Diagram of Eigenvector Centrality, #SyriaHoax. This diagram shows the viral and explosive transmission of the #SyriaHoax story on Twitter over a four-day period. Each dot represents a single retweet, and each line represents a link between accounts. The mass on the left depicts the story's proliferation among Alt-Right oriented Twitter accounts, as initiated by user @cernovich. The mass on the right depicts the story's proliferation among far-left–oriented accounts, as initiated by user @RVAwonk.

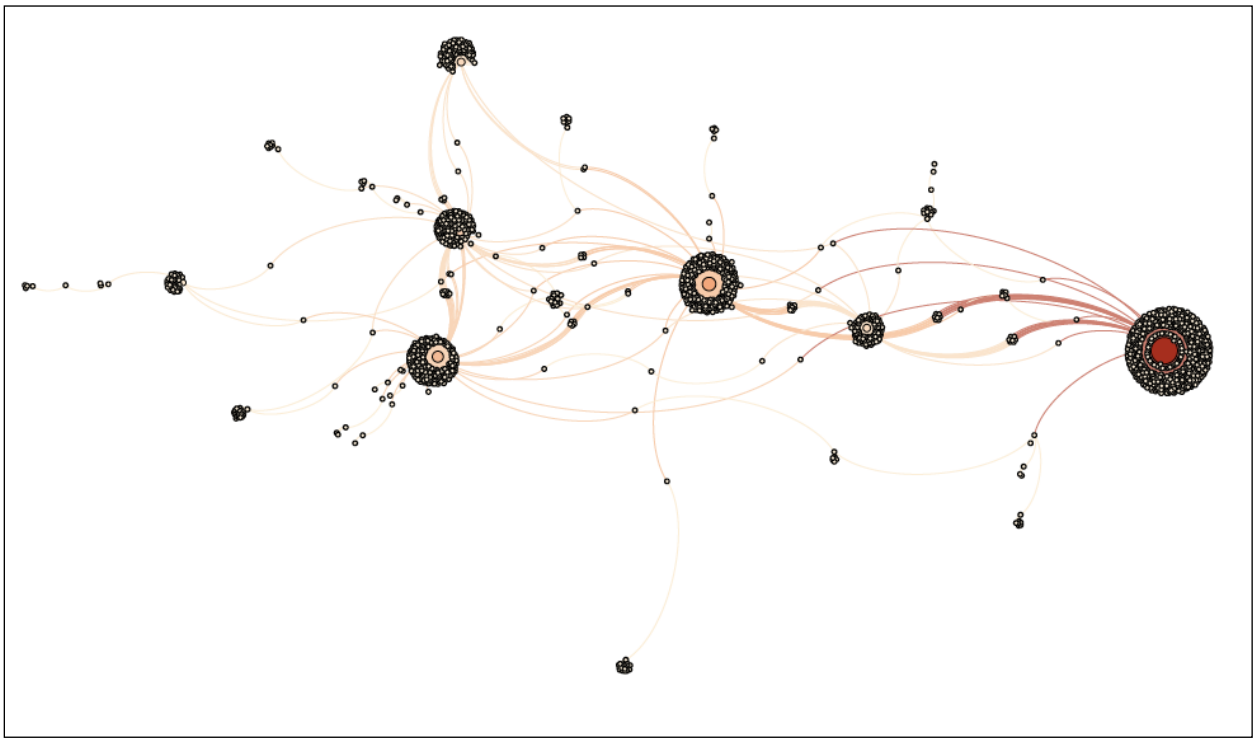


Figure 4. Gephi Visualization Diagram of Eigenvector Centrality, #syriangasattack. This diagram shows the more mundane pattern of proliferation for the truthful #syriangasattack story. The story was retweeted heavily among small bubbles of users but did not see the same exponential growth in activity as did its false #SyriaHoax counterpart.

The focus of my analysis within Gephi revolved around a concept called eigenvector centrality. Eigenvector centrality measures the influence of a node within a network by analyzing the extent to which nodes are connected to one another. It assigns relative scores to all nodes in a network on a scale of 0 to 1, with 1 representing the most influential node and 0 the least. Connections to high-scoring nodes contribute more to the score than connections to low-scoring nodes. One of the better-known examples of eigenvector centrality in practice is Google's PageRank, the algorithm used to rank the importance of website pages in Google search results [46]. Using Gephi's eigenvector centrality tools, I was able to rank order each dataset by the level of influence of each node, which then allowed me to identify those users most important to the spread of the narrative. I then created a visualization of this nodal influence using the Gephi visualization tool. I repeated these steps for each dataset.

Phase 3: Data Analysis

Armed with the Gephi products that enable visualization of what each narrative proliferation looked like, I then proceeded with the third, final, and arguably most important stage of analysis, in which I attempted to tell the story of how and why that proliferation occurred. This level of analysis required identifying the most influential personas in each distribution, gathering data on these personas via Twitter to attempt to assess their motivations and influences, and then nesting that data within the overarching geopolitical context in which each narrative spread. For example, how does a hashtag's lifespan on Twitter correlate to the lifespan of its corresponding narrative in major domestic and international media outlets? To what extent did the rise of the #SyriaHoax hashtag relate to the release of official Russian and Syrian statements?

A preliminary application of this analysis offers several interesting, and somewhat counter-intuitive, conclusions. For example, many of the most influential #SyriaHoax nodes belong to Alt-Right social media personalities who have no formal or overt connection to either Russian or Syrian geopolitical motives. What explains this pattern? Additionally, and especially interesting in light of this Alt-Right influence, the second most influential #SyriaHoax node belongs to a far-left–leaning social media personality who would otherwise have no connection to either Russia, Syria, or the Alt-Right. What does this pattern of proliferation within American social media personalities suggest about how false narratives spread? What does it say about Russian disinformation strategy? What can we learn about inform and influence campaigns in the 21st century from this case study? I attempt to answer these questions and more through a detailed analysis of the data.

Limitations

While my research was as comprehensive as I could make it given the timeframe of the project, there were several limitations to my research methodology that deserve further attention. First, the Twitter API that I used scrapes only a representative sample of all available tweets under an appointed hashtag [47]. It does not collect *all* tweets. This numerical limitation of the dataset will inherently make my conclusions speculative rather than definitive, based only on the trends that I see in my data sample rather than observed trends within the entire population. However, because the API collects tweets based on their relevance to the entire population, I am confident that my conclusions will be representative and generalizable.

An additional limitation concerns the time frame of my dataset. Ending my collection on 8 April allowed me to analyze only approximately 72 hours of the hashtags' lifespan, counting from approximately the time that the first instance of #SyriaHoax appeared on Twitter. While this 72- hour period saw admittedly explosive growth in the popularity of #SyriaHoax, it did not offer much insight as to whether, how, and to what extent the false narrative died. Future studies would do well to gather data on both the start and end of such narratives.

Finally, I had neither the time nor the programming savvy to conduct a thorough content analysis of the most influential Twitter accounts. My analysis of the top 20 #SyriaHoax accounts was based on a qualitative assessment of observable activity over an approximately one-month time span. I did not conduct similar analysis of the top #syriangasattack accounts, nor did I extend that analysis beyond the top 20 accounts of #SyriaHoax. Instead, I treated the more mainstream narrative #syriangasattack distribution as a control group in my comparative study, in order to assess how a false-narrative proliferation pattern compares to a true one. Future studies would do well to examine the comparative influence of bot and troll accounts within true narratives as well as false ones.

Results

My collection method resulted in the collection of 40,325 total #SyriaHoax tweets, and 3,619 #syriangasattack tweets. Using Gephi's measure of eigenvector centrality, I was able to verify the connection between Russian Twitter bots, alt-right accounts, and the false hashtag's spread in the U.S. A brief timeline of the hashtag's spread is as follows.

Initial reports of the gas attack began to appear on Twitter and YouTube just after 5 am local time on April 4th via medical first responders [48]. Later that afternoon, the Syrian-backed media outlet Al Masdar News (AMN) published the first story alleging that the gas attack was in fact a hoax, and that all social media postings to the contrary were reliant on recycled and staged pictures [49]. That evening, the Russian Federation Ministry of Defense posted their official statement of the attack on Facebook. In it, they stated that the alleged "gas attack" was a Syrian air strike on a terrorist weapon depot that contained numerous chemical munitions. Any social-media evidence to the contrary was false. Shortly thereafter, the first use of #SyriaHoax appeared on Twitter under a month-old, pro-Russian account with only 18 followers, "@magicpoledancer." This account has since been deactivated [50]. The hashtag began to trend on the morning of 5 April, with 40 accounts making over 3,000 tweets in a six-hour time span [51]. At around 3 pm on 5 April, the conspiracy theorist website "InfoWars" published a hoax story based almost entirely on the original AMN account. Both InfoWars and Alex Jones tweeted the story shortly thereafter, garnering over 700 retweets between them in a matter of hours.

At 16:14 UTC on 6 April, just over two days after the first reports of sarin gas, conspiracy theorist Mike Cernovich, of Pizza Gate fame [52], first used the #SyriaHoax hashtag, and it was at this point that the story truly went viral. Once fully enmeshed within Alt-Right conspiracy circles, #SyriaHoax generated over 20,000 posts between 16:00 and 22:00 UTC on 6 April. The story spread prolifically among both real and fake pro-Russian, pro-Trump, and anti-globalist accounts. By the evening of 6 April, #SyriaHoax was the number 2 trending hashtag on Twitter in the United States [53]. Among the top 20 most influential #SyriaHoax accounts, as analyzed according to the Gephi measure of eigenvector centrality, eight were bots or managed trolls, five were Alt-Right conspiracy theorists, and one was a far leftist online

personality. Figure 5 shows a summary of the top 20 accounts, in descending order of influence and color-coded by type.

Twitter Handle	Eigen	Name	Account Type	Content Type	Followers	Tweets	Active Since	Activity
Cernovich	1	Mike Cernovich	Real	Alt-Right, conspiratorial	261k	57.4k	Aug 2011	
RVAwonk	0.62	Caroline O.	Real	Far left	129k	46.9k	Jan 2014	
RealAlexJones	0.36	Alex Jones	Real	Conspiratorial	616k	32.2k	Jan 2010	
nia4_trump	0.32	"Nia"	Fake	Alt-Right, anti-globalism, nationalist, populist, supports Trump and Le Pen	48.3k	25.6k	Feb 2016	60 tweets/day
sahouraxo	0.27	Sarah Abdallah	Real (?)	Independent Lebanese journalist, Anti-MSM, pro-Putin/Assad/Trump	74.9k	1581	July 2015	
bakedalaska	0.23	Tim Gionet	Real	Alt-Right pro Trump nationalist. Internet troll. Former buzzfeed writer. Worked with Cernovich and Milo Y.	168k	38.9k	Jan 2010	
AngeloJohnGage	0.23	Angelo John Gage	Real	Anti-Islam, Alt-Right, anti-ISIS, lots of war tweets, nationalist	15.7k	27.9k	April 2014	
TrumpSuperPAC	0.21	N/A	Real	Pro-Trump, party line	48.2k	11.2k	Jan 2012	
ArmyofKek	0.17	Keks Army	Alt-Right	Extreme Alt-Right (racist/white supremacist/nationalist)	14.7k	16.4k	Sep 2015	
POLLiticss	0.14	POLLS	Likely Fake	Nationalist, anti-globalist, fear-mongering polls and statistics	33k	4745	Sep 2015	
America_1st_	0.14		Fake	Account deactivated	N/A	N/A	N/A	
DonaldPrezTrump	0.14		Fake	Account deactivated	N/A	N/A	N/A	
shhBec	0.14	Becky	Troll	European nationalist populist	1989	1214	March 2017	
cbn2	0.13	Michi	Real	Anti-Trump, partisan	3564	91.8k	Feb 2009	
BasedElizabeth	0.11	Elizabeth	Fake or troll	Alt-Right, nationalist, globalist	90.6k	12.4k	Apr 2016	31 tweets/day
KamVTV	0.11	Kambree Kawahinee Koa		"Proud no BS centrist" who writes only right wing/anti-globalist/one-sided	28.9k	57.4k	Oct 2015	100 tweets/day
activist360	0.11	Bill Madden	Real	Singer-songwriter, activist	87k	26.6k	Aug 2011	
Suziechka	0.1	Skippy Molesta	Fake	Pro-Russian far right; deactivated	N/A	10.3k	N/A	
TEN_GOP	0.1	Tennessee GOP	Real	Unofficial TN GOP fan page	8868	111k	Nov 2015	
RepStevenSmith	0.09							

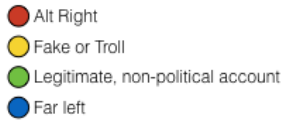


Figure 5. Top 20 Most Influential Twitter Accounts, #SyriaHoax. The measures of eigenvector centrality listed among the top 20 most influential Twitter accounts in Figure 5 reflect a viral model of distribution: multiple, highly influential accounts with overlapping circles of followers who display a high level of retweet activity. Also note the patterns of suspicious activity, highlighted in yellow: accounts created in 2015 or later, and accounts which reflect a suspiciously high volume of activity.

1	Twitter ID	Eigenvector
2	Lrihendry	1.00
3	Partisangirl	0.43
4	Ian56789	0.30
5	RussiaInsider	0.18
6	liberatethis	0.13
7	YoungDems4Trump	0.13
8	Pappiness	0.05
9	freedomrideblog	0.05
10	haaretzcom	0.02
11	LvsPnthers	0.02
12	heartdaughter	0.02
13	Russ_Warrior	0.02
14	BinsackSb	0.02
15	azmoderate	0.01
16	pessell_anna	0.01
17	ajitjogi_cg	0.01
18	ForeignPolicy	0.01
19	andreassoridis @Ironwand	0.01
20	KMGVictoria	0.01

Figure 6. Eigenvector Centrality of the Top 20 Most Influential Twitter Accounts, #syriangasattack. In contrast to Figure 5, notice the sharp decrease in eigenvector centrality after the top three most influential accounts. This reinforces the distribution pattern in which multiple accounts of only moderate influence spread the hashtag to multiple, disparate, non-overlapping circles of followers. This pattern does not reflect a viral distribution.

The distribution model of #SyriaHoax contrasts sharply with the distribution model of #syriangasattack. The best way to demonstrate this contrast is by examining the Gephi visualization of eigenvector centrality for each hashtag. As you can see from Figure 3, #SyriaHoax contains all the markings of a viral explosion of activity, launched by several highly influential accounts of gradually descending influence (as depicted in the two opposing dense masses) that are connected to a high number of followers. These accounts then spread the hashtag further to create multiple networks of overlapping influence. Each black dot in the Gephi diagram depicts a single user's retweet of the hashtag. The larger and darker the dot, the more influential the user, as measured in the number of retweets that

originated with that user account. Furthermore, the lines between various nodes of activity represents a retweet-link between user circles of influence. So, for example, the largest blob on the right side of Figure 3 represents the most influential account among far-left political circles, the left-leaning @RVAwonk. In contrast, the large explosion of activity on the left-hand side represents the many interconnected accounts associated with the Alt-Right, starting with Alex Jones, InfoWars, and Mike Cernovich. In contrast, #syriangasattack was distributed in a more limited fashion via fewer distribution nodes of sharply decreasing influence. As depicted in the diagram, the hashtag spread to multiple small, non-overlapping networks, and did not result in a viral explosion of activity as did #SyriaHoax.

Discussion

The #SyriaHoax hashtag carries several markings of a Russian disinformation campaign: it was started by questionable sources, supported by the official Russian state narrative, and spread by accounts of dubious origin marked by suspicious activity. DFR Lab highlights three central characteristics of political bots on Twitter: activity, amplification, and anonymity [54]. Political bots exist to promote messages, which means that the higher the level of activity, the more likely it is that a Twitter account is a bot. One can affirm this metric by comparing an account's number of tweets with when it was created, in order to calculate roughly how often the account tweets or likes per day. DFR suggests that any account with more than 72 engagements per day over an extended period of time should be regarded as suspicious. Furthermore, those accounts whose activity consists primarily of retweeted, rather than original, content should also be viewed with suspicion. Finally, accounts that attempt to maintain a high degree of anonymity, such as providing a single false or animated profile picture, should also be regarded with suspicion. In summary, DFR Lab states that "an anonymous account which is inhumanly active and which obsessively amplifies one point of view is likely to be a political bot, rather than a human" [55].

Applying these standards to the top 20 most influential accounts within my #SyriaHoax retweet data set, we can identify eight accounts that are likely fake — in other words, they are either automated accounts or manned by individuals for the sole purpose of spreading disinformation. @nia4_trump fits all three categories of activity, anonymity, and amplification. It has averaged over 60 tweets per day since its recent activation in February 2016, most of which are retweets, and maintains an ambiguous, indistinct profile picture. @America_1st_, @DonaldPrezTrump, and @Suziechka, the 11th, 12th, and 18th most influential accounts, respectively, have since been deactivated, suggesting their singular purpose as amplifiers within an ongoing disinformation campaign. @KamVTV, the 16th most influential account, bills itself as a "no-BS centrist" who nevertheless tweets an exclusively anti-globalist, far-right perspective. Furthermore, this recently activated account tweets more than 100 times per day, suggesting it is supported by either paid or automated online activity. @BasedElizabeth and @shhBec, both activated within the last year, engage in significant retweeting activity using a combination of generic and anonymous profile and

banner pictures. Furthermore, both maintain a noticeable anti-globalist slant in their content.

In addition to these likely fake accounts, five of the top 20 — in fact, five of the top ten — most influential accounts belong to verified Alt-Right personalities. The single most influential account, @cernovich, belongs to widely known Alt-Right conspiracist Mike Cernovich, a friend to Alex Jones and the mastermind behind the so-called "Pizza Gate" child pornography scandal. @BakedAlaska belongs to an Alt-Right, pro-Trump nationalist named Tim Gionet. Interestingly enough, the story of Mr. Gionet's turn towards the Alt-Right reflects the increasingly lucrative pull of the fake news business [56]. According to one source, Mr. Gionet has taken to fomenting conspiracy theories on Twitter as a way to bolster his celebrity as an entertainment figure and to compensate for his previously failed career as a rapper [57].

What explains this undue influence of the Alt-Right in spreading the false flag story? And to what extent, if any, was this influence orchestrated by the Russian state? As Kate Starbird noted in her analysis of alternative media ecosystems on Twitter, such conspiracy theories tend to be spread by members of both the far left and far right who support an anti-globalist worldview, and who are therefore suspicious of any hint of globalist conspiracy. One can see how the false flag narrative of #SyriaHoax broadly aligns with the Alt-Right's "crusade against establishment politics and perception of the US as a globalist, imperialist power working on behalf of liberal elites" [58].

Furthermore, the distribution pattern of #SyriaHoax captured by Gephi supports Starbird's claim that such conspiracy theories become deeply entrenched in the minds of those who believe in them due to what Sunstein and Vermeule term a "crippled epistemology" resulting from limited information sources [59]. As Starbird states, "this crippled epistemology may be exacerbated by the false perception of having a seemingly diverse information diet that is instead drawn from a limited number of sources." In this case, that limited number of sources constitutes a single article derived from fabricated evidence and published on a deliberately biased, pro-Assad news company. This article was simply reworded, repackaged, and recirculated as original content by a number of conspiracy-minded websites [60]. Members of the anti-globalist, anti-imperialist, pro-nationalist Alt-Right, already wary of the mainstream media establishment to begin with, latched onto these alternative news outlets as a seemingly diverse example of true, non-biased narrative, likely unaware that they all recycled the same falsified evidence to a fabricated story.

What can we learn about both disinformation and so-called "fake news" from the pattern of activity identified in this project? First, the dramatically anti-globalist slant of many of the fake accounts in my #SyriaHoax dataset suggest that Russian disinformation schemes have realized the utility of both the Alt-Right and Alt-Left as amplifiers of influence. Echoing the recent Crimean example, it appears that the Russians target the American Alt-Right and the European far right as conspiracy-minded populations that are ripe for agitation and social fissure. While #SyriaHoax began with a bot account of Russian origin, the campaign was

designed to make its way into the U.S. Alt-Right community through various bots that distributed a prolific amount of Alt-Right clickbait. Once the story wound up in Alt-Right circles, it exploded in popularity based on the influence of actual Alt-Right personalities who were eager to advocate for the latest anti-globalist conspiracy regardless of said conspiracy's original source.

This study does not attempt to address the question of whether the legitimate Alt-Right accounts that helped further the spread of #SyriaHoax were explicitly directed to do so by elements of the Russian state, but future research would do well to explore this potential link. It would also be useful to examine what percentage of these Alt-Right accounts are fake and what percentage are real. Such research would help to determine the extent to which this movement is a legitimate threat, rather than simply the American version of a manufactured threat designed by Russian propagandists who are eager to foment discord within an already volatile American political landscape.

Additionally, we can learn that it is not actually that difficult to ascertain for oneself which Twitter accounts are real and which are fake. Armed with the tripartite criteria of activity, amplification, and anonymity, the average Twitter user can easily screen the veracity of stories by assessing the extent to which its most highly trending users fit this bot criteria. Fake news cannot be easily stopped at the systemic level without trending dangerously toward information censorship. Instead, it should be stopped and reported at the user level by arming average citizens with simple tools of account verification.

Furthermore, it is important to note that the context of one's tweet does not matter in the battle against fake news, disinformation, and alternative narrative. For example, many of the retweets associated with @RVAwonk, the far leftist and the second most influential distribution node of #SyriaHoax, were simply calling attention to what this individual suspected was a false narrative. However, as the Gephi diagram demonstrates, the simple act of retweeting had distributive repercussions well beyond the intent of the tweet. Even though these actors recognized that the narrative was false, the act of retweeting it made them unwitting abettors of a Russian disinformation campaign by causing the story to trend into a more diverse viewership. This principle was also fast at work in the recent Russian Facebook campaign meant to influence the 2016 U.S. presidential elections. That campaign took advantage of the fact that Facebook rewards engaging content, which means the content that receives shares, comments, likes, and clicks will rise to the top of one's news feed regardless of whether the feedback on that content is positive or negative [61]. Once the content reaches the right community and gets more engagement, its original source — in this case, Russia — would no longer need to spend time and effort attempting to guide its movement, as it takes on a life of its own.

Finally, this research suggests the urgent need for a concerted, unified strategy for concerned nations to combat Russian disinformation. Discussions within the American military [62] and within NATO [63] are ongoing on how to counter this threat [64], yet thus far these talks have

produced little in the way of an operationalizable strategy. Within both military [65] and private [66] cyber circles, the task of countering online ISIS recruitment and pro-ISIS propaganda gets far more attention than the task of countering the more long-term, strategic threat of Russian disinformation. However, the methods for accomplishing both are largely the same. The cyber community would do well to devote a portion of its talent to the strategic problem of Russian digital influence. Enabled by the internet, social media, and a thorough understanding of social engineering, Russian information warfare in the 21st century presents a sinister threat to Western values that deserves commensurate strategic attention.

Appendix 1: Diagrams, R Code, and Figures

Figure 1 ….. Twitter API Image

Figure 2 ….. R Code

Figure 3 ….. Gephi Diagram #SyriaHoax

Figure 4 ….. Gephi Diagram #syriangasattack

Figure 5 ….. Most Influential Twitter Accounts #SyriaHoax

Figure 6 ….. Eigenvector Centrality of the Most Influential Twitter Accounts #syriangasattack

Appendix 2: Attachments

Attachment 1 ….. R Code

Attachment 2 ….. #syriangasattack retweet .csv file

Attachment 3 ….. #syriangasattack eigenvector .csv file

Attachment 4 ….. #syriangasattack retweet nodes .csv file

Attachment 5 ….. #syriangasattack eigenvector values pdf file

Attachment 6 ….. #syriangasattack Gephi diagram

Attachment 7 ….. #SyriaHoax retweet .csv file

Attachment 8 ….. #SyriaHoax retweet nodes .cvs file

Attachment 9 ….. #SyriaHoax eigenvector and analysis pdf file

Attachment 10 ….. #SyriaHoax Gephi diagram

References

1. See RAND Topics: Information Operations, for discussion of definitions of influence operations. Accessed at: https://www.rand.org/topics/information-operations.html

2. Chulov, M., and Shahdom K. Syria Chemical Weapons Attack Toll Rises to 70 as Russian Narrative is Dismissed. The Guardian. 5 April 2017. Accessed at: https://www.theguardian.com/world/2017/apr/04/syria-chemical-attack-idlib-province

3. Campos, Rodrigo. Syrian Government to Blame for April Sarin Attack: UN Report. Reuters. 26 October 2017. Accessed at: https://www.reuters.com/article/us-mideast-crisis-syria-un/u-n-report-finds-syria-government-to-blame-for-april-sarin-attack-idUSKBN1CV3GP

4. Both ISIL and Syrian Government Responsible for Use of Chemical Weapons, UN Security Council Told. UN News. 7 November 2017. Accessed at: https://news.un.org/en/story/2017/11/570192-both-isil-and-syrian-government-responsible-use-chemical-weapons-un-security

5. McClintock, Bruce. Russian Information Warfare: A Reality that Needs a Response. 21 July 2017. RAND Corporation. Accessed at: https://www.rand.org/blog/2017/07/russian-information-warfare-a-reality-that-needs-a.html

6. Armstrong, Matthew. No, We Do Not Need to Revive the US Information Agency. 12 November 2015. War on the Rocks. Accessed at: https://warontherocks.com/2015/11/no-we-do-not-need-to-revive-the-u-s-information-agency/

7. Information Operations. RAND Corporation. Accessed at: https://www.rand.org/topics/information-operations.html

8. Brunner, E.M. and Cavelty, M.D. The Formation of Information by the U.S. Military: Articulation and Enactment of Infomanic Threat Imaginaries on the Immaterial Battlefield of Perception. Cambridge Review of International Affairs 22:4. 2009.

9. Taylor, P. Munitions of the Mind. Manchester University Press. 2009. 31.

10. Hill, C. Grand Strategies. Yale University Press. 2011. 35.

11. Arquilla, J., and Ronfeldt, D. Cyberwar Is Coming!" From In Athena's Camp: Preparing for Conflict in the Information Age. RAND Corporation. 1997.

12. Kaplan, F. Dark Territory: The Secret History of Cyberwar. Simon and Schuster. 2016. 4

13. Arquilla, J., and Ronfeldt, D. "Cyberwar is Coming!" From In Athena's Camp: Preparing for Conflict in the Information Age. RAND Corporation. 1997.

14. Arquilla, J., and Ronfeldt, D. In Athena's Camp: Preparing for Conflict in the Information Age. RAND Corporation. 1997.

15. Bobbitt, Philip. Terror and Consent: The Wars for the 21st Century. 2009. New York: Anchor Books

16. Starbird, K. Explaining the Alternative Media Ecosystem Through the Production of Alternative Narratives of Mass Shooting Events on Twitter. Association for the Advancement of Artificial Intelligence. 2017.

17. Ferrara, E. Twitter Bots Pollute Public's Understanding of Politics. Newsweek. 13 November 2016. Accessed at: http://www.newsweek.com/twitter-bots-pollute-public-understanding-519851

18. Woolley, S. Resource for Understanding Political Bots. Political Bots: Project on Algorithms, Computational Propaganda, and Digital Politics. 18 November 2016. Accessed at: http://comprop.oii.ox.ac.uk/2016/11/18/resource-for-understanding-political-bots/

19. Stamos, Alex. An Update On Information Operations On Facebook. 6 September 2017. Facebook Newsroom. Accessed at: https://newsroom.fb.com/news/2017/09/information-operations-update/

20. Chen, Adrien. The Agency. 2 June 2015. The New York Times. Accessed at: https://www.nytimes.com/2015/06/07/magazine/the-agency.html?_r=0

21. Rid, Thomas. Disinformation: A Primer in Russian Active Measures and Influence Campaigns. Hearings before the Select Committee on Intelligence, United States Senate. 30 March 2017. Accessed at: https://www.intelligence.senate.gov/sites/default/files/documents/os-trid-033017.pdf

22. Snegovaya, Maria. "Putin's Information Warfare in Ukraine: Soviet Origins of Russia's Hybrid Warfare." September 2015. Institute for the Study of War.

http://www.understandingwar.org/report/putins-information-warfare-ukraine-soviet-origins-russias-hybrid-warfare

23. Giles, Keir. "The Next Phase of Russian Information Warfare." NATO Strategic Communications Center of Excellence. https://www.stratcomcoe.org/next-phase-russian-information-warfare-keir-giles

24. Military Doctrine of the Russian Federation. English translation, author unknown. 5 February 2010. Original source accessed at: http://carnegieendowment.org/files/2010russia_military_doctrine.pdf, with additional analysis found at: http://www.conflictstudies.org.uk/files/MilitaryDoctrine_RF_2010.pdf

25. Giles, K. Russia's 'New' Tools for Confronting the West: Continuity and Innovation in Moscow's Exercise of Power. Russia and Eurasia Programme. 2016. 9

26. Thomas, T. Russia's 21st Century Information War: Working to Undermine and Destabilize Populations. Defense Strategic Communications: The Official Journal of the NATO Strategic Communications Center of Excellence. 2015.

27. Giles, Keir. "The Next Phase of Russian Information Warfare." NATO Strategic Communications Center of Excellence. https://www.stratcomcoe.org/next-phase-russian-information-warfare-keir-giles

28. Klimburg, A. Mobilising Cyber Power. Survival. 53:1, 41-60. 2011.

29. Ibid.

30. Caryl, C. If You Want to See Russian Information Warfare at its Worst, Visit These Countries. Washington Post. 5 April 2017. Accessed at: https://www.washingtonpost.com/news/democracy-post/wp/2017/04/05/if-you-want-to-see-russian-information-warfare-at-its-worst-visit-these-countries/?utm_term=.a223e40f2120

31. Deibert, Ronald J. Cyclones in Cyberspace: Information Denial and Information Shaping in the Russia-Georgia War. Security Dialogue 43(1) (2012): 3-24

32. Blank, Stephen. "We Have No Counterattack to Russia's Information Warfare." The Hill. 27 Nov 2017. https://thehill.com/opinion/international/361897-we-have-no-counterattack-to-russias-information-warfare.

33. Standish, Reid. “Why is Finland Able to Fend off Putin’s Information War?” 1 March 2017. Foreign Policy. Accessed at: https://foreignpolicy.com/2017/03/01/why-is-finland-able-to-fend-off-putins-information-war/.

34. Faiola, Anthony. “As Cold War Turns to Information War, A New Fake News Police Combats Disinformation.” The Washington Post. 22 Jan 2017. https://www.washingtonpost.com/world/europe/as-cold-war-turns-to-information-war-a-new-fake-news-police/2017/01/18/9bf49ff6-d80e-11e6-a0e6-d502d6751bc8_story.html?utm_term=.fa494581fcd1&wpisrc=nl_draw&wpmm=1.

35. Collier, Corey M. “Latvia in the Crosshairs: Russian Information Warfare and Appropriate Countermeasure.” Small Wars Journal. http://smallwarsjournal.com/jrnl/art/latvia-in-the-crosshairs-russian-information-warfare-and-appropriate-countermeasures.

36. Branford, Becky. “Information Warfare: Is Russia Really Interfering in European States?” BBC News. 31 March 2017. https://www.bbc.com/news/world-europe-39401637

37. Holloway, M. How Russia Weaponized Social Media in Crimea. The Strategy Bridge. 10 May 2017. Accessed at: https://thestrategybridge.org/the-bridge/2017/5/10/how-russia-weaponized-social-media-in-crimea

38. Conversation with Natalia Antelava, CEO of Coda Story. 16 June 2017.

39. Pomerantsev, Peter, and Michael Weiss. The Menace of Unreality: How the Kremlin Weaponizes Information, Culture, and Money. 2014. Institute for Modern Russia. Accessed at: https://imrussia.org/media/pdf/Research/Michael_Weiss_and_Peter_Pomerantsev__The_Menace_of_Unreality.pdf

40. King, G., Pan, J., and Roberts, M. How Censorship in China Allows Government Criticism But Silences Collective Expression. American Political Science Review. 2013.

41. Starbird, K. 2017

42. DFR Lab Website. Accessed 20 April 2017. Accessed at: https://medium.com/dfrlab/about

43. Robins-Early, N. Far Right Bots are the Secret of Marine Le Pen’s Social Media Boom. Huffington Post. 7 March 2017. Accessed at: http://www.huffingtonpost.com/entry/marine-le-pen-bots-

twitter_us_58bc21c1e4b05cf0f40125d6?tihpjhu812wk2fn7b9

44. Nimmo, B., and Barojan, B. How the Alt-Right Brought #SyriaHoax to America. DFR Lab via Medium. 7 April 2017. Accessed at: https://medium.com/dfrlab/how-the-alt-right-brought-syriahoax-to-america-47745118d1c9

45. Oppenheimer, Harry, Harvard PhD Candidate, helped tremendously with my R code and Gephi analysis.

46. Austin, D. How Google Finds Your Needle in the Web's Haystack. American Mathematical Society. Accessed 18 April 2017. Accessed at: http://www.ams.org/samplings/feature-column/fcarc-pagerank

47. Conversation with Jim Waldo, 2 May 2017, Harvard University.

48. Twitter Webpage. Accessed 15 April 2017. Accessed at: https://twitter.com/DrShajulIslam/status/849145690613833728

49. Antonopoulos, P. Jumping to Conclusions: Something is Not Adding Up in Idlib Chemical Weapons Attack. AMN. 4 April 2017. Accessed at: https://mobile.almasdarnews.com/article/jumping-conclusions-something-not-adding-idlib-chemical-weapons-attack/

50. Twitter Webpage. Accessed 9 May 2017. Accessed at: https://twitter.com/Magicpoledancer. The original tweet activity also appears in my dataset.

51. Bertrand, N. From Al-Masdar to InfoWars: How a Pro-Assad Conspiracy Theory Got Picked up by the Far Right. Business Insider. 8 April 2017. Accessed at: http://www.businessinsider.com/syriahoax-conspiracy-alex-jones-infowars-syria-trump-hoax-2017-4

52. Wendling, M. The Saga of 'Pizzagate:' The Fake Story that Shows How Conspiracy Theories Spread. BBC News. 2 December 2016. Accessed at: http://www.bbc.com/news/blogs-trending-38156985

53. Collins, B. Alt Right Turns on 'Neo-Con Puppet' Trump After Bombing Syria. The Daily Beast. 6 April 2017. Accessed at: http://www.thedailybeast.com/articles/2017/04/06/wielding-a-russian-talking-point-alt-right-demands-president-trump-lay-off-syria.html

54. Nimmo, B. Human, Bot, or Cyborg? Three Clues that Can Tell You if a Twitter User is Fake. Medium. 23 December 2016. Accessed at: https://medium.com/@DFRLab/human-bot-or-cyborg-41273cdb1e17

55. Ibid.

56. Subramanian, S. The Macedonian Teens Who Mastered Fake News. Wired Magazine. 15 February 2017. Accessed at: https://www.wired.com/2017/02/veles-macedonia-fake-news/

57. Darcy, O. The Untold Story of Baked Alaska, a Rapper Turned Buzzfeed Personality Turned Alt-Right Troll. Business Insider. 30 April 2017. Accessed at: http://www.businessinsider.com/who-is-baked-alaska-milo-mike-cernovich-alt-right-trump-2017-4

58. Bertrand, N. From Al-Masdar to InfoWars: How a Pro-Assad Conspiracy Theory Got Picked up by the Far Right. Business Insider. 8 April 2017. Accessed at: http://www.businessinsider.com/syriahoax-conspiracy-alex-jones-infowars-syria-trump-hoax-2017-4

59. Sunstein, C. R., & Vermeule, A. Conspiracy theories: Causes and cures. Journal of Political Philosophy, 17(2), 202-227. 2009.

60. Nimmo, B., and Barojan, B. How the Alt-Right Brought #SyriaHoax to America. DFR Lab via Medium. 7 April 2017. Accessed at: https://medium.com/dfrlab/how-the-alt-right-brought-syriahoax-to-america-47745118d1c9

61. Saari, Aaron. Russia's $100,000 Facebook Spend Could Have Easily Reached 100 Million Americans. Business Insider. 8 September 2017. Accessed at: http://www.businessinsider.com/russia-targeting-americans-on-facebook-2017-9

62. Gallagher, S. DoD Needs Cyber Warriors So Badly It May Let Skilled Recruits Skip Boot Camp. ArsTechnica. 9 May 2017. Accessed at: https://arstechnica.com/information-technology/2017/05/dod-needs-cyberwarriors-so-bad-it-may-let-skilled-recruits-skip-boot-camp/

63. Gramer, R. Can NATO Weaponize Memes? Foreign Policy. 2017.

64. Holmstrom, M. The Narrative and Social Media. Defense Strategic Communications: The Official Journal of the NATO Strategic Communications Centre of Excellence. Vol 1 Number 1. 2015.

65. Nakashima, E., and Ryan, M. U.S. Military Has Launched a New Digital War Against the Islamic State. Washington Post. 15 July 2016. Accessed at: https://www.washingtonpost.com/world/national-security/us-militarys-digital-war-against-the-islamic-state-is-off-to-a-slow-start/2016/07/15/76a3fe82-3da3-11e6-a66f-aa6c1883b6b1_story.html?utm_term=.c7f6a1c7e795

66. Greenberg, A. Google's Clever Plan to Stop Aspiring ISIS Recruits. Wired Magazine. 7 September 2016. Accessed at: https://www.wired.com/2016/09/googles-clever-plan-stop-aspiring-isis-recruits/

Authors

Captain Sarah P. "Sally" White is a cyberspace operations officer in the U.S. Army. She is currently a PhD candidate in the Harvard Department of Government, where her research interests include military innovation, comparative cyberspace doctrine, and information warfare. She has served in the 82nd Airborne Division and the 780th Military Intelligence Brigade (Cyber) and is a 2009 graduate of West Point. While in the 780th, she served as a team lead in the Cyber National Mission Force and as the commander of an expeditionary cyberspace company. Following graduate school, she will serve as an instructor of international affairs in the West Point Department of Social Sciences.

Referring Editor: Latanya Sweeney

Citation

White S. Information Warfare in the Digital Age: A Study of #SyriaHoax. Technology Science. 2018111302. November 13, 2018. http://techscience.org/a/2018111302

Data

Under review for data sharing classification.