News and Political Information Consumption in Brazil:
Mapping the First Round of the 2018 Brazilian Presidential Election on Twitter

Caio Machado	Beatriz Kira	Gustavo Hirsch	Nahema Marchal
Oxford University	Oxford University	Oxford University	Oxford University
@caiocvm	@beakira	@gustavoh1985	@nahema_marchal
Bence Kollanyi	Philip N. Howard	Thomas Lederer	Vlad Barash
Oxford University	Oxford University	Graphika	Graphika
@bencekollanyi	@pnhoward		@vlad43210

ABSTRACT

In Brazil, there are rising concerns over computational propaganda and the political polarization it may cause. In this data memo, we analyze data about political news and information shared over Twitter in the period leading up to the 2018 Brazilian presidential election. We find that: (1) Brazil's political discourse on social media is highly partisan, with leading candidate Jair Bolsonaro dominating the conversation on Twitter; (2) accounts associated with Luiz Inácio Lula da Silva and Fernando Haddad hashtags show the highest level of high frequency tweeting; (3) Brazilian Twitter users are sharing more professional political content on Twitter than junk news — the highest proportion in all the elections we have studied; (4) while Bolsonaro supporters spread the widest range of known junk news sources, Lula da Silva and Haddad supporters accounted for the highest volume of shares.

INTRODUCTION

Brazilians are considered some of the most enthusiastic users of social networks and messaging apps in the world, and social media networks have become a key platform for citizens to share news and political information. As in other parts of the world, the type of news and information voters are exposed to on social media platforms ranges from professional news content to emotionally-driven and polarizing content. Sources spreading deceptive or false information can often mimic established news reporting, with actors across the political spectrum leveraging misinformation to capture attention. During times of heightened public interest, social media algorithms may promote and spread conspiratorial material over accurate information.[1] This has raised concerns about the manipulation of public opinion, especially in politically sensitive moments such as elections and referenda. [2]

In Brazil, there is increasing debate about the impact of misinformation on polarization and spread of violence, both online and offline. For the first time in the country's electoral history, Brazil witnessed the hacking of popular political Facebook groups, and the physical persecution, threat and harm to social media political leaders as well as celebrities.[3]

According to the 2018 Reuters Digital News Report, online platforms remain the main source of news within urban Brazil, with 66% of survey respondents reporting to use social media, including 14% who say they use Twitter, for news-seeking.[4] The Brazilian Centre of Telecommunication and Information Technologies (Cetic.br) reports that 50% of the population use the Internet to read news, and 68% of Internet users have shared some kind of content online in 2016.[5] WhatsApp has also emerged as a major and relevant source of news. With more than 120 million active users in Brazil, the country accounts for 10% of the world's subscribers, according to data provided by the company.[6]

In the context of Brazil's polarized political environment, we analyze sources of news and information shared over social media in a 10 day-long period leading up to the 2018 Brazilian presidential election. Our research questions are: (1) Which candidates led the conversation over Twitter and were associated with high frequency tweeting? (2) What types of content are being shared on Twitter? (3) How did different audience groups share junk news on Twitter?

THE BRAZILIAN GENERAL ELECTION AND THE MEDIA

The first round of the general election is scheduled to be held in Brazil on October 7, 2018. Brazilians will elect the president, governors, and members of the National Congress and of state assemblies. The president, vice-president and state governors are elected through a two-round system. Should any candidate fail to win a majority vote in the first round, a second round with the two most-voted candidates is scheduled for October 28, 2018.

Brazil has a proportional presidential representative system, where the party landscape consists of multiple smaller parties and larger coalitions. The president is the head of state and is elected for a four-year term, with the possibility of one re-election for a second successive term. For 13

consecutive years, from 2003 to 2016, Brazil was ruled by the Worker's Party, first with Luiz Inácio Lula da Silva for two terms, followed by Dilma Rousseff for one and a half terms. The current president is Michel Temer from the Brazilian Democratic Movement who replaced Dilma Rousseff after her controversial impeachment in 2016.

In March 2018, former president Lula, who was leading the opinion polls up until that point, was sentenced to jail. In early September 2018, he was barred from running in the election by Brazil's Superior Electoral Court (TSE), who enforced a national law preventing people with criminal convictions from running for elected political positions. Lula da Silva was forced to drop out from the race to be replaced by the Worker's Party vice-presidential candidate, Fernando Haddad. There are now 13 candidates registered in the race, the second highest number of candidates running for office in Brazil's democratic history and since the end of military rule in 1985.

On September 6, 2018, the right-wing candidate Jair Bolsonaro from the Social Liberal Party was stabbed in the stomach during a campaign rally. The near-fatal blow gave Bolsonaro enormous visibility, with conspiracy theories circulating widely on social media that the attack was a plot by liberals.[7,8] Despite the media frenzy, voting intentions for Bolsonaro did not significantly increase after the event and his approval rate, in fact, decreased overall.[9] While Bolsonaro remains the front-runner, his rival Fernando Haddad has seen his popularity soar since his official nomination.[10]

COMPUTATIONAL PROPAGANDA AND JUNK NEWS IN BRAZIL

Electoral success in Brazil has historically gone hand-in-hand with visibility on broadcast media. During the campaign period, Brazil's state-funded television channels are obliged to give parties and candidates a daily timeslot for electoral advertising. Parties are allocated television time based on the number of representatives they have in Congress, and they use time as a bargaining chip to form coalitions and alliances. There are huge discrepancies in the amount of time granted to each candidate: while Geraldo Alckmin from the Social Democracy Party enjoyed a full five minutes and 32 seconds for his campaign, leading candidate Jair Bolsonaro was only allocated eight seconds of total air time.

This year's election marked an increase in digital campaigning tactics, offering new opportunities to analyze how these tools could sway the electorate. According to a recent poll, 56% of Brazilian voters say social media would influence their choice of presidential candidate to a degree.[11, 12] Brazilian experts believe the 2018 General Election will be the most digital in the country's history and that leveraging Internet and social media will be crucial to the success of candidates and political

parties. Last year, a bill allowing boosting or prioritizing of political content on the Internet became law and this year, the TSE enacted a rule that detailed and authorized paid political advertisement on social media. For the first time, while candidates will be allowed to pay to sponsor posts, the use of bots and fake profiles to increase content visibility is strictly prohibited. In this same statute, the TSE established that freedom of speech does not protect the deliberate circulation of untrue information or expressions made solely with the intention of harming someone's image.

Nonetheless, news media articles have reported the involvement of politicians and political parties in activities to manipulate public opinion over social media, either with the help of their own campaigning personnel or through companies hired to run social media campaigns. The operation and production of automated content are widespread in Brazil across the political spectrum, and studies suggest that groups with different interests have been using automatically generated content to influence discussions on Twitter and benefit candidates.[13,14]

For this reason, different Brazilian governmental bodies are seeking ways to address, monitor, and punish the deliberate dissemination of junk news, and the use of other mechanisms that might unduly influence how citizens receive information in the run up to the 2018 general election. The TSE hosted an international seminar on fake news in June of this year, resulting in a number of new statutory rules on electoral campaigns on the Internet. Over 20 bills about fake news are currently under consideration by the National Congress.[15,16]

SAMPLING AND METHODS

The Twitter dataset contains 1,432,000 tweets posted by 204,097 unique Twitter users, collected between August 19 and August 28, 2018, using a combination of relevant political party hashtags, election-specific hashtags, and handles for the individual parties and party candidates. Of the 13 registered candidates for presidency, only nine belong to parties with more than five representatives in the Congress, which is the threshold adopted by Brazilian Electoral Law to decide which candidates should take part in TV debates. We also adopted this rule to select candidates for our Twitter data collection. In the case of the Worker's Party, considering the high likelihood of Lula da Silva's candidacy being barred, we collected data related to both Lula da Silva and Haddad. The list of hashtags associated with the Brazilian election was compiled by a team of three trained coders who are native Brazilian Portuguese speakers and are very familiar with Brazilian politics. Prior to launching the data collection, the set of hashtags was refined in a trial run, which revealed the most frequently used hashtags, and the list was revised accordingly.

Twitter's Streaming API was used to collect publicly available tweets. The platform's precise

sampling method is not disclosed, however Twitter reports that data available through the Streaming API is, at most, 1% of the overall global public traffic on Twitter at any given time. Tweets were collected if they: (1) contained at least one of the relevant hashtags or at least one Twitter handle of the political parties or political leader; (2) contained the hashtag in the URL shared, or the title of its webpage; (3) were a retweet of a message that contained a relevant hashtag or mention in the original message; or (4) were a quoted tweet referring to a tweet with a relevant hashtag or mention.

The list of hashtags associated with the Brazilian election was further refined through an iterative snowballing process, including a five day-long test data collection to reveal the top-used election-related hashtags. We tracked hashtags that were both in favor of and against the candidates and their parties. Each tweet was counted if it contained at least one of the hashtags followed. If the same hashtag was used multiple times in a tweet, it was counted only once. If a tweet contained more than one of the tracked hashtags, it was credited to each relevant candidate hashtag group (see *Table 1*). During the analysis of the party-related Twitter traffic, every tweet was counted once if it contained at least one of the hashtags or the mentions associated with a political party. If the same tweet contained hashtags or mentions for different parties, it was credited to each of the relevant parties. If a tweet included more than one relevant hashtags or mentions for the same party, it was still counted only once per party.

The final dataset contains links to news sources shared five times or more on Twitter; it also includes links to content on YouTube and Facebook. Links pointing to Twitter itself were excluded from our sample. This approach resulted in 97.6% coverage, meaning the team coded 97.6 % of all the URLs shared. The process of classifying the base URLs, accounts, channels, and pages, based on the evaluation of the sources, was done according to a rigorous and iterative coding process using a typology that has been developed and refined through the project's previous studies of six elections in five Western democracies and several countries in Latin America.[17,18]

To measure inter-coder reliability we calculated the Krippendorff's alpha which was 0.84. The existing literature concludes that this provides a high level of reliability.[19] Next, we tracked how these URLs were being shared over Twitter. We use the Graphika visualization suite to map accounts that followed the ones associated with known junk news sources. Visualizing social network data is a powerful way of understanding how people share information and associate with one another. By using selected keywords, seed accounts, and known links to particular content, it is possible to construct large network visualizations that can be examined to find communities of accounts or "groups" that share very

similar kinds of content with each other. In our analysis, we computed the coverage and consistency scores for each group we identified. *Coverage* of a group refers to the percentage of all propaganda domains identified in our junk news sources list that a group posted links to. The *Consistency* of a group refers to the total percentage of links to all the propaganda domains identified in our junk news sources list that is shared by the group. A high value for coverage shows that the group is sharing a wide range of propaganda, while a high value for consistency shows that the group is playing a key role in the spreading of such propaganda. Coverage and consistency scores were calculated from the number of links shared from the groups to the junk news sources. The typology explaining our content classification is as follows:

Professional News Content
- Major News Brands. This is political news and information by major newspapers, broadcasting or radio outlets, as well as news agencies.
- Local News. This content comes from local and regional newspapers, broadcasting and radio outlets, or local affiliates of major news brands.
- New Media and Start-ups. This content comes from new media and digitally native publishers, news brands and start-ups.
- Tabloids. This news reporting focuses on sex, crime, astrology and celebrities, and includes yellow press publications.

Professional Political Content
- Government. These links are to websites of branches of government or public agencies.
- Experts. This content takes the form of white papers, policy papers or scholarship from researchers based at universities, think tanks or other research organizations.
- Political Party or Candidate. These links are to official content produced by a political party or candidate campaign, as well as the parties' political committees.

Polarizing and Conspiracy Content
- Junk News and Information. These sources deliberately publish misleading, deceptive or incorrect information purporting to be real news about politics, economics or culture. This content includes various forms of propaganda and ideologically extreme, hyper-partisan or conspiratorial news and information. To be classified as Junk News and Information, the source must fulfill at least three of these five criteria:
  - *Professionalism*: These outlets do not employ standards and best practices of professional journalism. They refrain from providing clear information about real authors, editors, publishers and owners. They lack transparency and accountability, and do not publish corrections on debunked information.
  - *Style*: These outlets use emotionally driven language with emotive expressions, hyperbole, ad hominem attacks, misleading headlines, excessive capitalization, unsafe generalizations and logical fallacies, moving images, and lots of pictures and mobilizing memes.
  - *Credibility*: These outlets rely on false information and conspiracy theories, which they often employ strategically. They report without consulting multiple sources and do not fact-check. Sources are often untrustworthy and standards of production lack reliability.

- *Bias*: Reporting in these outlets is highly biased, ideologically skewed or hyper-partisan, and news reporting frequently includes strongly opinionated commentary.
- *Counterfeit*: These sources mimic established news reporting. They counterfeit fonts, branding and stylistic content strategies. Commentary and junk content is stylistically disguised as news, with references to news agencies and credible sources, and headlines written in a news tone with date, time and location stamps.
- Russia. This content is produced by known Russian sources of political news and information.

Other Political News and Information
- Political Commentary Blogs. Political blogs that employ standards of professional content production such as copy-editing, as well as employ writers and editorial staff. These blogs typically focus on news commentary rather than neutral news reporting on a news cycle and are often opinionated or partisan.
- Citizen, Civil Society and Civic Content. These are links to content produced by independent citizen, civic groups, civil society organizations, watchdog organizations, fact-checkers, interest groups and lobby groups representing specific political interests or agendas. This includes blogs and websites dedicated to citizen journalism, personal activism, and other forms of civic expression that display originality and creation that goes beyond curation or aggregation. This category includes Medium, Blogger and WordPress, unless a specific source hosted on either of these pages can be identified.

FINDINGS AND ANALYSIS

For our analysis of Twitter data, we examined the volume of tweets, the degree of high frequency tweeting and the types of news content shared on Twitter during the Brazilian presidential election.

Figure 1: Hourly Twitter Conversation about the Brazilian Presidential Candidates Based on Hashtag Use
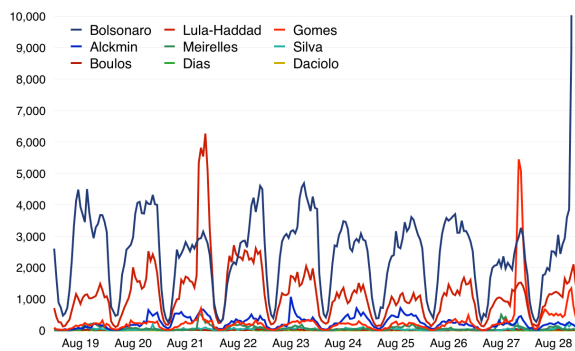
Source: Authors' calculations from data sampled between 19/08/18 — 28/08/18. Note: See online supplement for a complete list of hashtags.

Figure 1 shows the hourly Twitter conversation on the election based on hashtag use. *Table 1* shows the breakdown of the Twitter conversation about the Brazilian election based on candidate hashtag use. We also identify the levels of high frequency tweeting of hashtags pertaining to specific candidates. To measure this, we chose the threshold of 50 or more tweets with these hashtags in a 24-hour period. As tweets often contain multiple hashtags, there is some overlap between the candidate groups, hence the total number of tweets in *Table 1* (1,428,771) does not represent the total number of unique tweets in the entire dataset (1,432,000).

Table 1: Twitter Conversation and High Frequency Tweeting about the Brazilian Election

Political party or general traffic	N	%	N of high frequency tweets	% of high frequency tweets
General	61,187	4	2,020	3
Jair Bolsonaro	645,950	45	23,893	32
Lula & Haddad	482,472	34	35,354	47
Ciro Gomes	67,549	5	8,490	11
Geraldo Alckmin	61,532	4	1,885	2
Marina Silva	52,150	4	1,560	2
Guilherme Boulos	33,742	2	496	1
Henrique Meirelles	17,000	1	1,691	2
Alvaro Dias	2,686	0	6	0
Cabo Daciolo	4,503	0	44	0
Total	1,428,771	100	75,439	100

Source: Authors' calculations from data sampled 19/08/18 — 28/08/18. Note: See online supplement for a complete list of hashtags and Twitter handles. Percentages have been rounded to the nearest whole number unless they were below one percent, in which case they were rounded to one decimal place. High frequency tweets refer to the number of tweets from high frequency-tweeting accounts.

Jair Bolsonaro, the leading candidate in the polls, dominated the Twitter conversation, accounting for 45% of the total hashtag-based traffic, while Lula da Silva and Fernando Haddad accounted for the largest percentage of high frequency tweets (47%) (See *Figure 1* and *Table 1*). Bolsonaro 34 percent more daily content on Twitter than either Lula or Haddad, and around 10 times as much as Ciro Gomes and Geraldo Alckmin. High frequency tweets were also more concentrated, with 90% of the activity revolving around three candidates: Lula & Haddad, Bolsonaro and Ciro Gomes. On 21 and 27 August 2018, we observe a spike in tweeting activity associated with Gomes-related hashtags (*Figure 1*), which can mostly be attributed to his long interviews on TV channels. The spike is even greater on August 28 when Jair Bolsonaro was interviewed on Brazil's most watched TV news show and the Supreme Court started hearing a racism case implicating him. That night, the hourly traffic for Bolsonaro reached 31,700 tweets for a short, one hour-long peak.

Next, we analyze the types of news content shared during the 10 days of our data collection. Our results are presented in *Table 2*.

Table 2: Types of News and Information Shared on Twitter

| Type of Source	N	%
Professional News Content		
News Brands	13,956	20.4
Tabloids	65	0.1
Subtotal	14,021	20.5
Professional Political Content		
Political Party or Candidate	18,772	27.4
State-Funded Pro-Government	1,885	2.8
Government	357	0.5
Expert	30	0.0
Subtotal	21,044	30.7
Polarizing & Conspiratorial Content		
Junk News	781	1.1
Russian Content	25	0.0
Subtotal	806	1.2
Other Political News & Information		
Video/Image Sharing	9,583	14.0
Citizen or Civil Society	3,098	4.5
Political Blogs	1,751	2.6
Fundraising and petitions	1,814	2.7
Remaining categories*	2,695	3.9
Subtotal	18,941	27.7
Other		
Social Media Platforms	10,641	15.6
Remaining categories**	2,956	4.3
Subtotal	13,597	19.9
Total	68,409	100

Source: Authors' calculations from data sampled 19/08/18 — 28/08/18. See online supplement for a complete list of hashtags. Note: Major News Brand, Local News, New Media and Start-ups were collapsed into the Professional News Brand category for this table. In the Other Political News & Information parent category, Remaining Categories include Political Humor, Lifestyle, Religion, Online Portals, Cloud Services and Other as these constituted a low percentage of total shares. In the Other Non-Political parent category, Not Available, Shopping, Services, and Applications, Link Shorteners, and Other Non-Political were collapsed into Remain Categories for the same reason.

Professional Content (Professional News Content and Professional Political Content combined) was the most shared on Twitter, constituting roughly 50% of total shares, while Polarizing & Conspiratorial Content comprised less than 2% of shares. This follows the trend we observed in other Latin American countries.[20] Professional Political Content was shared most widely, totaling 31% of all shares, followed by Professional News Content with 21% of shares. In the Political News & Information category, Video/Image content represented 14% of all shares, underlining the primacy of visual content during the campaign. Of the links categorized as Other, 16% linked to other social media platforms, including Facebook, indicating a high degree of cross-platform posting.

Lastly, after identifying five main clusters of accounts who follow other users known for sharing

junk news sources we calculated a heterophily score for each combination of group pairings (see online supplement for the heterophily index). A heterophily score of 1.0 indicates a neutral connection. Anything above that indicates a strong tie while anything below signals a lack of a connection. A higher score of a group to itself indicates more within-group connections. We notice a high heterophily score (1.2) between the Alckmin and Bolsonaro groups, suggesting a high degree of interaction between the two groups. This might be attributed to the fact that both candidates present themselves as anti-Worker's Party candidates and their followers largely reject left-wing candidates.

Figure 2: Brazilian Junk News Audience Groups on Twitter
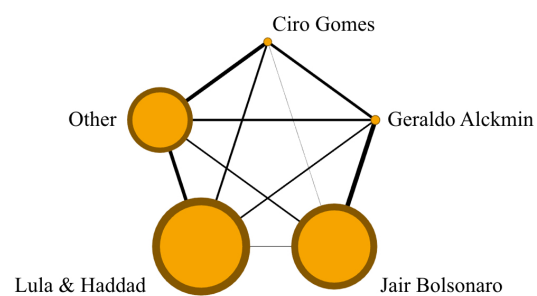
Source: Authors' calculations from data sampled between 22/08/2018 - 21/09/2018. Note: Groups are determined through network association. This is a basic visualization (see online supplement for a full visualization)

Table 3: Size, Coverage, and Consistency of Junk News Audience Groups on Twitter

Scores	Users N	Users %	Coverage	Consistency
Lula & Haddad	4,549	39	54	65
Jair Bolsonaro	3,946	34	81	27
Other	2,930	25	78	7
Geraldo Alckmin	126	1	24	0
Ciro Gomes	70	1	8	0
Total	1,1621			

Source: Authors' calculations from data sampled 22/08/2018 - 21/09/2018. Percentages have been rounded to the nearest whole number unless they were below one percent.

Finally, from *Table 3* we see that supporters of Jair Bolsonaro have a coverage of 81%, indicating that those accounts shared the widest range of identified junk news sources on Twitter, whereas supporters of Lula and Haddad shared the highest volume of junk news sources overall, at 65%.

CONCLUSIONS
Our main conclusions are that: (1) Brazil's political discourse on social media is highly partisan, with leading presidential candidate Jair Bolsonaro dominating the conversation on Twitter; (2) accounts

associated with Lula da Silva and Fernando Haddad hashtags show the highest level of high frequency tweeting; (3) Brazilian Twitter users are sharing more professional political content on Twitter than junk news — the highest ratio in all the elections we have studied; (4) while Bolsonaro supporters spread the widest range of known junk news sources, Lula da Silva and Haddad supporters accounted for the highest volume of shares of junk news sources.

The high proportion of professional political news shared by Brazilian users could be attributed to the fact that only a small, more politically-savvy and literate fraction of the Brazilian population uses Twitter for news-seeking. However, we note that as information sharing and political conversations progressively move away from public platforms like Twitter and into more private discussion spaces like WhatsApp or Facebook Messenger, an analysis of other popular services might have yielded different results about the spread of misinformation on social media in Brazil.

ONLINE SUPPLEMENTS AND DATA SHEETS
Please visit comprop.oii.ox.ac.uk for additional material related to the analysis, including (1) high-resolution visualizations of the networks for Twitter, (2) the full list of segments and groups, (3) calculation of heterophily scores, (4) detailed explanation of the hierarchical agglomerative clustering algorithm used to create groupings, (5) the k-core reduction used to reduce the set of Twitter users, (6) a list of the top 10 junk news sites that we found in the dataset.

ABOUT THE PROJECT
The Project on Computational Propaganda (COMPROP) based at the Oxford Internet Institute is an interdisciplinary team of social and information scientists researching how political actors manipulate public opinion over social networks. This work includes analyzing the interaction of algorithms, automation, politics, and social media to amplify or repress political content, disinformation, hate speech and junk news. Data memos are designed to present quick snapshots of analysis on current events in a short format, and although they reflect methodological experience and considered analysis, they have not been peer- reviewed. Working papers present deeper analysis and extended arguments that have been collegially reviewed and engage with public issues. COMPROP's articles, book chapters and books are significant manuscripts that have been through peer review and formally published.

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