A Study of Misinformation in WhatsApp groups with a focus on the Brazilian Presidential Elections.

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ABSTRACT

There are rising concerns over the spread of misinformation in WhatsApp groups and the potential impact on political polarization, hindrance of public debate and fostering acts of political violence. As social media use becomes increasingly widespread, it becomes imperative to study how these platforms can be used to as a tool to spread propaganda and manipulate audience groups ahead of important political events. In this paper, we present a grounded typology to classify links to news sources into different categories including 'junk' news sources that deliberately publish or aggregate misleading, deceptive or incorrect information packaged as real news about politics, economics or culture obtained from public WhatsApp groups. Further, we examine a sample of 200 videos and images, extracted from a sample of WhatsApp groups and develop a new typology to classify this media content. For our analysis, we have used data from 130 public WhatsApp groups in the period leading up to the two rounds of the 2018 Brazilian presidential elections.

CCS CONCEPTS

• Social media networks • Online social networks

KEYWORDS

WhatsApp, Misinformation, Brazilian Elections, Typology

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1 Introduction

WhatsApp, the private messaging application, has emerged as a popular tool for inter-personal communication in several countries around the globe. The role of social media in spreading political misinformation has been well-documented in the literature [1] [2]. However, our previous research noted that information sharing and political conversations have progressively moved away from public platforms like Twitter and into more private discussion spaces like WhatsApp or Facebook Messenger, particularly in countries like Mexico and Brazil [3] [4]. Consequently, this paper presents our preliminary study of the role of WhatsApp in political communication and propaganda, using data from Brazilian WhatsApp groups during the period leading up to the two rounds of the Brazilian presidential elections. This work seeks to answer the following questions: (1) What types of news sources are being shared within the WhatsApp groups studied? (2) What types of content are being shared? (3) How much of the media content --- image and video files shared can be considered to be polarizing content?

2 Sampling and Methods

In order to examine how political news and information was being circulated within WhatsApp groups, we collected data related to the Brazilian presidential elections, given the enormous popularity of the messaging app in the country and amid reports that it was being used widely as a campaigning tool. We joined political WhatsApp groups dedicated to discussion of politics, news and current affairs with publicly available invite links. These groups were easily accessible and were preferred channels to disseminate political information. Our approach relied on information available on the web, indexed directly by search engines or available in public repositories that can be found through search engines. Using

Google Search and DuckDuckGo we obtained access to a few repositories, two of which were particularly active, namely Gruposwhats.com and Gruposdezap.com. We also joined WhatsApp groups made publicly available on campaign pages, but many links were quickly revoked, possibly due to attacks by supporters from other candidates. In these repositories, we used keywords that would identify parties, presidential candidates or phrases used by the main campaigns. General keywords such as "Politic*", "Right", "Left", "Liberal" and "Conservative" (in Brazilian Portuguese) were used as search queries for both the search engine and the repositories search tool, in order to identify political groups across the spectrum of Brazilian politics. Some of the main repositories used in this study were: http://www.gruposwhats.com/, https://www.gruposdozapzap.com.br/, https://www.linksdegruposzap.com/. Public links made available in repositories has a high turnover and were often revoked. On the other hand, by joining invite links made available within the WhatsApp groups it was possible to join a substantial number of political groups. Using this snowball sampling method, we joined 130 public WhatsApp groups. Groups varied in size and had a high turnover of participants that joined and left groups frequently. Many of our groups reached the 256-user limit. According to our ethics protocol, sought the consent of group members in the groups we joined from the repositories and then snowballed into other groups via public links and invitations circulating in those chats. To seek consent, we posted a message at the time of joining the group announcing ourselves as researchers and requesting group members to contact us if they had any issues with their data being used for this study. Further, all data for this analysis was strictly anonymised and only included media links, images and audio-visual content shared on this thread. We used no personal data or messages to inform our research findings. Between September 21 – October 20 we collected 298,892 WhatsApp messages and received, 99,988 media files. We note that this snowball sampling strategy does not ensure that all existing public WhatsApp groups, are adequately represented. The closed nature of the platform means that it is very difficult to comprehensively map the network of public groups in a region. Also, this data collection method may introduce a bias which is linked to our initial dataset, where groups might share invites to other groups with similar political alignments.

We accessed the chat history from 130 public groups and extracted 50,795 URLs shared within these groups. Out of these 5,723 URLs pointed to the whatsapp.com domain itself. After examining these links and finding that they were all WhatsApp group invites, we removed the links from our dataset. We analyzed the remaining 45,072 links and successfully labeled 38,800 links, achieving 86.1% coverage of the dataset. This dataset, apart from containing links to diverse news sources, also includes links to other platforms such as YouTube, Facebook and Twitter. Due to the large number of YouTube and Facebook links, we labeled all unique links from these two platforms that were shared five times or more on WhatsApp. We treated every post from the same public Facebook public page as content coming from one source. Similarly, in the case of YouTube, we used the same label for all videos originating from the same channel. All other URLs were classified on a domain or sub-domain level. The coding was done according to a rigorous and iterative coding process and by using a previously developed grounded typology. This typology was tested and refined by analyzing links shared on social media platforms, including Twitter and Facebook, during elections and other high salience political events across multiple countries [5]. The links were coded by a team of coders with high inter-coder reliability measured by the Krippendorff's alpha which was 0.84. The existing literature on coder reliability metrics concludes that this provides a high level of reliability [6]. The typology explaining our content classification is detailed below:

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 that 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."

Further, we analyzed a random sample of 200 images and 200 videos that were collected between 21 September - 28 September, from our data sample. We initially classified videos and images into 5 main parent categories broadly on the basis of their political affiliations:

- Pro-PSL: in favor of the Social Liberal Party
- Anti-PSL: against the Social Liberal Party
- Pro-PT: in favor of the Worker's Party
- Anti-PT: against the Worker's Party
- Other Parties

These groups are representative of the political forces dominating the public debate in the Brazilian elections, particularly in the run up to the second round. Under each one of the parent categories, we further classified the media content under the following sub-categories:

- Campaign and Support Material – Broadly supportive of the candidate, using verifiable facts and figures, pertaining to social, economic and political issues.
- Polarizing/Junk Content –
- Style: Content uses emotive expressions, hyperbole, misleading information, unsafe generalizations and logical fallacies.
- Credibility: Content promotes false information and conspiracy theories, which is often employed strategically.
- Bias: Content is highly biased, ideologically skewed or hyper-partisan. Promotes inflammatory viewpoints.
- Discrediting tactics: Content discrediting opponents, by indulging in smear campaigns, ad hominem attacks, falsehoods about personal lives, attacks using religious themes/iconography.
- Religion – Pertaining to religious practices, references to religious texts and values, claiming alignment with core religious values from political leaders, claiming support of prominent religious leaders for the campaign.
- Celebrities – Prominent social figures in the arts, TV stars, sports personalities, senior officials in law enforcement and other government institutions voicing strong support for candidates.
- Hate, Gore and Porn – Hate speech/content directed against individuals, minority groups like women, LQBT community, against ideologies, as well as videos depicting acts of extreme violence or obscenities.
- Satire – Content that uses humor, irony or exaggeration to comment on political and social issues.
- Other – Lifestyle, goodwill messages and content that doesn't fit the above categories.

3 Findings

First, we analyzed the types of news content shared between 21 September and 20 October. Looking specifically at links being shared within WhatsApp groups, we note that junk news sources account for 13.1% of all links in our dataset (see Table 1). On the other hand, the relatively low number of professional political sources 2.7%, could be caused by one or both of two things: first, the adaptation to the cultural use of WhatsApp, which is an interpersonal platform and tends to simulate a more private environment; second, the strategic use of WhatsApp to disseminate junk content, benefitting from reduced control mechanisms and debilitated law enforcement mechanisms. Though there have been attempts to implement technical

solutions on WhatsApp to restrict the viral spreading of junk news, there are still no means of monitoring or tracing content, nor of enabling the removal of illegal content.

Another interesting observation is the very high number of YouTube links in our WhatsApp dataset. The 17,702 links, pointing to YouTube videos account for close to 40% of the shared links, suggesting a strong interaction across these two platforms, where affordances and sharing strategies differ. We labeled 11,255 links out of the total number of YouTube links from our dataset, using our grounded typology and the remaining 6,447 YouTube links were classified as Video/Image sharing (see Tables 1 & 2). Further links to YouTube and Facebook are used to expose users to high percentages of junk content, namely 30.9% on YouTube and 42.3% on Facebook (see Table 2). Moreover, the general culture around WhatsApp use in Brazil favors a very open and participative relationship on social media even in public groups, sharing entertainment, gossip and sometimes violence [7]. This behavior is a trend even on Facebook, where users tend to be very active and public about their activities and posts. Following our overall data analysis, we analyzed a random sample of media content extracted between 21 September - 28 September 2018. The purpose of this collection was to provide a broad overview of the media content being shared in public WhatsApp groups during the election campaign for the first round. Our analysis is presented in Tables 3 & 4. Looking at the different types of content, we note that videos are an important resource for the dissemination of polarizing and conspiratorial content. They are particularly effective because they are easily edited and can convey information using loaded and appealing imagery. Videos can simulate the production of content from users as "eye witnesses" of certain events or simulate personal statements of citizens and specialists, misleading the users. We coded over two thirds of the YouTube links shared within the WhatsApp groups. The approach excluded the links that were shared less than 5 times, which accounts for the long-tail distribution of videos which were in the last third of the total links shared. This means that the sample of YouTube links coded is highly representative of the volume of links being disseminated, even though it isn't representative with regards to the variety of content. These diverse, but less frequently shared links could point towards to non-political user activity on the platform such as sharing entertainment videos. A similar trend was observed in Facebook. Thus, although WhatsApp has its own affordances for sharing and disseminating media within the platform, bringing users to YouTube could be a strategy for exposing them to a network of content based on YouTube recommendations.

While authorities and researchers focus on platforms in an isolated manner, it is hard to evaluate how the exposure to one link on one platform could lead to contact with polarizing content when the user follows the path of related content. For example, while WhatsApp's media sharing was under scrutiny of authorities, bringing users to YouTube could be a strategy to avoid detection. The collection of images and video files from the WhatsApp conversations had exploratory purposes. Rather than aiming at representativeness of all the media being disseminated through WhatsApp, this analysis reflects important findings of our research that can offer directions for future research. In this regard, we coded images and videos according to a high-level typology, which would allow us to broadly classify the political orientation of content circulating and identify patterns of polarizing and conspiratorial material. For the purposes of this research we combined categories that supported a specific candidate or that opposed his adversaries under a single group. For example, we combined content that specifically attacked Jair Bolsonaro (Anti-PSL) and content that supported Fernando Haddad (Pro-PT) into a single unified category (Anti-PSL / Pro-PT), in order to better depict the polarized dispute between the candidates. As seen in Tables 3 & 4, a majority of the videos and images are classified as Anti-PT/Pro-PSL. We believe that this is due to: (1) the use of WhatsApp as a broadcast system was an innovative strategy and only one political party had developed this communication structure. (2) further specific foreign advertising agencies were hired to offer this service, which was something other political parties had not yet caught onto [8]. This methodological choice is justified because the online debate was dominated by these two figures and virtually all of the political content was used either to support and/or attack one of these two candidates. This approach is supported by the fact that we counted only 14 videos and 22 images supporting other candidates. As we can see from the Tables 3 & 4, the number of Polarizing and Junk images and videos is high, and it is worth pointing out that the categories Satire and Hate, Gore and Porn had also had high numbers. The media we collected has been very similar across the groups supportive of the same candidate. The presence of these elements points towards the intense use of visual and emotional strategies to influence the user. Media files (99,988) accounted for 33% of all messages collected (298,892) that included links to news sources, text messages and media files. Therefore, a significant proportion of overall content being disseminated are images, audio and video files, illustrating the prolific use of audio-visual strategies to disseminate news and information in WhatsApp groups.

Though the data analyzed is insufficient for drawing conclusions about the comparative use of videos and images between the candidates, it shows that the media affordances of WhatsApp are being intensely exploited for the dissemination of political content. This is an important finding, because images and videos don't fit the concept of "news", in the sense of being reported by periodicals or media outlets. Such media rarely have the intention of simulating the authority of media sources, as is common with junk news being shared online. For these purposes, images and videos operate with a slightly different rhetoric than the one established by the "fake news" debate, since they usually don't point to any source or attempt to pass any credit or authority. They are strategically constructed rumors, that will distort and attack proposals from the opposing party or that will evoke emotional reactions from the users. More importantly, Bolsonaro's campaign has repeatedly attacked major media outlets as "fake news" outlets and defended WhatsApp as a free space where users can report 'first-hand' experiences and bypass the biases of the traditional media

gatekeepers [9]. Within this context, the rhetoric of memes and videos is able to thrive without indicating any sort of source, since they appeal to users as a truth that was formerly concealed under the traditional media monopoly. This also fosters speculative behavior from the users, that might forward content simply for supporting their views or for raising awareness. Reports have indicated that out of the top 50 most widely diffused images, 46 were fake or distorted [10]. These findings are important indicators of the strategic use of images to disseminate polarizing content, which spread widely under the veil of satires, memes, or openly as hoaxes, and whose source is almost impossible to verify. Such content appears to be user produced, especially when disseminated on WhatsApp, where the content is forwarded by users and hosted on the users' phones. Shifting from a direct public broadcasting of information (ex. Facebook, Twitter) to a broadcast strategy via a network of groups can be highly effective in reaching out to users in a medium that is perceived as more intimate, while making it extremely difficult to trace back to the disseminating accounts or even to filter content distribution.

4 CONCLUSIONS AND FUTURE WORK

This research represents a preliminary study of the use of WhatsApp as a tool for political propaganda in Brazil. From analyzing links to news sources and random sample of images and videos we found that: (1) In Brazil, WhatsApp presents an extremely low number of professional political content and a high number of junk news content; (2) Information spreading on WhatsApp relies intensely on the dissemination media files, which don't use the same rhetoric as junk news sources, not attempting to simulate authority to credit information; (3) Content dissemination strategies within WhatsApp groups often resort to hate speech and deception to achieve viral dissemination. Our investigations indicate that visual metaphors are being heavily used within WhatsApp groups to distort information and manipulate users. The analysis of this content at scale, will require a combination of both quantitative and qualitative methods. In order to analyze large volumes of visual content, we propose in our future work to explore automated image recognition techniques to develop broad clustering strategies, for instance identify the most popular images that have been shared within the groups in our data sample, and then apply a detailed typology for qualitatively classifying clustered media files into various categories. We believe that misinformation campaigns in the future, specifically in messaging apps like WhatsApp will increasingly use visual media to spread propaganda and carry out influence operations. Therefore, the work of analyzing such content will be vital to ensuring that such content does not endanger democratic processes by polarizing societies and deepening fault lines within communities.

Table 1: Types of News and Information Shares on WhatsApp

Type of Source	N	%
Professional News Outlets		
News Brands	10,503	27.1
Tabloids	70	0.2
Subtotal	10,574	27.3
Professional Political Content		
Political Party or Candidate	625	1.6
Government	287	0.7
Expert	131	0.3
Subtotal	1,043	2.7
Polarizing & Conspiratorial Content		
Junk News	5,093	13.1
Subtotal	5,093	13.1
Other Political News & Information		
Video/Image Sharing	6,524	16.8
Citizen or Civil Society	1,828	4.7
Political Commentary Blog	1,724	4.4
Portals, Search & Aggregators	909	2.3
Fundraising & petitions	476	1.2
Remaining categories**	436	1.1
Subtotal	11,897	30.7
Others		
Social Media Platforms*	3,086	8.0
Portals, Search & Aggregators	4,067	10.5
Fundraising & petitions	1,303	3.4
Remaining categories***	1,737	4.5
Subtotal	10,193	26.3
Total	38,800	100

Source: Authors' calculations from data collected from Sept 21 to Oct 10, 2018.

* Besides other image and video sharing platforms, YouTube links were labelled as SHC unless they were coded separately. Similarly, Facebook links were labelled as SM unless coded individually (For more details, see Table 2).

** Political Humor, Lifestyle, Religion, Cloud Services, and Other Political were collapsed as these categories constituted low percentage.

*** Not Available and Link Shorteners were collapsed as these categories constituted low percentage.

Table 2: Links Shared to Different Platforms on WhatsApp.

Source of the Link	Total Links (N)	Links Coded (N)	Junk Links (N)	Junk Links (%)
YouTube Video	17,702	11,255	3,477	30.9
Facebook Post and Page	1,549	494	209	42.3
Other news and Information Sources	25,822	19,549	1,407	7.2

Source: Authors' calculations from data collected from Sept 21 to Oct 10 2018.

Table 3: Analysis of a Random Sample of 200 Videos.

Categories	Anti-PT/ Pro-PSL	Anti-PSL / Pro-PT	Other Political	Non-Political
Campaign and Support Material	56	4	6	0
Polarizing / Junk Content	35	0	0	1
Religion	4	1	0	3
Celebrities	2	0	0	0
Hate, Gore and Porn	12	0	0	7
Satire	16	1	2	12
Lifestyle	0	0	0	3
Remaining Categories	6	5	6	18

Source: Authors' calculations from data collected from Sept 21 to Sept 28, 2018.

Table 4: Analysis of a Random Sample of 200 Images.

Categories	Anti-PT/ Pro-PSL	Anti-PSL / Pro-PT	Other Political	Non-Political
Campaign and Support Material	37	9	16	0
Polarizing / Junk Content	33	4	1	0
Religion	0	1	0	5
Celebrities	7	0	0	0
Hate, Gore and Porn	4	1	0	2
Satire	33	2	2	5
Lifestyle	0	0	0	13
Remaining Categories	3	0	3	19

Source: Authors' calculations from data collected from Sept 21 to Sept 28, 2018.

5 ETHICAL CONSIDERATIONS

We adhered to strict professional and ethical guidelines. This includes safe data storage policies, concerted attempts to include a diverse range of participants, and open explanation of project methods and goals with participants. Our researchers agreed not to interact in conversation or collect data on specific users of messages. Chat logs were accessed, downloaded, and pseudonymized before our research staff could access them for analysis. We only undertook quantitative data analysis of these chat logs, extracted links to news sources, classified other content like memes and jokes, and not use personal quotes or opinions sourced from these transcripts, in our research.

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