

The Myth Behind the Stabbing: Engagement of Bolsonaro's posts on Facebook during the 2018 election.

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Abstract

This article aims to discuss how post's content are responsible for the engagement on Bolsonaro's page on Facebook during the 2018 presidential election. Social networks, such as Facebook, have a striking aspect of distribution information flows and provide a personalist and direct link between politicians and like-minded users. Besides, the posts' textual content analysis allows us to address the elements mobilized in Bolsonaro's Facebook during his campaign period. For that, I use Social Network Analysis (SNA) as an analytical tool to identify the relationship and content of Bolsonaro and the other political actors' interactions. Finally, I also analyze the post's engagement in Bolsonaro's Facebook using Change Point Analyses to understand if it is possible to highlight significant post engagement changes and create links with the events in the electoral period. Our preliminary results indicate that the post's content topics are directly related to the post's engagement, and the attack against Bolsonaro (also known as the "stabbing") promoted a temporary change point on the engagement of the posts in Facebook during the election and was conjugated along other contents.

Key-words: Change Point, Facebook, Election, Social Network Analysis, Engagement

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1 Introduction

The turn of the century inaugurates a new era where digital communication interpolates with the more diverse aspects of reality. Among them, one addresses the communicational model mobilized in political science studies, where public opinion and political preferences raise important discussions on the impacts that technology brings: the impact of the internet and social media on democracies and political processes (Castells, 2000; Bennett and Livingston, 2020). From this perspective, studies of political behavior and social networks have proven to be fertile ground for investigating how political preferences permeate and shape discussions surrounding digital media. These, in turn, reflect on the communication strategies adopted by political personalities during electoral processes - which is the object of the present study (Recuero, 2014; Bennett and Livingston, 2020; Benkler, Farris and Roberts, 2018).

Given how digital media participates and intertwines with different configurations of the political space, several examples help us understand how they relate and allow different frames of public opinion. Some of these are: the election of President Barack Obama in 2008 (Katz, 2013) and later of President Donald Trump (2016) in the US (Benkler, Farris and Roberts, 2018; Hall, Tinati and Jennings, 2018; Grinberg et al., 2019) and the Cambridge Analytica scandal (Berghel, 2018), British Prime Minister Boris Johnson (Wood and Flinders, 2016), the vote on Brexit in the UK (Bonacchi, Altaweel and Krzyzanska, 2018; Hall, Tinati and Jennings, 2018) and the emergence of the 5 Star Movement in Italy (Tronconi, 2015; Musiani, 2014). Thus, showing that such presence is not endemic to the Brazilian case as observed in the 2018 presidential election, in which Jair Bolsonaro was elected president of the Republic.

We part from the idea that in 2018 the first digital presidential election took place in Brazil and, with it, there was substantial growth in the consumption of internet and digital content in the Latin American country. On top of that, albeit social networks cover a series of platforms (e.g., WhatsApp, Instagram, Wechat, and Facebook), each with its peculiarities, the present study focuses mainly on Facebook and, from that, aims at understanding how the then-candidate Jair Bolsonaro worked his content throughout his electoral campaign. In addition to having a network with a high number of users, when politicized, Facebook allows for direct communication between the candidate and the user, with substantial accuracy in terms of reaching “like-minded” (Beam, Hutchens and Hmielowski, 2018; Recuero, Soares and Gruzd, 2020) groups or profiles and speed when it comes to transmission of information.

2 Literature Analysis

2.1 The Role of Social Networks

As stated, the internet favors the democratization of relationships and dissemination of information and inaugurates a new communicational model. On social networks, representatives have feedback to voters, that is, direct access. The speed in the communicative process, the reach of the message in different and more diverse groups of interlocutors, as well as the capillarity of the communicative process, enhance the dialogue of actors through social networks and, consequently, allow direct communication between representatives and represented, that is, without the mediation of groups, actors or institutions.

In this way, we seek to organize in this section the discussions that deal with the characteristics of Facebook as a mediating agent in the debate and how its characteristics connect with the electoral processes.

Faced with a situation where illiberal leaders (Bennett and Livingston, 2020, p.261) emerge in political scenarios and right-wing parties gain political strength at a time when misinformation is correlated with the development of digital media, Bennett and Livingston (2020) call the attention to a symptom of a possible pathology of epistemological and institutional crisis, the election of Trump in 2016, and the inflow point that connects these different dimensions are the internet and social networks.

In a move to understand how the (American) media ecosystem connects with political discourses, Benkler et al. (2018) show how the internet is a threat to democracy itself, but compose two analytical perspectives.

It is optimistic because it suggests that the introduction of the internet and social media does not itself put pressure on democracy as such. [...] The pessimistic lesson of our work is that there is no easy fix for epistemic crises in countries where a politically significant portion of the population does occupy a hyperpartisan, propaganda rich environment (Benkler, Farris and Roberts, 2018, p. 386).

In this sense, Patrut (2014) argues that Facebook makes political communication possible in two ways: “political actors may send messages to internet-users-citizens who are willing to listen to them and they may receive feedback to their messages” (PĂTRUȚ, 2014, p. 247). With its advantages, the platform allows its users alternative sources of information, intensifies and maintains direct communication between political actors and community members, encourages political participation by members, and proves to be a powerful tool in mobilizing supporters and volunteers. The author exemplifies the tool’s potential for mobilizing the tool with the case of Obama’s presidential election in 2008.

Obama succeeded in mobilizing almost 6 billion young volunteers to share his message and to convince the undecided that he was the best candidate for president (Toader 2009, pp.182–198). During the 2008 election campaigns, Facebook was a very active social network at the political level: 5.4 billion voters, Facebook members, clicked on “I voted” on the page dedicated to elections and 1.5 billion users mentioned the name of a candidate on his/her page (O’Neill 2008). Facebook helps in not only attracting and mobilizing a high number of supporters but also in collecting the data about the voters’ demographic segmentation and in contacting voters in order to remind them to go to vote (PĂTRUȚ, 2014, p. 247/248).

The repertoire of social networks in policy studies does not end there, there are also studies on the role of Facebook in political dynamics as an important element at various times. In addition to the cases mentioned, Tronconi (2015) presents the Italian Five Star Movement (M5S) starring Beppe Grillo and the centrality that such digital resources had in the creation and growth of the movement. Katz et al. (2013), on the other hand, bring significant insights when they investigate the role of social media in US election campaigns. Considering social networks as tools for citizen engagement in politics and bringing the concept of “campaign permanently” to the fore (Katz, 2013, p. 21), where social networks play an essential role in periods that do not correspond to campaigns elections.

In a different approach, Hall et al. (2018) propose to analyze the role given to Facebook and Twitter in the Brexit vote and in the 2016 US presidential election, starred by Trump.

Authors aware that social networks do not represent the full dimension of political discussions but only a part of the political ecosystem that involves events of such magnitude, argue in favor of the importance of analyzing social media. This is because they were able to capture indicative elements in both the Brexit vote and the American election that traditional polls failed to predict (Hall, Tinati and Jennings, 2018, p. 25).

2.2 Brazilian context, why Facebook?

In the endeavor to understand the importance of Facebook in the Brazilian context, the platform that integrates the social media hall gained prominence in political communication in the last decade for integrating millions of users. Created in 2004, the platform gained prominence in 2008 when it surpassed MySpace in the number of users, with 100 million people connected, and in 2010 it had more than 500 million users¹. With such prominence, the social network was not left out of the political debate, because it proved to be an effective resource in political communication.

During the 2018 presidential campaign, with the growth of the platform, all candidates, without exception, mobilized their voters or supporters at some level on their Facebook fan pages. Highlight for Jair Bolsonaro, in the Digital News Report survey of 2019, where:

Brazilians remain some of the heaviest users of social media in the world and usage of all the top social and messaging brands has gone up significantly again over the last year. [...] Throughout the presidential campaign (and after it), Bolsonaro's frequent tweets and Facebook Live appearances forced a change in traditional media coverage, as journalists had to keep a constant watch not only over the president's social media accounts but also on those of his allies (Carro, 2019).

Parmeggiani directly explores the potential of Facebook and other social networks that fit the same communicational logic in the digital environment and argues "that Facebook can serve as an accountability tool, within its limits" (Parmeggiani, 2015, p. 8). We also see several works and studies involving digital democracy, electronic government, such as Mendonça and Pereira (2011) that contribute to the debate on the potential that digital media have in different sectors of society.

Furthermore, the works of Aggio (2015) and Ituassu et al. (2019) also addresses the topic. The first investigates the impacts of Twitter on the campaign strategies of the 2010 presidential election, while the second study analyzes the US presidential election of 2016 and the Brazilian one in 2018 in a comparative perspective. In it, the authors discuss the impacts of digital communication on electoral campaigns from the concept of "computational advertising" by Woolley and Howard (2019), which proposes a communicational practice based on algorithms and automation that seeks to disseminate fake news and disinformation.

For the Brazilian case, however, a more cautious reflection is worth it. From the arguments about social networks presented so far, there is a somewhat complex scenario. Nicolau (2020) in his book "O Brasil dobrou à direita: uma radiografia da eleição de Bolsonaro em 2018" brings a series of questions and insights that help understanding both the Brazilian political scenario and the role given to social networks in the election, in special to Whatsapp and Facebook. In this

¹<http://g1.globo.com/tecnologia/noticia/2014/02/facebook-completa-10-anos-veja-evolucao-da-redesocial.html>

presidential election, Jair Bolsonaro arrived at the beginning of the electoral campaign known nationally and as a strong candidate in voting intentions.

Nicolau argues that the candidate annulled the traditional discussion of social and economic achievements of the Workers' Party (PT) governments and prioritized issues such as corruption and security. Combining his agendas with Anti-PT speeches, the author summarizes the candidate's core positions on the topic: "O PT é um partido de corruptos, que ameaça as famílias tradicionais e quer transformar o país em uma enorme Venezuela" (Nicolau, 2020, p. 82). With indications that the candidate dominated the discussions on digital platforms, the author cites two processes associated with Bolsonaro's performance in the campaign. The first, that the Bolsonarism has a strong urban and metropolitan component and, the second, that it is a technological component. This comes to light from 2010 when the country observed a strong expansion of broadband in the national territory and the growth of users on social networks (Nicolau, 2020, p. 99).

It is interesting to note the element of digital platforms in this analysis, as Bolsonaro's commitment to the digital field can be seen since 2015 when it began to gain prominence in the media. Being a work carried out in parallel with other undertakings of the candidate, as the author cites: trips around Brazil and participation in radio and TV programs.

According to what Nicolau presents, Santos Júnior (2019) brings to light a retrospective of Jair Bolsonaro's trajectory and communicational strategies since 2014 on the platform. It presents the genesis of an Anti-PT community that dialogues with the agendas and speeches confluent with Bolsonaro's and that has been notorious since the Workers' Party (PT) victory in the 2014 presidential election.

Thus, the theoretical discussion presented brings out the role given to Facebook both in political communication and in the Brazilian scenario. In it, once again, playing a non-peripheral role in the presidential election, in 2018 the platform proved to be essential for the democratic process, being present in the electoral dynamics and actively participating in the dynamics of the Brazilian electoral process.

3 Data

To understand the elements' disposition mobilized by Bolsonaro, this work uses a dataset provided by the Media Bias research project². The collected data are from the official Facebook pages of Jair Bolsonaro and other presidential candidates, their posts were downloaded according to the time series, between the beginning of the electoral campaign and the second round of the 2018 presidential election (Aug 15 to Oct 28, 2018). The analysis unit is based on the candidates' posts on the social network. The collection was performed through the data extraction API of the FanpageKarma tool³, which allows the extraction of retroactive posts in time, the data was exported on May 13, 2021. Some of the collected variables are presented below:

Table 1: Dataset variables

²<https://sites.google.com/view/mediabias>

³<https://www.fanpagekarma.com/>

Variable	Definitions
Date	Post's date.
Message	Post's Contend.
Network	Social Network.
Page	Monitored Page.
Engagement	Engagement
Link	Post's Link.

A limitation regarding data collection is the impossibility of collecting data from posts that were taken down or deleted at the time of data export, as the API used is limited and does not allow a perfect picture of the data in the retrospective period.

To facilitate the analysis, we have subdivided the paper into the three techniques used, each with its technical explanation followed by the analysis and results. Thus, it is possible to capture three insights about the electoral campaign promoted by Bolsonaro and other candidates on Facebook: (i) what content the Bolsonaro's network focused on in the campaign; (ii) the relationship between the textual content of Bolsonaro's posts and other candidates; (iii) and the content mobilized by Bolsonaro has changed patterns during the campaign.

To this end, we have organized the work in the following topics:

- Social Network Analysis (SNA);
- Classification of issues according to topics;
- Change Point Analysis;

4 Social Network Analysis

4.1 Methods

The proposal to use Social Network Analysis (SNA) is based on the potential to understand the relationships between political actors (Higgins and Ribeiro, N.d.) based on data collected from the candidates' public pages. For its application, the data to which the candidate the page belongs to and the textual content of the posts were used (following the same time frame, August 15th to October 28th, 2018).

The analysis referring to SNA (Csardi, 2020; R Core Team, 2013; Sposito, 2017; Ognyanova, 2019; Sadler, 2017; Murphy and Knapp, 2018) were subdivided into four frames, as shown in the table:

Table 2: Temporal frames partition

Frame	Period
Frame 1	From the start of the electoral campaign to the stab at Jair Bolsonaro (15/08/2018 to 06/09/2018).
Frame 2	From the stab in Jair Bolsonaro to the first turn (07/09/2018 to 06/10/2018).
Frame 3	From the first round to the second round of the election (07/10/2018 to 28/10/2018).

From the separation into four temporal frames, citation networks were created for each frame, where the message networks were processed and the candidate or candidate who owns the page corresponds to the “sender” and the candidate mentioned in the post message is the “receiver”. The political actors mentioned were limited to candidates competing in the presidential election.

The arrangement of the constructed graphs allows the creation of directed networks, that is, where the relationship has a meaning. In them, the nodes represent the metric degree of that actor and the thickness of the interactions correspond to the edges of the graph.

It is worth noting that for the challenge of candidate Lula as head of the slate by the Workers’ Party (PT) (on September 1, 2018), vice Fernando Haddad takes over the candidacy after the electoral campaign has already started. For this reason, it was decided to work the networks of both actors as only ones. Even though not running for the presidency, Lula’s page continued to be active and showing support for his replacement Haddad.

4.2 Analysis - Social Network Analysis on candidates

Secondly, with the Social Network Analysis (SNA), there is an effort not to capture the content of relationships (qualitatively) and references between presidential candidates on Facebook, but rather how these actors relate to each other, how and who are the main actors in electoral dynamism when it comes to the pages of candidates in the dispute.

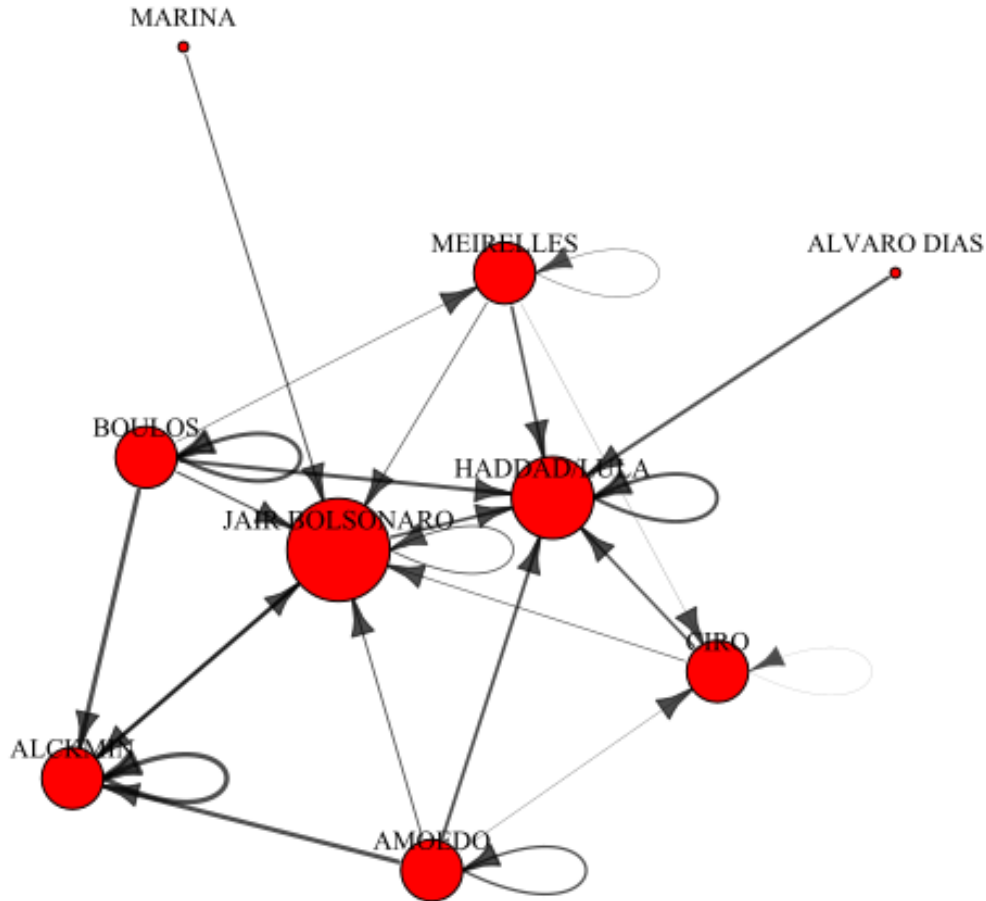
This passage provides elements to identify the most important actors in the network, that is, for each frame, we indicate the importance of the main actors based on centrality metrics, either by degree (the count of other people with which each participant is connected) or eigenvector centrality (a measure of the influence of a node in a network).

That said, we have analyzed the three-time frames (frames) used in the networks below.

The first frame, referring to posts made between August 15th and September 6th, brings interesting insights. Network 1 immediately brings two relevant pieces of information, the first one refers to the size of the nodes and the second to the thickness of the relationships. The size of the nodes in the network represents the metric degree of that vertex. This means that the larger the vertex’s node is, the greater the degree’s centrality is. In other words, the larger the node is, the greater is the access and role of the actor in this network. The second analysis refers to the thickness of the relationships, where the more intense it is, the more interactions (in this case, mentions made in the textual body of posts) between the sender (owner of the page) and the receiver (actor mentioned in the post). Those messages, from the sender to the receiver, are represented on the graph by the edges with the direction of the relationship-oriented by the arrow (arrow edge).

Thus, Network 1 stands out for having Bolsonaro (degree = 10) and Haddad/Lula (degree = 8) as the two actors with the highest degree of entry (degree), that is, they are the two vertices with the highest number of connections on the network. This shows how much the two actors are present in the interactions. While Bolsonaro only quotes Alckmin and Haddad/Lula, the Haddad/Lula vertex only quotes each other (in the analysis we consider the two pages, both of Haddad and Lula as a single Workers’ Party actor).

Figure 1: Quote network among candidates on Facebook on frame 1



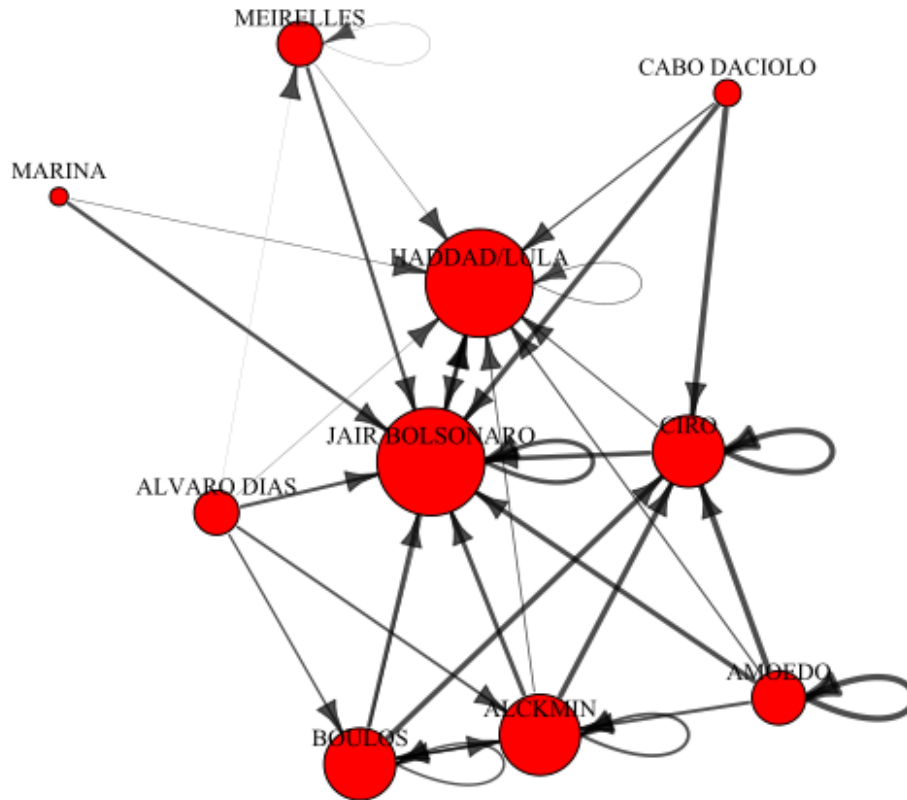
Source: Author's elaboration, based on Facebook page.

Another insight to look at is the eigenvector centrality. This centrality measure gives us a measure of the node's influence on the network. In the context of Facebook, where networks are built from declared messages in the body of posts, we have a high index in eigencentality that represents how important that political actor is in the Brazilian electoral scenario. As shown in table 4, the greatest eigencentality of this network is for the Haddad/Lula node, which has a value equal to 1.0. In addition to counting the influence of the node on the number of edges of the relationships, it also takes into account the strength of the relationships, in other words, it is the MOST vertex mentioned by the aforementioned actors.

Analytically, we currently have two facts that complement the information. First, during the beginning of the election campaign, Bolsonaro has clashed with Alckmin for fighting for the same "elector" positioned to the right of the ideological spectrum, and second, since Haddad/Lula was the biggest competitor among the presidential candidates⁴, justifying the mentions as an attempt to undermine or take a stand against the PT.

⁴<https://g1.globo.com/politica/eleicoes/2018/eleicao-em-numeros/noticia/2018/08/22/pesquisa->

Figure 2: Quote network among candidates on Facebook on frame 2



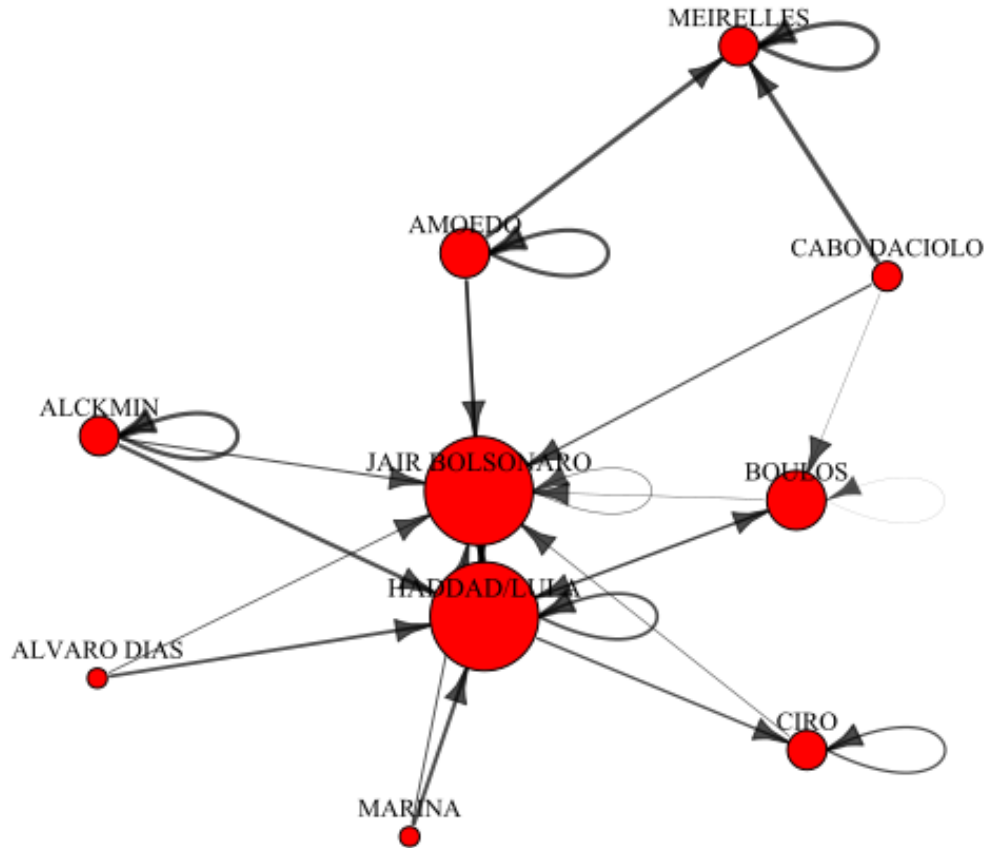
Source: Author's elaboration, based on Facebook page.

The second frame, in figure 2, refers to the posts made between September 7th and October 6th, presenting some distinctions when compared to the previous cut. Now, Bolsonaro and Haddad/Lula vertices share the same input degree (they have degree = 12), where the two actors interact with all vertices of the network. Keeping the same settings as the previous graph, node size, edge thickness, and directed networks. This graph introduces us to a movement where all political actors effectively direct their mentions to Bolsonaro, especially in the week after the attack that took place in the city of Juiz de Fora/MG. It is interesting to note that eigencentality (reported in table 5) which continues to attribute Haddad/Lula with the highest metric, 1.0, even with the attack on candidate Jair Bolsonaro.

From these changes in the citation networks among the candidates, the node representing Jair Bolsonaro keeps mentioning Haddad/Lula in its citation network. Whether these mentions are linked to the Anti-PT and moral speeches, or linked to the values of the Brazilian "família de bem" or linked to the attack, as shown in figure 4. In this case, we cannot accurately extract the real "stabbing effect" in this period, nor if it remains strong in the network.

datafolha-lula-39-bolsonaro-19-marina-8-alcmin-6-ciro-5.ghml

Figure 3: Quote network among candidates on Facebook on frame 3



Source: Author's elaboration, based on Facebook page.

Finally, we have the last network counting posts between the first and second rounds of the election (10/07/2018 until 10/28/2018). Before identifying the elements of graph 3, as the second round of the presidential election involves only candidates Jair Bolsonaro and Haddad/Lula, it is expected that the other candidates would reduce activity on the network, as they no longer participate in the electoral process directly. And, there is a reduction in the degree for all actors (except for Cabo Daciolo and Marina Silva, who kept the index in previous table 5).

Keeping the parity in metric degree for Jair Bolsonaro and Haddad/Lula, both have degrees equal to 11. Here is stated the maintenance of the eigencentality to remain at 1.0 for Haddad/Lula. Ultimately, this suggests the domain of information sharing and citation networks by candidate Bolsonaro, where the Workers' Party candidate does not express the strength to fight over the negative mentions on the platform.

Thus, we can identify three conclusions regarding social networks on Facebook during the 2018 election campaign, they are: (1) Bolsonaro and Haddad/Lula had prominence throughout the Facebook campaign period, compared to the other candidates. (2) Haddad/Lula presented for all frames eigenvector centrality equal to 1.0, being the most mentioned nodes in the period.

(3) Being more cited in this network of competitors, where candidate Jair Bolsonaro enters the campaign period as a phenomenon in the networks, puts Haddad/Lula in a fragile position regarding the positive mobilization of his network, despite being the central node on the networks.

5 Classification of issues according to topics

5.1 Methods

The classification was carried out based on the textual content of the posts based on keywords and, later, a manual review of the extracted terms that referenced the most relevant topics in Jair Bolsonaro's Facebook posts. We emphasize that due to limited time and resources, this process was carried out only for posts linked to candidate Bolsonaro's Facebook page regarding the beginning of the electoral campaign period and the second round of the 2018 presidential election (August 15th to October 28th, 2018).

The segmented topics chosen for the analytical composition of the work (Puschmann, 2019; Traber, 2019) were exhaustive and adjusted according to common or most relevant themes in the time series of candidate Bolsonaro's posts. The final composition of topics aggregates the main issues mobilized by the candidate in the period (see table 3).

The analytical composition for each post may contain more than one topic, an example of which comprises posts where the candidate directly links the Workers' Party (PT) or party leaders to corruption scandals,

Jair Bolsonaro: "Se eu usasse caixa dois, seria candidato pelo PT, eles privilegiam quem tem envolvimento com o crime. Não é à toa que o verdadeiro candidato deles está na prisão!"⁵. (18/10/2018)

5.2 Analysis - The topics distribution

Containing the textual data of the posts of candidate Jair Bolsonaro on Facebook, a temporal analysis was performed, which presents the composition of the topics mobilized on the candidate's page aggregated by week⁶. The choice to use the weekly chart was based on the analytical practicality of capturing the main elements mobilized in a time frame where they remain in the spotlight and are not presented as a momentary trend.

Graph 4 brings that the candidate's page predominantly contains content involving criticism and opposition to the Workers' Party (PT), composing the "Anti-PT" topic. Also, a considerable part of the posts focuses on corruption content and crimes involving the Brazilian political context, which is the "Corruption" topic. The third theme, also relevant to the analysis, is the "Moral/Family" topic representing speeches and expressions of a Brazilian traditionalism (Rennó, 2020; Nicolau, 2020) of moral and normative values.

Last, but not least, we have the topic that is cause for controversy and impasses about its real effect on the 2018 presidential election, the attack suffered by Jair Bolsonaro on September 6, 2018. Here, encoded by "Stabbing" refers to all posts that make direct reference to the attack suffered by the candidate.

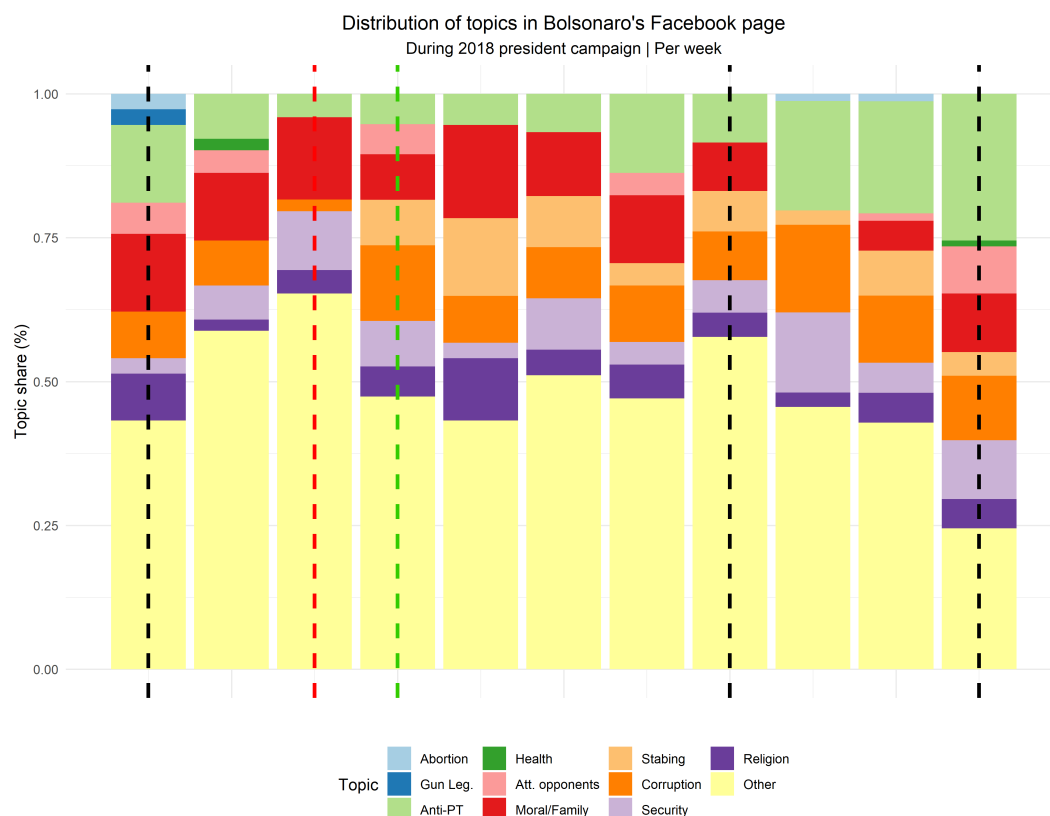
There are four dashed lines in the graph 4, starting from the chronological order, they represent the beginning of the electoral campaign period (August 16), the judicial process that ended

⁵<http://www.facebook.com/211857482296579/posts/1260857704063213>

⁶The original graph, aggregated by day is shown in Figure 7 in the Appendix.

with the challenge of the PT's candidacy, placing the vice-president of the ticket, Haddad, as the party's presidential candidate (September 1st), the attack on candidate Jair Bolsonaro (September 6th), the first round of the presidential election (October 7th) and, finally, the second round (October 28th).

Figure 4: Distribution of topics on Bolsonaro's Facebook page during 2018 presidential election by week



Source: author based on Facebook page.

Source: Author's elaboration, based on Facebook page.

From graph 4, there is more space given to posts related to the attack in the weeks close to the incident. This repercussion in the candidate's network is stronger immediately and weakens over time, but persistent until the end of the second round. What raises the question is whether this stabbing effect is maintained in the performance of the page with the potential to leverage and reach more users or is shown only as a showcase on the candidate's page, which enhances the contents that are conjugated to it.

On the other hand, a considerable part of Bolsonaro's network strategically focused on harsh and radical criticism of its main competitor, the PT. There is an expressive distribution of the Anti-PT topic throughout the entire time series, conveying the idea that, since the beginning of the campaign, candidate Jair Bolsonaro opposed the party, which, despite not being part of the government, transmitted the idea of continuity. However, beyond the information of what is stated on the Facebook platform, Jair Bolsonaro's speeches and positions in interviews during his parliamentary career place him as an outlier of the political class that shows an alternative

to the Workers' Party (PT) governments.

In the same way, the clash or antagonism that Bolsonaro puts himself against the Workers' Party is very much associated with harsh criticism of petist corruption scandals, such as the Mensalão and the Lava-Jato Operation (Samuels and Zucco, 2018; Layton et al., 2021; Rennó, 2020). Many posts link corruption associations of the Workers' Party governments or statistical information negatively addressing the increase in violence, homicides or even economic aspects presented compared to PT governments. Thus, this strong association with the Anti-Petist critical portfolio is formed mainly in anti-corruption speeches and messages.

With these elements presented, this descriptive block raises a question about the impact of the "stabbing effect" on the metrics of reaching users and shows how Bolsonaro provided the critical and communicative elements to the Workers' Party in its favor, strategies that were implemented since the beginning of the electoral campaign.

6 Change Point Analysis

6.1 Methods

To understand if Jair Bolsonaro's posts had a greater viralization effect or reach on the Facebook platform during the electoral campaign, the time series analysis was used. The aim is to identify whether, at some point in time (crossed by campaign events and political events), the themes of the posts (according to the classified topics) are reflected in the engagement of the candidate's posts.

For this, the change points method was applied. The detection of change points allows the identification of moments or occurrences where the probability distribution of a time series changes. Thus, identifying change points in the time series for the candidate Bolsonaro's network and linking them to the facts or events that occurred, allows us to understand how such events affected the engagement metrics in his posts on the network (Lesmeister, 2013; Rich, 2017; Killick et al., 2016).

The identification process of the change points was performed using the Pruned Exact Linear Time (PELT) method (Wambui, Waititu and Wanjoya, 2015), which analyzes the change point's from the changes in the mean and variance of the metric (engagement) in the time series.

6.2 Analysis - Change Point on engagement

Before the change points analysis according to the available time series, it is necessary to briefly contextualize the formal concept of engagement and why it was chosen for the analysis.

By definition, we consider engagement for the Facebook platform as:

The number of all interactions for each post. Interactions are likes, haha, etc. as well as comments and shares or retweets. For each post, the sum of interactions is divided by the number of followers at the time of the post. Then you add up the values of all posts. Finally, you divide this sum by the number of days in the period. (...). Engagement shows how successfully a profile encourages users to interact. By dividing by the number of followers, the Engagement becomes independent of the size of the profile. This makes profiles comparable⁷.

⁷<https://academy.fanpagekarma.com/en/metrics/>

Despite bringing the formal concept of engagement (the metric is calculated by the Fanpage Karma⁸ tool itself), and together with the exported data, comes the engagement metric already calculated for each of the exported posts. Despite that, it is interesting to bring the notation to the working concept to be clearer.

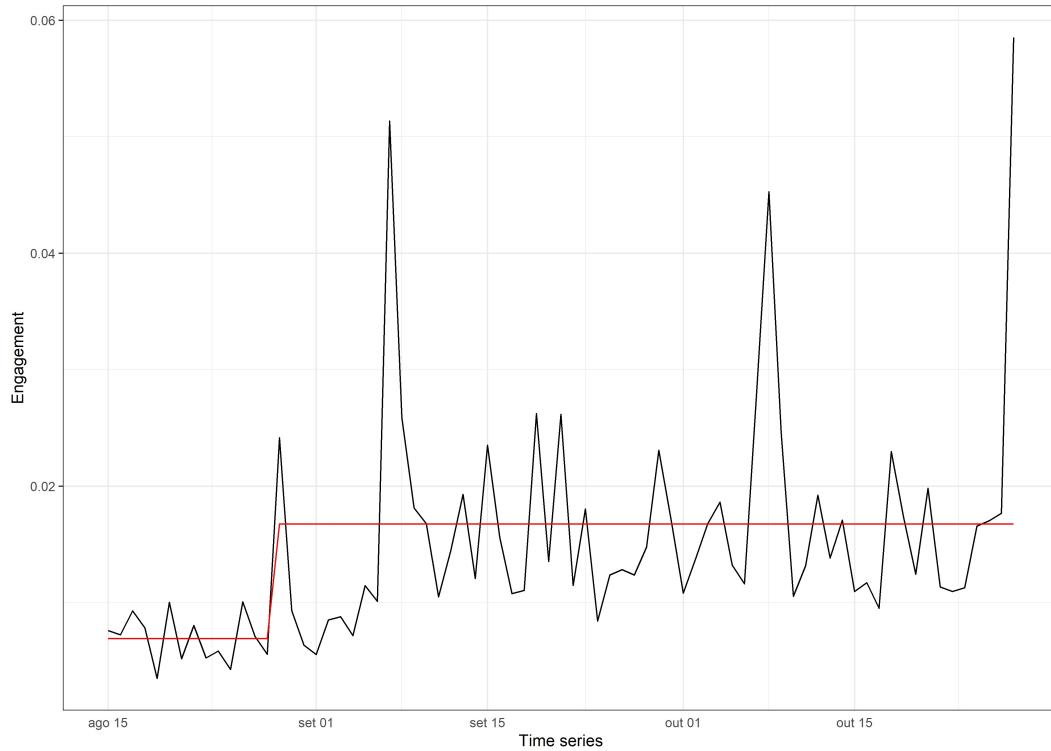
$$Engagement = \frac{\sum \frac{Interactions}{Followers_{post\ data}}}{Num. days T.M.} \quad (1)$$

Engagement gives us a measure of "success" between posts on the same page or different pages. The focus is to analyze, based on the content provided by Bolsonaro on the network (per day), whether there is a point of change in the metric of posts, the distinction of data between the changing points, and which electoral events may link to these possible changes detected.

Having clarified the justification for using engagement to detect change points on candidate Jair Bolsonaro's page, we moved on to the analysis.

Graph 5 represents the time series of post-engagement aggregated by day. In this chart, where there is no distinction between the content of the topics covered by post, we chose to consider the median engagement of all posts per day to avoid possible bias when working with a complex metric⁹.

Figure 5: Change Point in the engagement of Bolsonaro's Facebook page during 2018 presidential election by day



Source: Author's elaboration, based on Facebook page.

⁸<https://www.fanpagekarma.com/>

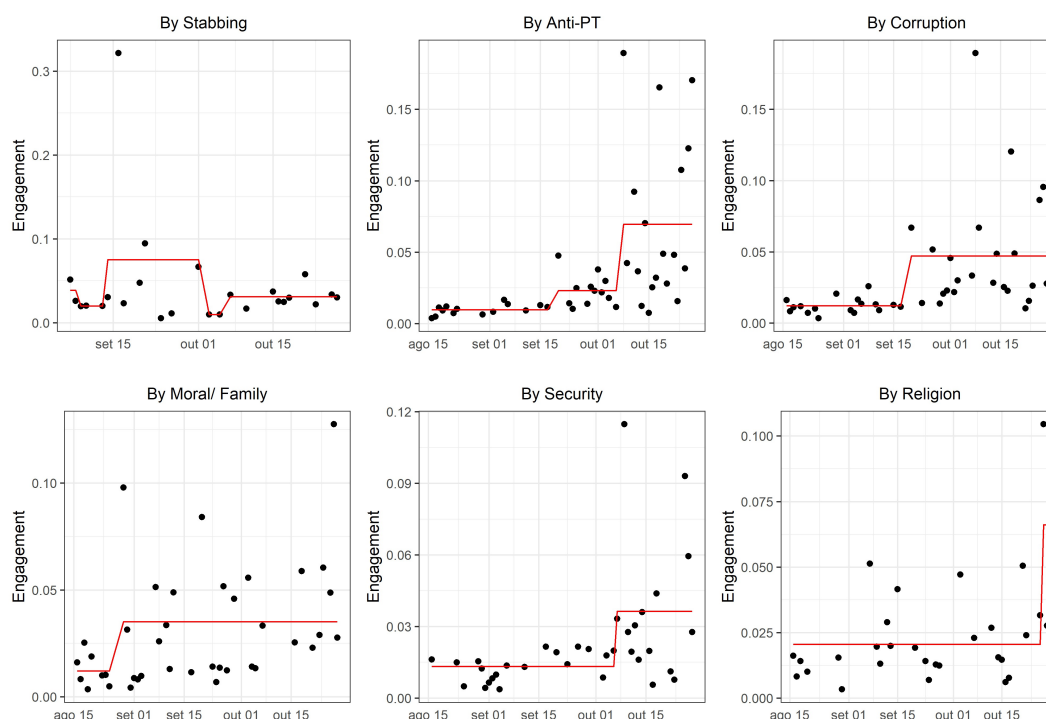
⁹Note: All engagement values per post were calculated by the Fanpage Karma platform itself

In this sense, the Change Point Analysis technique was applied, which accounts for changes in the mean and variance from the algorithm for estimating change points in the time series. For the historical series, only one change point was identified on August 28th, when candidate Jair Bolsonaro was interviewed in Jornal Nacional¹⁰ and gained certain notoriety and recognition by the general public making a public appearance.

As a general result, considering all topics in the same historical series in this analysis, there is a change point that is imbricated in possible biases or that is simply masked under various effects. To scrutinize and confirm whether this point of change represents the effect of engagement in the series, we replicated the same technique, from Change Point Analysis to the PELT method for each of the most expressive topics in the distribution of Jair Bolsonaro's page (see figures 7 and 8).

Graph 6 indicates in a precise form the composition of various effects (according to posts related to them), based on the assumption that different content mobilizes users with different preferences, having no problem considering distinct contents in multiple time series.

Figure 6: Change Point in the engagement of Bolsonaro's Facebook page during 2018 presidential election by topics



Source: Author's elaboration, based on Facebook page.

Note: The change point model was elaborated using PELT method to identify the best changing point in time series. Each of those models, were separated by topics elaborated from the categorical classification applied in pre-processing fase.

From this, there are some points to be clarified: (1) In fact, the "stab effect" was the biggest

¹⁰<https://g1.globo.com/jornal-nacional/noticia/2018/08/28/jair-bolsonaro-psl-e-entrevistado-no-jornal-nacional.ghtml>

turning point found, but as a temporary effect, the attack discourse does not hold up in the second round. (2) Moral and family values remain unchanged between the first and second round. (3) The public safety topic has a change point on the week prior to the first round and remains in the second round. (4) The mobilization of religious elements on the candidate's Facebook was not relevant in terms of change points, nor does it represent an essential part of the engagement in the network. (5) The Anti-PT topic presents two progressive change points regarding engagement, the first comes in a time frame close to the stab effect, and the second, in the week before the first round of changes, where it remained. (6) Last but not least, the topic of corruption also presents a turning point with the first of Anti-PT and the Stabbing effect.

This result suggests that the stabbing effect, despite being temporary, was combined with Anti-PT and corruption content as a campaign communicational strategy, helping to establish a viable opposition to the Workers' Party candidate and to have its network leveraged.

7 Conclusion

The 2018 Brazilian presidential election culminated with a former army captain and far-right candidate sitting at the head of the larger democracy in Latin America. Breaking expectations and mobilizing strategies not yet adopted before, Bolsonaro stood out by taking a stand against the rights of the LGBTI community, women's rights, income distribution policies, and mobilizing the evangelical vote (Rennó, 2020; Nicolau, 2020; Sarmiento, Massuchin and Mendonça, 2/2021; Layton et al., 2021). Bolsonaro solidified his position as a hindrance to secular and progressive values with solid positioning and assertive content. By politicizing Facebook, he found in that Social Media a tool not explored previously by other candidates in previous elections - one that drove him to victory and that had led others to a similar path in other places.

Building on that, in addition to the demographic variables that electoral studies most often rely on, it is possible to contribute to the field by exploring aspects of a digital perspective strategy. Thus, the results achieved here can be summarized below:

- The relevant distribution of the "Anti-PT" topic throughout the time series suggests that, since the beginning of his campaign, Bolsonaro was already in opposition to the Workers' Party.
- (1) Bolsonaro and Haddad/Lula were prominent throughout the Facebook campaign period; (2) Haddad/Lula presented the most cited nodes in the period for all frames; (3) Haddad/Lula, despite being the central node in the networks, suggests an inability to react to criticism from competitors.
- Bolsonaro's Facebook campaign focused on mobilizing the "Anti-PT" (Anti-Workers' Party) electorate, attacking Haddad/Lula mainly with speeches of corruption that heightened in the second round (see figures 4 and 6).
- The stabbing effect, although temporary in Bolsonaro's network, suggests the potential to leverage other contents, such as Anti-PT and corruption.

Finally, the discursive construction of Bolsonaro's positions on Facebook has been worked on since before his electoral campaign, indicating technical preparation and pointing towards a powerful strategy, since Facebook pages referring to the political character Jair Bolsonaro have

been featured in Anti-PT (Anti-Workers' Party) network ever since 2014 (Santos Junior, 2019, p. 60).

From this work it is expected to develop initiatives that mainly explore three themes, they are:

1. Apply comparative analysis to Lula/Haddad in communicative strategies;
2. Explore the dimension of candidates' page resources as a unit of analysis (instead of posts) to identify its network campaign event (since, for pages, there is a composition of metrics before and after treatment).
3. Investigate what uses and resources other social networks had as well as their impact during the campaign (Whatsapp to trigger messages, Instagram to show portfolio and Twitter to position themselves);

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8 Appendix

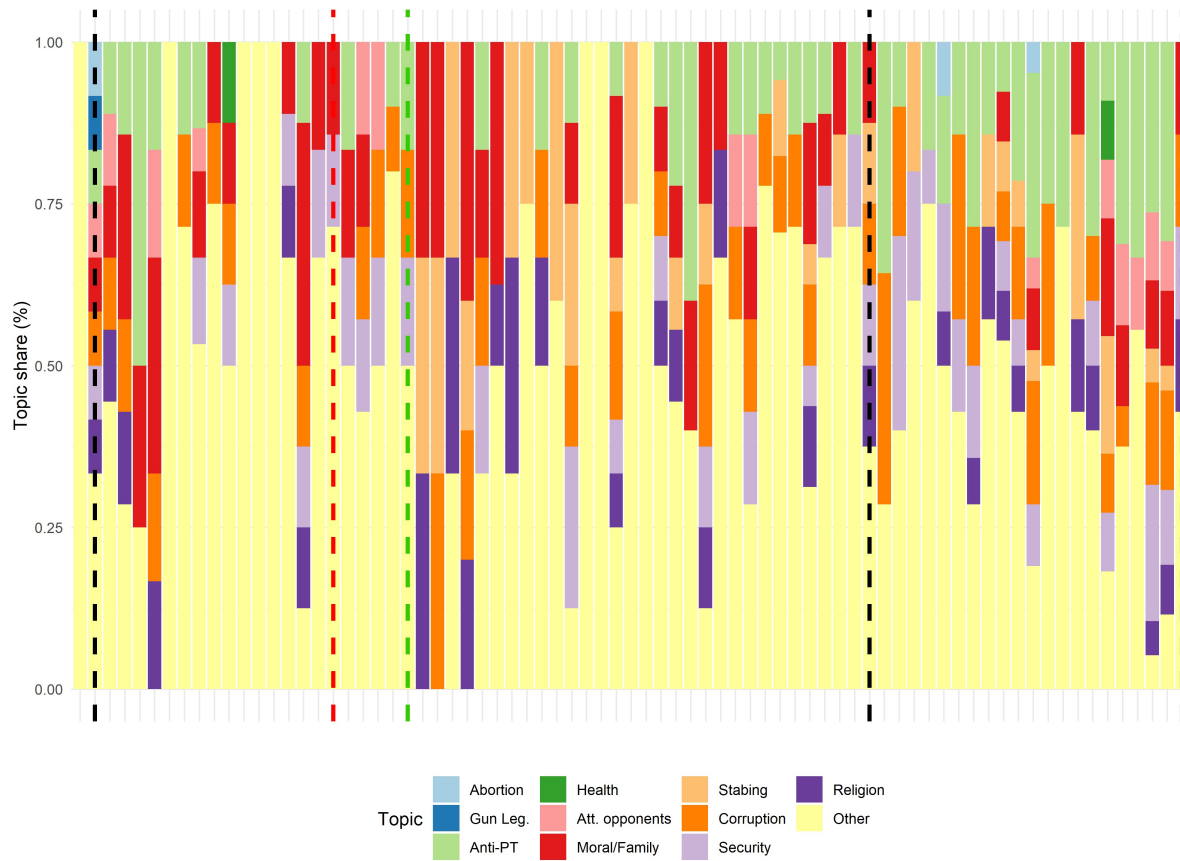
8.1 Topics composition classification

Table 3: Topics composition table

Variable	Description
Abortion	Abortion defense.
Gun Leg.	Legalization of gun ownership.
Anti-PT	Posts referenced as attacks or criticisms with direct mentions to the Workers' Party (PT) or personalities linked to the party.
Health	Public Health (e.g., SUS).
Att. opponents	Explicit attack or discrediting of political opponents (except for actors linked to the PT).
Moral/Family	Posts related to family and moral values.
Stabbing	Posts related or that make explicit mention of the attack suffered by candidate Jair Bolsonaro.
Corruption	Attacks or mentions of corruption or corruption scandals linked to actors in the Brazilian political scene.
Security	Posts linked to public safety and the criminalization of violence (e.g., defense of police attitudes or criticism of indicators of violence and mortality).
Religion	Direct or explicit mentions to actors or religious institutions or arguments invoking religious elements.
Other	Elements that do not fit into the main themes mobilized or attitudinal issues that were not expressive (e.g., Taxation of large fortunes, gay marriage, capital punishment or income redistribution).

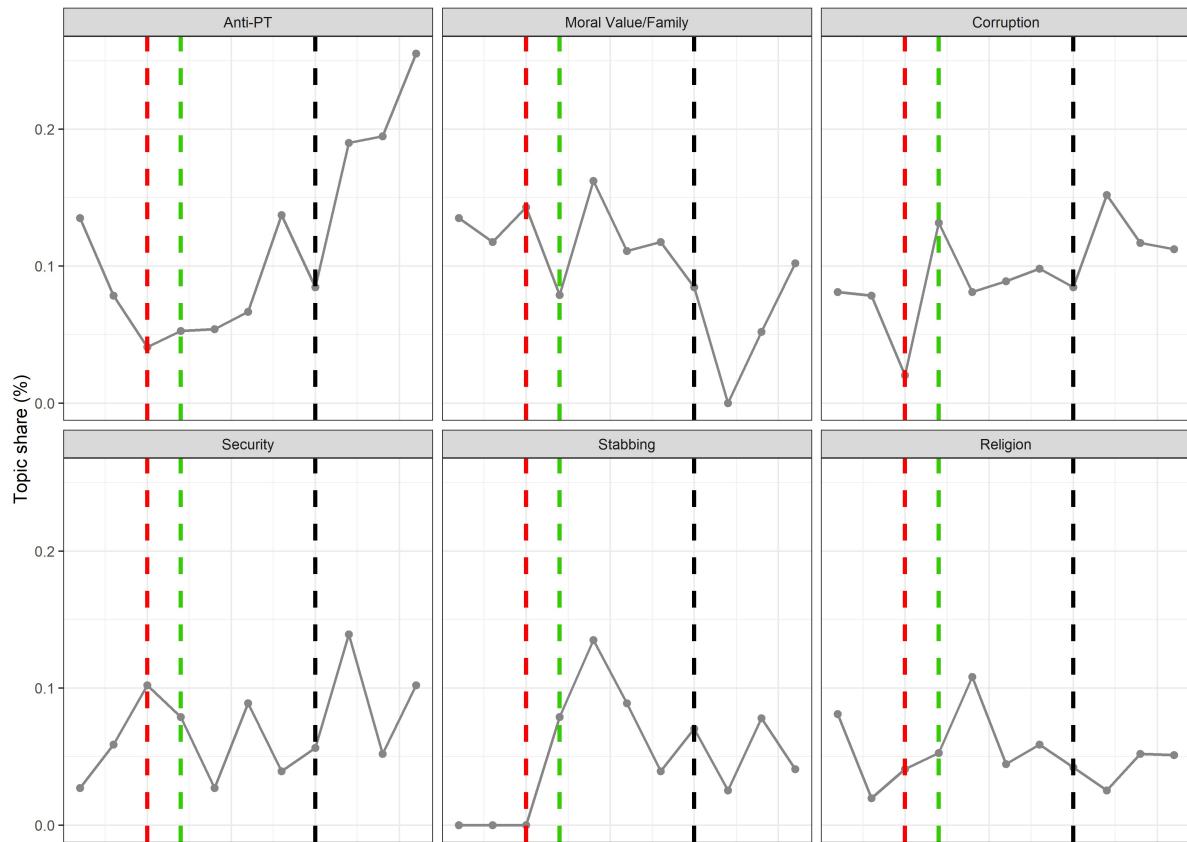
8.2 Topics distribution time series

Figure 7: Distribution of topics on Bolsonaro's Facebook page during 2018 presidential election by day



Source: Author's elaboration, based on Facebook page.

Figure 8: Distribution of topics on Bolsonaro's Facebook page during 2018 presidential election by week



Source: Author's elaboration, based on Facebook page.

8.3 SNA

Appendix information for Degree and EigenCentrality metrics in delimited frames.

Table 4: Metrics in Frame 1

	deg	eig
CIRO	6	0.0006858
MEIRELLES	6	0.0011214
JAIR BOLSONARO	10	0.0032588
AMOEDO	6	0.0075372
ALVARO DIAS	1	0.0042102
HADDAD/LULA	8	1.0000000
MARINA	1	0.0000069
BOULOS	6	0.0017961
ALCKMIN	6	0.0000090

Table 5: Metrics in Frame 2

	deg	eig
ALVARO DIAS	5	0.0175292
MEIRELLES	5	0.0008532
MARINA	2	0.0031176
HADDAD/LULA	12	1.0000000
BOULOS	8	0.0020802
ALCKMIN	9	0.0086001
JAIR BOLSONARO	12	0.0040099
CIRO	8	0.0042047
AMOEDO	6	0.0067041
CABO DACIOLO	3	0.0003573

Table 6: Metrics in Frame 3

	deg	eig
BOULOS	6	0.0330387
JAIR BOLSONARO	11	0.1434249
CIRO	4	0.0008121
HADDAD/LULA	11	1.0000000
ALVARO DIAS	2	0.0029119
AMOEDO	5	0.0009082
MARINA	2	0.0022119
ALCKMIN	4	0.0008041
MEIRELLES	4	0.0000007
CABO DACIOLO	3	0.0001240