Article

Political discourses, ideologies, and online coalitions in the Brazilian Congress on Twitter during 2019

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Abstract

The aim of this research is to describe the pattern of interactions of Brazilian legislators on Twitter during 2019 in the construction of political discourses. Based on 20,076 replies during 2019, posted on Twitter by 514 Brazilian legislators, we conducted descriptive analysis of legislators' Twitter profiles, social network analyses from their interactions, and content analysis of the messages. We found that (1) there are large disparities between legislators in the use of Twitter; (2) the pattern of interactions depicted five clusters defined by political affinities; (3) each cluster had different features regarding their composition and impact; (4) the centrality of the legislators within the network was positively associated with public endorsement on Twitter; and (5) the topics of messages within the clusters reinforce discourses aligned to political ideologies. We argue that the pattern of interactions on Twitter allows to identify online coalitions that reinforce particular discourses within the Brazilian parliament.

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Social media is transforming the production of political discourses and can influence
political behavior. Political communication in social media has received particular atten-
tion during agitated times, such as during protests and social movements (Casas et al.,
2016; Jost et al., 2018a), presidential elections (Barberá and Rivero, 2015; Guo et al.,
2020), and with a focus on the Global North (Farrell, 2012; Jungherr, 2016). But less is
known about how social media capture nuances regarding the overall arrangement of
political systems and the evolution of ideologies that feed public opinion in the Global
South. We seek to fill this gap by analyzing the production of political discourses in
Brazilian politics through a particular social media platform (i.e. Twitter) during the first
year of the 56th legislature, elected in 2018. Particularly, we analyze the pattern of inter-
actions among Brazilian members of Congress (MCs) on Twitter to identify the forma-
tion of online political coalitions and the production of political discourses.

    Analyzing the production of political discourses in the Brazilian Congress provides
a unique case for understanding the role social media plays in political systems in sev-
eral ways. First, Brazil's Congress is a complex structure composed by a high number
of political parties. In this context, MCs are expected to build political coalitions
beyond their political parties to get support for advancing their political agendas.
These coalitions, however, are hard to see to the naked eye, since it involves subtle
ways by which MCs endorse (or reject) particular ideas from other MCs. Second, the
Brazilian Congress recently experienced important transformations in terms of its
political communication strategies—for the first time in Brazilian democracy, a presi-
dent was elected without the support of traditional political parties, with few political
coalitions and reduced coverage by the mainstream media. Similarly, online communi-
cation played a pivotal role in the 2018 elections, since one political party—the PSL—
relied on this strategy and gained 52 seats in Congress, despite having poor
representation previously. Thus, the analysis of online interactions can help identify
what groups are being formed within Congress, and whether such groups share char-
acteristics and ideologies in their production of political discourses. We argue that
Brazilian Congress is ideologically organized on Twitter by clustering MCs with both
political affinities and rivalries that reinforce particular worldviews about political
issues. This method allows us to add another layer of research on how political repre-
sentation is construed on social media in Brazil.

Political discourse, social media, and democracy

Political discourse is a concept that integrates many elements linked to the use of lan-
guage (i.e. contexts, events, history, shared beliefs) in everyday interactions (Van Dijk,
2002). From the perspective of Van Dijk (2003), political discourse is just the "discourse
of politicians" (p. 212); that is, a class of genres articulated by political actors and

circumscribed to the domain of politics (Van Dijk, 2003). Thus, political discourse is the overall framework that articulates the text and the context of the communication process.

The use of social media influences the production of political discourses and the functioning of democratic regimes. Social media can improve the flow of information between citizens and politicians/institutions, increase diversity, inclusion, and accountability (Gomes, 2018). Similarly, social media has facilitated civic participation by allowing people to share information about mobilizations, reinforce their motivations, and find support networks (Jost et al., 2018a). Besides, social media has been used in politics to reach potential voters, reinforce ideologies, and gain public support (Barberá and Zeitzoff, 2018). Under this perspective, social media can be used to deliver information (Theocharis et al., 2020) and to craft cyber-rhetoric during election campaigns (Jungherr, 2016). But the use of social media in politics can also undermine democratic regimes. The use of disrespectful and derogatory language in social media can instigate political polarization and enhance anti-democratic narratives that prevent people from participation in political debates (Gervais, 2015; Theocharis et al., 2016).

The use of social media shapes the production of political discourse and the communication between politicians and citizens. Politicians use Twitter as a tool for broadcasting and criticizing political adversaries, rather than for promoting deliberation. Instead of discussing social issues on Twitter, Politicians used it for self-promotion and agenda-setting in the United States (Hemphill et al., 2013), for campaigning and critiquing adversaries (e.g. economy, welfare) (Graham et al., 2014), and for reinforcing political ideas and identities (López-Meri et al., 2017).

The use of Twitter has amplified the diffusion of ideological content and has fragmented online communication. On one hand, extreme political views interfere with the flow of interactions and communications. For instance, extreme political parties across 26 European countries hardly interact with other parties and displayed fewer patterns of associations (Bright, 2018). In the United States, Twitter messages about social issues intertwine both political and extremist views (Graham, 2016). In Europe, some politicians use Twitter for populist purposes by discrediting economic elites (left-wing politicians) and the media (right-wing politicians) (Engesser et al., 2017). In Latin America, politicians are very active on Twitter, and some of them use it for spreading ideas and attacking their critics (Waisbord and Amado, 2017).

The fragmented communication in Twitter is also determined by people's participation in groups with relatively homogeneous characteristics—homophily (Farrell, 2012). For instance, Himelboim et al. (2013) found that political discussions on Twitter reflect high levels of political homogeneity; Guo et al. (2020) showed that Twitter communities during the 2016 American elections not only had high levels of political homogeneity, but that communities talking about Trump depicted more polarized opinions than communities talking about Clinton. Indeed, Colleoni et al. (2014) found that engaged Republicans in the United States had higher levels of political homophily in their network structure when compared to engaged Democrats. As such, these findings suggest the existence of ideological differences in the political homogeneity shown in social media.

Political discourse, social media, and ideologies

Political discourse and ideologies are concepts widely discussed in social sciences (e.g. Fairclough, 2010; Foucault, 1971). For the purpose of this article, ideologies are defined as shared belief systems that organize the way people understand the world, others, and the self (Van Dijk, 2003). Unlike political discourse that encompasses the overall frame for using the language, ideologies are related to the specific content of the messages related to beliefs and values about something. In this vein, political ideologies comprise worldviews about what is and what ought to be in the domain of politics, helping people to make sense of reality and their political behavior (Jost, 2006). As such, ideologies are embedded in political discourse in many explicit and subtle ways, with the potential to affect political decisions (Van Dijk, 2002).

In this regard, political discourses articulate ideologies on social media by creating frames for understanding the world (Entman and Usher, 2018). Indeed, political actors exert "discursive power" in online communication by introducing, amplifying, and maintaining topics, frames, and actors that lead the political debate (Jungherr et al., 2019). As such, political communication on Twitter discloses ideologies through the content and tone of the messages, spreading ideas that are not openly shared, such as authoritarianism, racism, xenophobia, and so on. Therefore, political communication on Twitter has been used to make normative claims that justify politicians' ideological positions (Jakob, 2020); and to undermine institutional trust through the use of derogatory language toward the media and political opponents in Trump's political campaign (Ross and Rivers, 2018). Similarly, authoritarian regimes use social media to discredit the opposition in Azerbaijan (Pearce, 2015), for glorifying politicians in power and denigrating their adversaries in Pakistan (Masroor et al., 2019), and for delegitimizing political adversaries and gaining support of military interventions in Colombia (Barreto-Galeano et al., 2019).

Besides, online behavior and social media consumption can reveal people's political ideologies. In this regard, Barberá (2015) found that people were likely to follow like-minded people on social media, and therefore, the structure of their online social networks serves as an indicator of their political ideology. For instance, the network of communications among politicians in the United States revealed well-defined political partisanship clusters (Conover et al., 2012). As such, partisanship signals people's political ideologies, since people affiliate to political parties with which they share worldviews or identities. These ideological differences embedded in social networks create "echo chambers" that reduce diversity in online interactions (Barberá et al., 2015).

The use of Twitter along political parties can disclose ideological differences. For instance, conservatives (vs liberals) are more motivated to interact with ideologically similar others and to engage in homogenous social networks (Jost et al., 2018b). Similarly, conservatives were more active on Twitter when talking about political topics (Barberá et al., 2015) and were more keen to prioritize topics related to traditional values, national symbols, terrorism, crime, and other potential threats (Sterling et al., 2020). As such, the underlying ideologies embedded in political discourses also condition how people interact with each other on social media.

However, the use and influence of social media on political discourses should be examined through the lens of specific political contexts. Particularly, Brazil provides a different scenario from the traditional American bipartidism, and so demands a deeper look at how political discourses interact with social media. For instance, politicians linked to the traditional left in Brazil have been more active on Twitter than other political parties, had more followers on Twitter, and were more focused on mobilizing people to engage in social movements (Braga and Carlomagno, 2018; Pereira et al., 2017). This is a different pattern from the American system, where Republicans are more active on social media than Democrats (Barberá et al., 2019). Indeed, the size of politicians' followers on social media in Brazil was positively correlated with the votes they garnered in elections (Marques et al., 2014); and, Twitter had a significant effect on the Congress election outcomes in 2010 (Gilmore, 2012). Besides, political parties linked to the traditional right in Brazil established more relationships with like-minded users, creating clusters of relatively homogeneous legislators (Amaral and de Pinho, 2017). This kind of homogeneous online interactions can be useful strategies to spread ideological discourses (e.g. depicting threats posed by criminals, communists) during the first 100 days in office of the Brazilian president Jair Bolsonaro (Almeida et al., 2018).

Furthermore, the Brazilian political context introduces nuances for analyzing online political communication. Despite the generalized support for democratic institutions after the military dictatorship that lasted from 1964 to 1985, the 2018 presidential elections were the first in the history of recent Brazilian democracy in which both the president and a bloc of new parliamentarians were elected after using militarized and anti-establishment discourses in social media (Pereira et al., 2017). Besides, the multiparty—and fragmented—political Brazilian system demands the formation of legislative coalitions to support the executive power. These coalitions have been characterized based on traditional categories related to the parliamentary activity (e.g. relations between political parties, voting patterns of the benches) that overlook the way how the political activity is represented in social media. Since social media is becoming more popular among political actors, it becomes important to understand the interactions and discourses that compose online political communication.

Besides the specificities of the Brazilian political system, the features of the Twitter platform also shape political communication. For instance, using Replies allows identifying political actors engaged in online communication; and Hashtags help to capture particular topics that facilitate the flow of information (Bruns, 2012). Using replies and hashtags on Twitter allows unveiling the formation of clusters based on political actors' interactions, along with the trending topics embedded in each group. Therefore, replies and hashtags contribute to crystallize topics and clusters that demarcate positions in political discourses, signal the occurrence of relevant events,[1] and indicate the spread of information and collective actions (Bruns, 2012; Freelon et al., 2015; Jost et al., 2018a).

The present research

The aim of this study is to describe the production of political discourses and ideologies of Brazilian MCs through their online interactions on Twitter during the course of 2019. Particularly, we aim to identify patterns of online relationship between MC's,

along with the content of the messages implied, to unveil the formation of online political communication clusters. Besides, we examine whether political ideology accounts for the formation of these clusters, and whether the messages' content shed light on ideological repertoires that go beyond the left-right political spectrum and partisanship. We integrate the analysis of MCs' Twitter profiles and their interaction networks based on replies with the analysis of the topics covered in their messages. This approach relies on emerging theoretical approaches discussing the exercise of discursive power and multimodal communication processes, which demands an integration of political communication, social sciences, and computational tools (Entman and Usher, 2018; Jungherr et al., 2019; Theocharis and Jungherr, 2020). We argue that interactions on Twitter reveal aspects of an ideological organization of Congress by clustering MCs with political affinities that reinforce the production of particular worldviews, and with political rivalries that strengthen their positions by using confrontational strategies.

Method

Dataset

We identified Brazilian MCs with an active Twitter account (N_{MC} = 514 users, 436 out of 513 Federal Deputies, and 78 out of 81 Senators) and retrieved all tweets posted by them during 2019 (N_{Tweets} = 438,082). From this data corpus, we focused on Twitter replies because these include both relational and textual data that allow us to depict both the structure of MCs' relationships as well as the topics covered in the interactions. After excluding undirected messages and self-replies (i.e. message threads), our final dataset consisted of 20,076 replies.

Variables

We used three pieces of information for our analyses. First, the MC's profile information on Twitter, including the number of people following the MCs (followers) and followed by the MC (following). This information was retrieved by using rtweet package (Kearney, 2019) implemented in R software (R Core Team, 2020). We also identified the MC's political party and home state from the official congressional website.

Second, we use information from the Tweets to account for the MC's potential diffusion capacity. Specifically, we used the number of messages posted by MCs in their timeline (statuses). We also computed a measure of impact that consisted of the sum of *likes* and the sum of *retweets* in the MC's replies. Thus, higher values of likes and retweets indicate that a particular MC achieved more impact by getting more people's endorsement.

Third, we used centrality measures provided by social network analysis conducted on the MC's reply network. Centrality measures are computed on the basis of connections between people, which signal their role in the overall network (Scott, 2017). We focused on the degree of centrality, which is the number of connections established by each MC

with other people in the network. Higher values of degree centrality indicate a more active user—who provides and receives more replies—within the network (Scott, 2017).

Procedure

We combined quantitative and qualitative approaches to analyze the data. From a quantitative perspective, we first described the overall information from a user's profile in terms of their diffusion capacity and achieved impact on Twitter (i.e. volume of tweets, retweets, and likes). Second, we conducted a social network analysis based on Twitter replies, in which the nodes were the MC, and the edges were the replies.

Third, we employed a clustering algorithm to detect groups of MCs based on the probability of interacting between them (Traag et al., 2019). This algorithm allows us to identify groups of MCs that concentrate more activity between them, indicating possible niches of communication. We described the features of the clusters in terms of political party to examine the clusters' political homogeneity and identified the diffusion capacity and achieved impact per cluster.

Fourth, we compared the clusters in terms of the achieved impact among the public and conducted ordinary least squares (OLS) regression to test the relationship between MCs' centrality metrics and their achieved impact on Twitter. This analysis helps to establish whether the role of the MC within the online network is linked to their overall public endorsement on Twitter.

Finally, from a qualitative perspective, we qualify aspects of the MCs' ideologies and political discourses by looking at the messages' content. On one hand, we analyzed the topics of the most frequent hashtags used for each cluster (Bruns, 2012). On the other hand, three researchers performed an exploratory qualitative content analysis of the 200 most impactful (sum of likes and retweets) responses per cluster ($n = 1000$) to identify the topics and formats of the messages. We created meaningful categories for coding the material from a grounded theory perspective and relied on expert judgment and intersubjective agreement for the coding (Bardin, 2002). Every message was coded and reviewed by different researchers; and the disagreements were solved by reaching consensus between researchers. We obtained four categories regarding the message format (i.e. attack-criticize adversaries, defend-endorse allies, inform the public, and spreading beliefs) and six categories regarding the topics (i.e. bills, relationships, social issues, institutional activities, international relations, and private life) (see Table S6 for the coding scheme).

Results

Twitter profiles and diffusion capacity of Brazilian MCs

In Table 1, we present the information about Twitter profiles for the top 10% of Brazilian MCs with the highest diffusion capacity, as measured by the number of Followers, Likes, and Retweets received in their posts (complete information is available in Table S1 in the supplementary material[2]). A preliminary look at the data suggests that Brazilian MCs produced a large number of posts during 2019, yet with

Table 1. Twitter information from members of Congress profiles and potential impact.

No.	User account	User name	User profile		Following	Potential impact		
			Party	Followers		Statuses	Favorites	Retweets
1	CarlaZambelli38	CARLA ZAMBELLI	PSL	481,260	291	13,805	1,535,056	302,058
2	joicehasselmann	JOICE HASSELMANN	PSL	299,960	146	51,894	478,323	69,519
3	danielPMERJ	DANIEL SILVEIRA	PSL	56,377	334	8720	193,602	33,998
4	Biakicis	BIA KICIS	PSL	344,631	912	21,946	1,033,535	215,954
5	BolsonaroSP	EDUARDO BOLSONARO	PSL	1,921,509	630	18,466	1,066,375	177,712
6	carlosjordy	CARLOS JORDY	PSL	161,461	974	5294	451,716	76,507
7	pedro_lupion	PEDRO LUPION	DEM	7552	482	6235	40,216	7444
8	alefrota77	ALEXANDRE FROTA	PSDB	39,371	682	10,970	66,949	7127
9	SorayaThronicke	SORAYA THRONICKE	PSL	127,659	614	2721	69,036	10,343
10	JoseMedeirosMT	JOSÉ MEDEIROS	PODE	89,292	1665	50,169	65,862	10,000
11	filipebarrost	FILIPE BARROS	PSL	176,875	432	2313	416,543	79,134
12	kimpkat	KIM KATAGUIRI	DEM	544,256	680	5603	150,587	14,012
13	aureacarolinax	ÁUREA CAROLINA	PSOL	66,647	2776	8353	73,486	10,506
14	erikakokay	ERIKA KOKAY	PT	124,229	479	25,438	79,183	19,578
15	jandira_feghali	JANDIRA FEGHALI	PCdoB	293,876	828	25,452	47,569	6127
16	alesilva_38	ALÉ SILVA	PSL	61,306	348	1414	138,212	26,077
17	pauloteixeira13	PAULO TEIXEIRA	PT	131,512	59,957	26,446	63,043	12,383
18	marcofeliciano	PR. MARCO FELICIANO	PODE	601,370	45	50,563	255,494	55,564
19	depheliolopes	HELIO LOPES	PSL	142,845	218	12,594	58,412	8172
20	gleisi	GLEISI HOFFMANN	PT	655,492	790	14,093	41,787	8424
21	FFrancischini_	FELIPE FRANCISCHINI	PSL	89,939	352	4597	102,699	18,661
22	Sen_Alessandro	ALESSANDRO VIEIRA	CIDADANIA	49,047	383	1600	42,692	11,236

(Continued)

Table I. (Continued)

No.	User account	User name	User profile		Followers	Following	Potential impact		
			Party				Statuses	Favorites	Retweets
23	GeneralGirao	GENERAL GIRÃO	PSL		101,606	390	6962	45,472	7396
24	marcelvanhattem	MARCEL VAN HATTEM	NOVO		273,445	1794	15,809	129,717	20,697
25	senadorhumberto	HUMBERTO COSTA	PT		147,796	2433	61,387	28,435	7633
26	CarolDeToni	CAROLINE DE TONI	PSL		164,601	270	1066	105,304	19,774
27	marciolabre	MÁRCIO LABRE	PSL		36,297	9594	4095	34,957	7235
28	ContaratoSenado	FABIANO CONTARATO	REDE		31,980	68	1489	31,064	6325
29	randolfeap	RANDOLFE RODRIGUES	REDE		146,409	1044	23,863	42,223	6351
30	fernandapsol	FERNANDA MELCHIONNA	PSOL		69,856	1218	11,731	71,910	7751
31	samiabomfim	SÂMIA BOMFIM	PSOL		249,326	709	15,194	132,953	13,246
32	mariadorosario	MARIA DO ROSÁRIO	PT		341,134	1344	26,272	65,764	12,949
33	davidmirandario	DAVID MIRANDA	PSOL		301,978	711	7014	76,744	9644
34	lasiermartins	LASIER MARTINS	PODEMOS		71,546	352	8310	35,507	9292
35	IvanValente	IVAN VALENTE	PSOL		180,007	2128	18,377	54,309	9628
36	DeputadoFederal	PAULO PIMENTA	PT		317,399	5613	73,495	58,150	16,442
37	MarceloFreixo	MARCELO FREIXO	PSOL		1,211,699	784	41,048	152,965	20,002
38	davialcolumbre	DAVI ALCOLUMBRE	DEM		196,718	797	6420	61,866	9170
39	FlavioBolsonaro	FLÁVIO BOLSONARO	S/Partido		1,579,621	1226	11,784	102,981	12,330
40	bibonunes1	BIBO NUNES	PSL		51,353	66	1239	29,189	6745

Table 2. Twitter behavior per cluster identified in the MC's replies network.

Cluster	Twitter behavior	Mean	SD	Min	Max
Cluster 1 (*n* = 99)					
	Replies	1560			
	Statuses	7669.94	13,011.85	47	107,896
	Likes	785.93	3958.96	0	37,857
	Retweets	75.21	318.05	0	2828
Cluster 2 (*n* = 86)					
	Replies	3636			
	Statuses	15,082.77	14,957.34	180	80,377
	Likes	13,925.26	29,156.48	0	152,965
	Retweets	2321.76	4484.23	0	20,002
Cluster 3 (*n* = 74)					
	Replies	1731			
	Statuses	7401.59	15,158.31	39	115,702
	Likes	5634.23	13,661.30	1	69,036
	Retweets	1058.38	2518.50	0	11236
Cluster 4 (*n* = 51)					
	Replies	1537			
	Statuses	5598.67	5861.60	41	26,889
	Likes	8641.22	28,060.49	0	150,587
	Retweets	1000.49	3507.64	0	20,697
Cluster 5 (*n* = 49)					
	Replies	5099			
	Statuses	5478.41	8715.64	66	50,563
	Likes	30,961.31	51,869.96	16	255,494
	Retweets	5417.61	10,120.02	2	55,564

important asymmetries, ($M_{Statuses}$ = 9252.74, SD = 13,733.90, $Range$ = [39, 115,702]). Most of the MCs were more likely to be followed on Twitter ($M_{Followers}$ = 68,635.67, SD = 225,132.03, $Range$ = [62, 2,555,995], than to follow other users ($M_{Following}$ = 1336.26, SD = 3652.41, $Range$ = [8, 55,957]).

In addition, the MCs' activity on Twitter reflects large disparities by political party and ideology in terms of their diffusion capacity and achieved impact. Based on the information depicted in Table 1, 67.5% of MCs belonged to three political parties: PSL[3] (37.5%), PT (15%), and PSOL (15%). These political parties concentrate the vast majority of Twitter activity in the MCs' reply network: the renewed right-wing party, PSL, had a larger audience (35.33%, based on the sum of followers in Table 1) and received more likes (74.50%) and retweets (76.59%) than the left-wing parties PSOL and PT parties. The PSOL and PT had a similar pattern between them in terms of number of followers (PSOL = 17.42%, PT = 14.39%), the number of likes (PSOL = 7.28%; PT = 4.35%), and the number of retweets (PSOL = 5.12%, PT = 5.60%). However, we found the opposite pattern when we looked at the number of people followed by these political

parties. That is, MCs from the PT were more likely to follow other people (67.54%) when compared to the PSL (14.89%) and the PSOL (7.96%) (see Table S2 in the supplementary material).

Social network analysis of MCs' interactions on Twitter

The MCs' interaction network was composed of 478 MCs (*nodes*) and 6,125 links (*edges*). The network revealed relatively low interconnections, as only a small proportion of all possible interactions were effective (*density* = 0.027). In general, we found large disparities in the MCs' interactions registered on the network. MCs interacted, on average, with 32.28 MCs (*SD* = 32.71, *Range* = [1, 235]; and provided a mean of 37.80 replies (*SD* = 74.54, *Range* = [1, 794]). Accordingly, centrality measures indicate some MCs are reaching out to about half of Congress, whereas others just interacted with a few of their fellow legislators (see Table S1 in the supplementary material).

From the perspective of political parties, based on the Top 10% of MCs highly active on Twitter, we found that MCs from the right-wing party, PSL, accounted for 43.67% of the sum of the centrality degree measure, whereas the left-wing political opposition accounted for about 26.67% (PT = 15.29%; PSOL = 11.36%). A similar pattern was found for the other centrality metrics (see Table S2 in the supplementary material), which indicates that MCs from the PSL are playing a more central role linking other MCs within the network.

Underlying groups within the MCs' replies network

We applied the Leiden algorithm to identify the clusters of nodes with a higher probability of interactions between them (Traag et al., 2019). We used the quality function of Modularity with a resolution of 1.0 and 1000 iterations. This procedure detected six clusters, but we excluded one of them because it grouped four MCs that did not represent a substantive group.

The clustering process put together MCs with political affinities and rivalries both in terms of partisanship (Figure 1) and political ideology[4] (Figure 2 and Table S3 in the supplementary material). Cluster 1 (29.08% of MCs) brought together MCs from the traditional political parties, related to what has been dubbed the "*centrão*" (big-center), yet it has more right-wing MC's (Twitter behavior per cluster is described in Table 2).

Cluster 2 (20.5% of MCs) depicted political opposition to the current administration, mainly consisting of left-wing political parties that are known for their explicit rejection of government proposals led by the current President Bolsonaro, and who make strong pushes for institutional reforms (e.g. pensions, health, education).

Cluster 3 (19.25% of MCs) group exclusively members for the Senate, which means that it includes MCs from all the political leanings. The ideological organization of the Senate revealed, however, that it is mainly dominated by right-wing political parties.

Cluster 4 (15.27% of MCs) consists of a group of younger MCs, who are mostly affiliated with new political parties that seek to renew the liberal political agenda. This cluster of MCs was formed as a result of the political coalitions made by political parties during
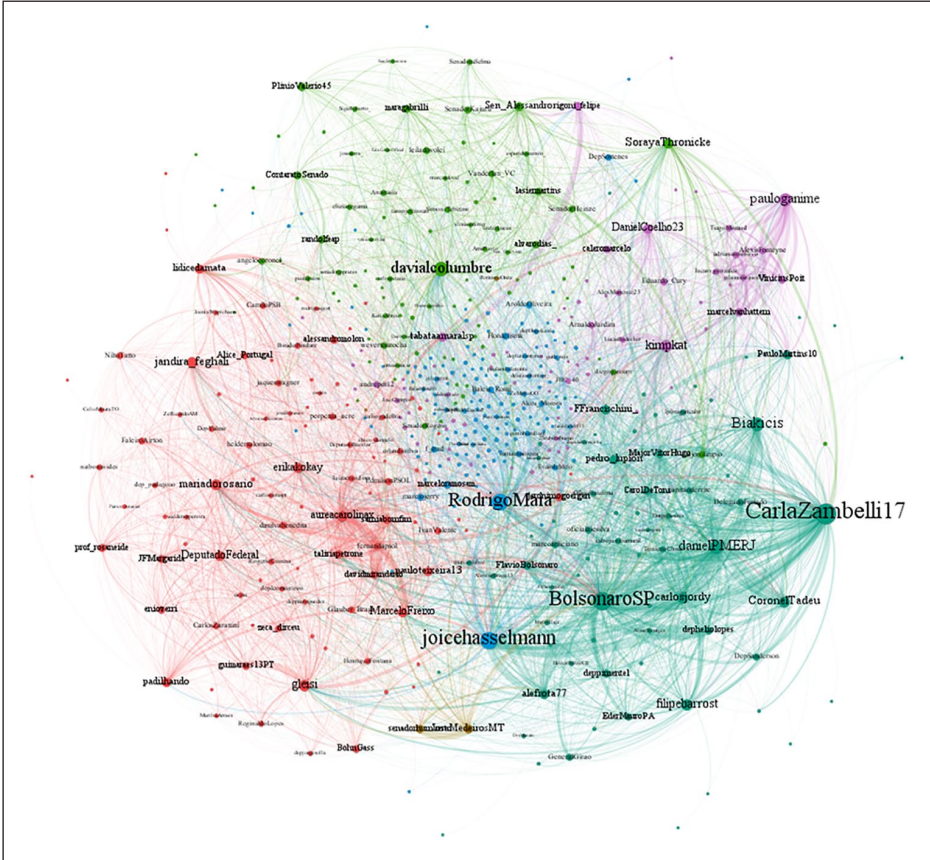
Figure 1. Graph of the replies network during 2019.
Node and Label sizes indicate the centrality degree; colors indicate the cluster; labels with interactions below 20 times are not shown.

the 2018 presidential elections, representing "moderated" politicians both at the left and right sides of the political spectrum.

Cluster 5 (15.06% of MCs) is mainly composed by MCs from the political party that support the President Bolsonaro (PSL), and thus, represent the right-wing political base of the administration. Indeed, MCs from this political party have been associated with support for conservative policies (e.g. security, privatization) and far-right movements.

Impact and public endorsement on Twitter per cluster

We examined the differences in the MC clusters in terms of their achieved impact on Twitter. We found that Cluster 5—right-wing aligned to President Bolsonaro—achieved more impact than Cluster 2, $t(138) = -3.098$, $p = .002$, $d = -0.54$; Cluster 1, $t(151) = -3.553$, $p < .001$, $d = -0.60$; Cluster 3, $t(126) = -3.127$, $p = .002$, $d = -0.56$; and Cluster
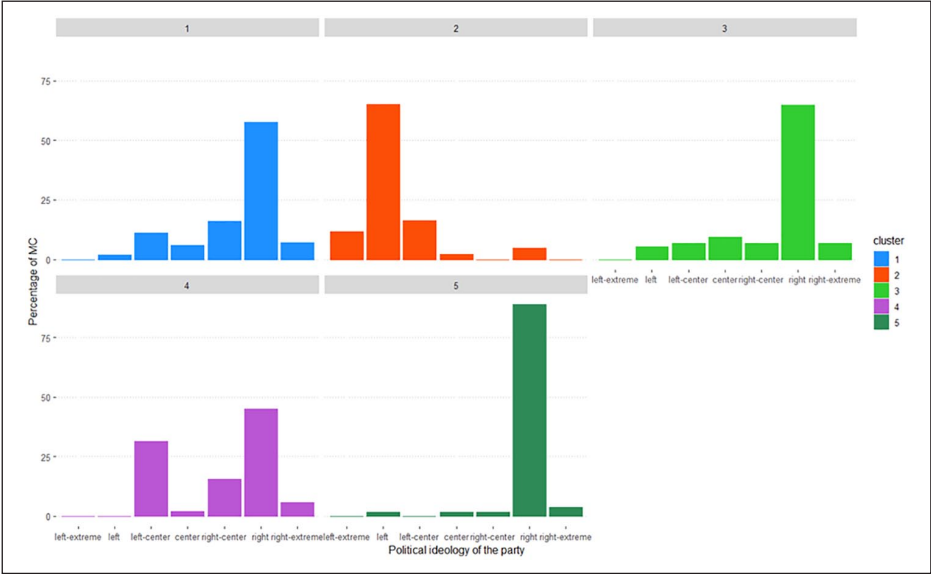
Figure 2. Frequency of MCs political ideology (left-right) per cluster.

4, $t(103) = -2.525$, $p = .013$, $d = -0.49$. On the other hand, the potential impact of Cluster 2—left-wing—was higher than the impact of Cluster 3, $t(158) = 2.248$, $p = .025$, $d = 0.36$; but there were no differences with Cluster 1, $t(183) = -1.444$, $p = .15$, $d = -0.21$; nor with Cluster 4, $t(135) = 1.144$, $p = .254$, $d = 0.20$ (see Figure 3).

In addition, OLS regression analysis reached statistical significance, $F(3, 357) = 63.76$, $p < .001$, $R^2 = .349$, and revealed that the degree of centrality was positively associated with an MC's impact on Twitter ($b = 861.35$, $SE = 106.973$, $t = 8.052$, $p < .001$). In other words, every additional connection to other MCs within the network—centrality degree—was associated with an increase of 861.35 units of impact—the sum of likes and retweets (see Figure 4).

Political discourses implied in MCs' Twitter replies per Cluster

From the perspective of the use of hashtags, a frequency analysis showed that MCs in Cluster 2—left-wing—used this marker more than the other Clusters. The number of hashtags per cluster was (in descending order): Cluster 2 = 54,423; Cluster 1 = 22,214; Cluster 5 = 17,864; Cluster 3 = 15,401; and Cluster 4 = 11,036.

A qualitative examination of the topics implied in the hashtags suggests the existence of ideological differences between clusters. These differences are particularly evident between Cluster 2—left-wing—and Cluster 5—right-wing. Thus, the main topics in Cluster 2 revolved around social and political mobilization (e.g. demanding health services, pensions, and liberty for former Brazilian President Luiz Inácio Lula da Silva) and denouncing corruption and authoritarianism. On the contrary, Cluster 5
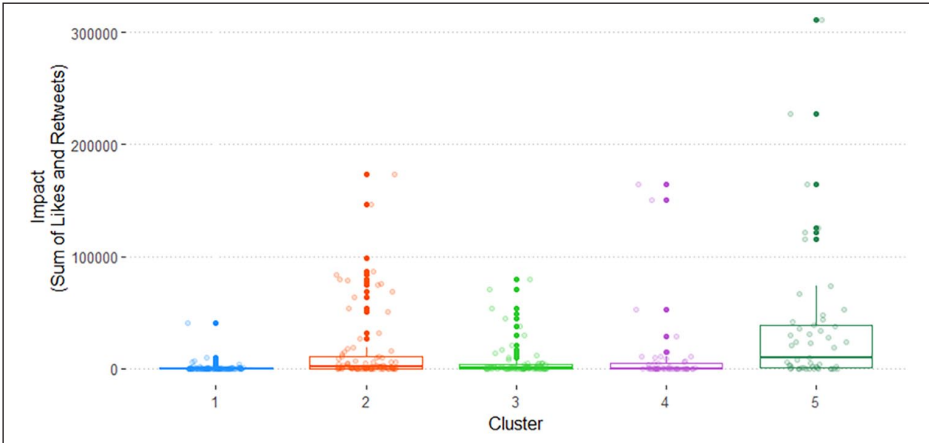
Figure 3. Boxplot of messages achieved impact per cluster.
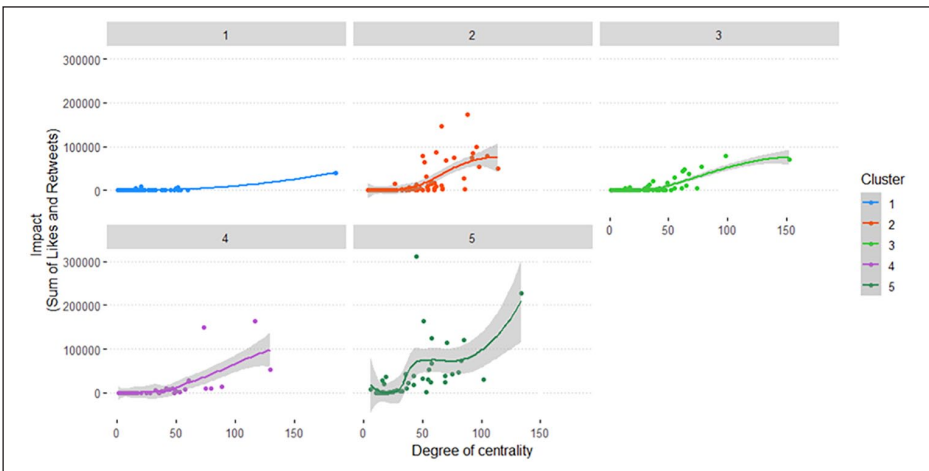Excluding extreme values (3 *SD* from the mean).

Figure 4. Loess regression of degree of centrality on MC's achieved impact.
Excluding extreme values (3 *SD* from the mean).

focused on enhancing nationalist and traditional values (e.g. minhacoréobrasil [*mycolorisBrazil*], brasilacimadetudo [*Brazilaboveall*], forçaehonra [*strengthandhonor*]), praising political figures (e.g. Jair Bolsonaro) and criticizing mainstream media. As for the remaining clusters, MCs used hashtags related to more neutral or broad social topics (e.g. Amazon, work, health, pensions), self-promotion, and institutional announcements (e.g. MCs' names, administrative teams), citing Brazil's regions, and marking political topics (e.g. taxes, pensions) (see Figure 5, and Table S4 for more complete information).
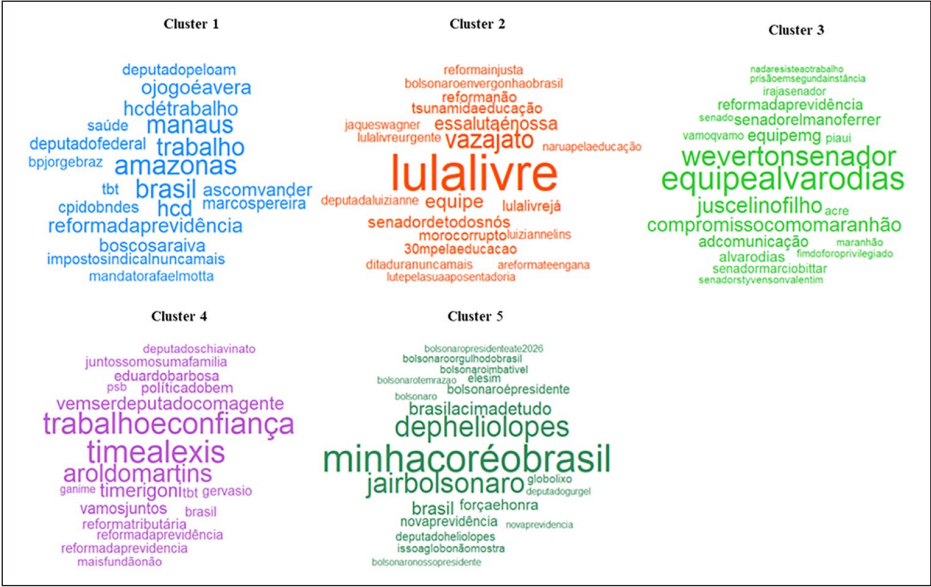
Figure 5. Wordcloud of hashtags used per cluster.

From another perspective of the qualitative content analysis of the top 200 replies, we identified two discursive strategies. On one hand, a confrontational discourse focused on attacks-critics toward political adversaries and defense-endorsement of political allies. On the other hand, self-promotion—more neutral—discourse for delivering information to the public (see Figure 6).

These strategies, however, were employed in different ways. As for Cluster 1, 2, and 5, MCs engaged in confrontational-defensive discourse for different motives. In Cluster 1, there was a public dispute between MC's that accused each other of betraying the principles of their parties and deviating from their previous alignment with President Bolsonaro. In Cluster 2, from left-wing opposition, MC's targeted politicians that support President Bolsonaro, denouncing corruption in the judiciary (e.g. related to the imprisonment of Lula) and abuses of power (e.g. tax evasion and influence peddling by Bolsonaro's relatives). Cluster 5 was focused on internal disputes due to the leadership of their political parties and direct attacks toward critics and left-wing politicians. Yet different in the particular content, political communication from these clusters seemed to have a similar pattern of communication.

As for Clusters 3 and 4, both depicted a strategy more focused on giving information about institutional activities for self-promotion; and showed more defense-endorsement of their allies than attacking-criticizing their opponents. These clusters were also more diverse than the previous ones. Particularly, Cluster 3, which compiled the senators from all the political parties, used a more institutional language even to confront other political institutions (e.g. Federal Supreme Court of Brazil). Similarly, Cluster 4 employed a more informative discourse, endorsing language that advocate for political renovation and
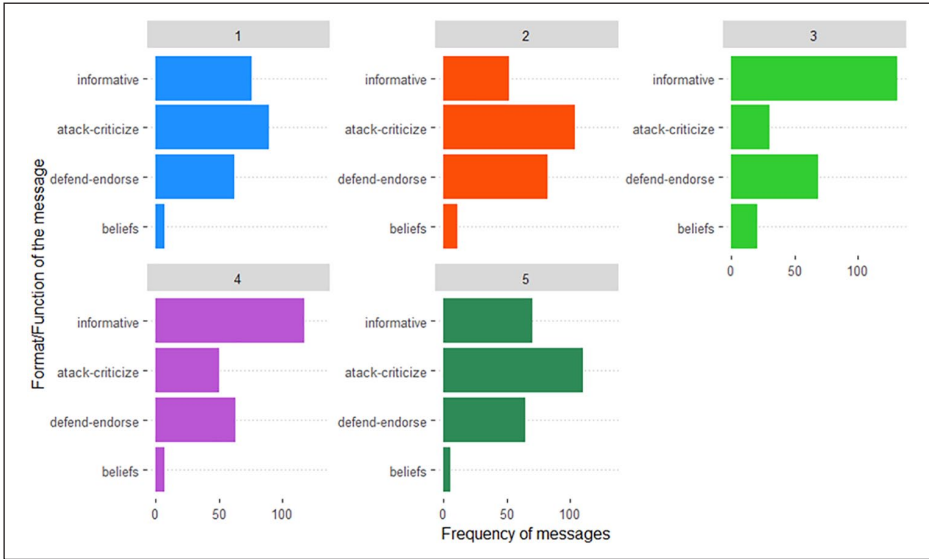
Figure 6. Frequency of the messages' format per cluster.

structural reforms); (e.g. pensions, political reform and were more likely to use informal language (e.g. sarcasm, irony) to confront other MCs (see Table S5 in the supplementary material for example messages).

In relation to the topics of the messages, MCs from all the clusters focused on relationships between political actors and institutional affairs, with fewer mentions to discussions about bills, social and international issues (see Figure S1 in the supplementary material).

Discussion

In this article, we sought to identify the pattern of online interactions and communication strategies of Brazilian MC's to account for the production of political discourses and ideologies in Brazil's Congress during 2019 on Twitter. We focused on the role of political ideologies in the formation of online clusters that go beyond political parties; and on the topics that structure particular beliefs and values that are delivered through the messages.

Based on this analysis, we highlight three core discussion points. First, we found the existence of large disparities and recent changes in the use of Twitter in Brazil's Congress based on ideological affinities. On one hand, we found that some MCs are more active on Twitter than others (e.g. posting, replying, retweeting), which give them more visibility and potential influence in the online public sphere. On the other hand, the MCs' network of interactions also showed that some MCs play a more central role within the network by having more intense (i.e. frequent) and more diverse (e.g. heterogeneous) connections. Importantly, these differences were particularly observed in politicians

from parties that represent the traditional left-wing (i.e. PT) and the renewed right-wing (i.e. PSL), even though neither of them have sufficient seats to hold the majority in none of the two chambers of Congress.

Although Brazilian left-wing parties were more likely to use online communications to mobilize the public (Braga and Carlomagno, 2018; Pereira et al., 2017), our findings suggest that renewed right-wing parties have consolidated and overtaken their congressional rivals' online presence on Twitter. Indeed, the MCs belonging to the PSL, which is acknowledged as a new, conservative and anti-establishment political party, not only had more potential influence on Twitter (i.e. more followers) than other political parties, but also obtained more public support from the Twitter audience (e.g. received more likes and retweets). This phenomenon shows a particular communication strategy that is linked to the presidential campaign of Brazilian President Jair Bolsonaro, who invested in social media while abandoning and discrediting the traditional news agencies (Almeida et al., 2018). This finding is similar to the 2018 Swedish national elections, where right-wing actors were more effective than their counterparts in gaining people endorsement online (Larsson, 2020).

Importantly, the use of online communication by right-wing Cluster 5 during the 2018 elections is currently under investigation for spreading fake news and hiring software companies to influence the public. It is worth noticing that many of the MCs from this cluster, who relied on this communication strategy, were elected for the first time in Congress. Their communication pattern was characterized by attacking the so-called "traditional politics," criticizing mainstream media and public institutions, and using a confrontational-derogatory language to address their adversaries. Taken together, these elements describe the discursive structure of right-wing populism on social media (Gerbaudo, 2018).

The second finding has to do with the formation of clusters in the network that correspond to MC's political affinities. Unlike the two-party scheme present in many Western democracies, the Brazilian political system is composed by 33 political parties—and 75 are under development (STF, 2019). Despite this political diversity, Congress achieves some stability by forming coalitions, called *bancadas*, that go beyond political parties. These coalitions are formed around regional or political interests to exert influence on the legislative agenda (Silveira and De Araújo, 2019). However, these groups are not always formalized, since there are political coalitions that represent specific values and ideologies (e.g. "bancada da bala" [bullet-coalition], "bancada da biblia" [Bible-coaliton]) (Carta Capital, 2018).

In this vein, the online clustering of MCs sheds light on the ideological organization of Congress, and therefore, in the production of political discourses online that reinforce particular ideologies. The clusters' composition showed that MCs are more likely to relate to other MCs with ideological affinities, indicating that some political homogeneity is behind the formation of online clusters (Colleoni et al., 2014; Farrell, 2012). But these patterns of interactions also reveal ideological asymmetries between clusters. For instance, the right-wing Cluster 5 was the most homogeneous—mostly from the same political party—and revolved around a few but very influential actors. On the contrary, the left-wing Cluster 2, included more diversity of political parties, and the MCs displayed similar activity on Twitter. The remaining clusters showed more diversity both in

terms of political party and ideology: Cluster 3 compiled MC's from the Senate and from all ideological positions; Cluster 1 reflected the traditional politics that support the status quo, yet with mixed positions regarding the Bolsonaro's administration; and Cluster 4 represents the emergence of new politics, young and recently elected legislators both from the left and right side of the political spectrum.

Importantly, the online clustering of MCs not only confirms the formation of echo chambers of like-minded people (Barberá et al., 2015; Colleoni et al., 2014), but indicates an ideological clustering that reflects another organization of the Brazilian Congress and political representation. Indeed, this clustering discloses a more complex organization of the Congress that cannot be reduced to traditional criteria such as the governments' alignment-opposition, left-right ideologies, and voting behavior. For instance, clusters 2 and 5 reveal that MCs create "echo chambers" to produce political discourses, deliver ideas, and project an image to the public, beyond their affiliations to political parties and ideologies. The remaining clusters (i.e. 1, 3, and 5), however, showed a different pattern since MCs from different political backgrounds engaged in online communication with political adversaries to reaffirm their position based on reciprocal criticism. Hence, the online clusters identified in our findings not only reinforce ideas of like-minded people but also engage in confrontational discourse to reassure their political positioning.

The third core finding is related to the MCs' potential influence on the organization of the political discourse and the public debate. On one hand, we found that the messages from right-wing (5) and left-wing (2) clusters reached more people and obtained more support from the public than the other clusters. These findings suggest that MCs are reaching a large audience on Twitter who endorse the political discourse coming from MCs that represent their political identity or ideologies. This is consistent with previous findings showing that people from the right were more likely to be homogeneous and have higher identification with their political party (Himelboim et al., 2013; Recuero et al., 2020).

In addition, our examination of the content implied in MCs' Twitter replies showed that they use topics and formats that can exacerbate political polarization and undermine democratic values. On one hand, the use of confrontational and derogatory language online exacerbates the perception of zero-sum worldviews that can lead people to strengthen their identity in opposition to other groups, or simply to disengage from politics (Theocharis et al., 2020). On the other hand, Twitter messages help MCs spread ideological beliefs about what is wrong in society and what should be done to fix it. For instance, the discourse in the left-wing cluster (2) relied on mobilizing people to demand fairness and respect for human rights, whereas the discourse of the right-wing cluster (5) mainly praised authoritarian figures who espouse nationalistic and traditional values. In both cases, these discourses update political views that contribute to how people form an idea about the value of democracy.

Our findings also contribute to the theory in political communication by showing the interplay between online interactions and discursive strategies in shaping the public debate. Emerging theoretical proposals argue that political communication in democratic systems should account for different platforms, analytics, algorithms, ideological media, and actors that participate in the public debate (Entman and Usher, 2018). Under this frame, political actors exert discursive power, through which they produce, disseminate and maintain topics, frames, and actors that lead the communication (Jungherr et al.,

2019). Our findings provide support for these emerging theoretical frameworks that bring together substantive theories from communication and social sciences with the capabilities of computational methods (Theocharis and Jungherr, 2020). Our findings can be extended to other contexts since online political communication can reveal additional layers of political representation that go beyond the formation of like-minded echo chambers. As we show in a multi-party system from the Global South, the interplay between platforms, interactions, topics, and frames shed light on alternative ways of representing the political debate in democratic system.

This study also presents some limitations. First, our analyses depict the dynamics of political discourse in the Brazilian Congress at a particular time and on a specific online platform. As such, the pattern of interactions between MCs, as well as the topics and style used in their messages, can be expected to vary in accordance with the emergence of new political challenges and the possibilities offered by other online platforms. In addition, we focused on political discourse from the perspective of interactions within Congress, but this ignored the vast majority of political discourse that happens outside Congress. A second limitation has to do with the use of Twitter as a platform for political communication. The large disparities depicted in how MCs use Twitter can signal a "digital divide" between MCs. Thus, some MCs may rely more on other social platforms, which shape the production of discourses (Freelon, 2015). Future research should try to explore those other ways of producing political discourses using a multimodal perspective (e.g. audiovisual) offered by different online platforms.

To summarize, political discourses on Twitter capture part of the offline political debate and its ideological production, and also add new possibilities to form networks that reinforce, update, and transform ideas regarding political issues. These political discourses, albeit online, can reflect the positive attributes of democracy by opening up the possibility of improving political representation and the public's engagement in the political debate that undergird democratic systems (Mutz, 2002). However, some politicians are exploiting social media to promote particular ideologies and political agendas that resonate within closed and homogeneous groups, rather than to promote the inclusion, diversity, and deliberation needed for a healthy democracy (Dubois and Gaffney, 2014). As such, the study of online political discourses provides us with important insights on how our democracy works, and what we could do to improve it.

Authors' note

Declaration of conflicting interests

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Data availability statement

Data, materials, code, and supplementary information linked to this work are publicly available at the open science framework platform: https://osf.io/x2cfm/

Supplemental material

Supplemental material for this article is available online.

Notes

1. https://nev.prp.usp.br/noticias/as-10-hashtags-mais-frequentes-no-twitter-veiculadas-por-congressistas-no-ano-passado/
2. Data, code, and supplemental material are available at: https://osf.io/x2cfm/
3. PSL = Partido Social Liberal; PT = Partido dos Trabalhadores; PSOL = Partido Socialismo e Liberdade
4. Retrieved from Bolognesi et al. (2020)

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