Codebook:

Mapping Political Elites COVID-19 Vaccine Tweets in Brazil in 2020 and 2021

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I. Introduction

This codebook summarizes the data collection and coding stages employed in developing the *Political Elites COVID-19 Vaccine Sentiment on Twitter 2020 and 2021 in Brazil* dataset. The dataset aims to provide readers with detailed information about Brazilian political elites' participation in debates surrounding the themes of COVID-19 vaccines and vaccination through Twitter.

The codebook is divided into three main sections: the first section delineates processes undertaken to build the *Political Elites Dataset;* the second section is devoted to characterizing the development of the *COVID-19 Tweet Classification Strategy.* Finally, the third section presents detailed descriptions of all the variables in the compiled dataset.

The section devoted to the *Political Elites Dataset* encompasses four subsections: Municipal Mayoral Candidate Data including Party Affiliation; Classification of Party; Classification of Party Aligned with Jair Bolsonaro, the former Brazilian president, between 2019 and 2022; Classification of Bolsonaro Allies; and Twitter ID Retrieval. The dataset aims to provide detailed information on candidates, including party affiliation, ideological positioning, and information about active and inactive Twitter profiles.

The *COVID-19 Tweet Classification Strategy section* comprises four subsections: Sample Selection, Sample Definition, Keywords, Stance and Sentiment Classification. This section of the codebook aims to describe and discuss in detail the steps taken to collect and categorize candidate tweets.

The third section provides details on additional features of the tweets that were classified. Specifically, we identified whether the main topic of the tweet referred to mandatory vaccination, children and adolescents, or to specific vaccine

brands. We also manually detailed if the tweet expresses or uses an ironic or sarcastic tone.

The final section provides detailed information about other variables such as date, likes, retweets, epidemiological week, and descriptions of all the variables in the dataset with details about coding processes.

II. Political Elites Dataset

The *Political Elites Dataset* was designed to include detailed information regarding mayoral candidates who participated in the 2020 municipal elections in the Brazilian state capitals. Using the data recorded by the Superior Electoral Court (TSE),[1] we compiled a comprehensive list of all the mayoral candidates who participated in the 2020 elections across the 26 state capitals of Brazil.

Among the 323 candidacies presented in these municipalities, the TSE accepted 300 candidates. The remaining 23 candidates either resigned their candidacies or were rejected by the court. On average, about 12 candidates participated in the elections in each capital. Rio Branco, the capital of the Acre (AC) state, had the lowest candidacies, with only seven competitors at the time of the election. Belo Horizonte (Minas Gerais - MG), Curitiba (Paraná - PR), and Porto Velho (Rondônia - RO) emerged as the capitals with the highest number of candidates, each boasting a total of 15 contenders. Table 1 portrays the number of approved candidacies by the TSE in the 26 Brazilian state capitals.

Table 1. Number of Mayoral Candidates in the 2020 Elections by State Capital

State	City	Number of candidates
Acre (AC)	Rio Branco	7
Alagoas (AL)	Maceió	10
Amazonas (AM)	Manaus	11

[1] Tribunal Superior Eleitoral (the electoral court of all Brazilian elections). The website can be accessed in: https://www.tse.jus.br/#/

Amapá (AP)	Macapá	10
Bahia (BA)	Salvador	9
Ceará (CE)	Fortaleza	10
Espírito Santo (ES)	Vitória	13
Goiás (GO)	Goiânia	14
Maranhão (MA)	São Luís	10
Minas Gerais ()MG	Belo Horizonte	15
Mato Grosso do Sul (MS)	Campo Grande	13
Mato Grosso (MT)	Cuiabá	8
Pará (PA)	Belém	12
Paraíba (PB)	João Pessoa	14
Pernambuco (PE)	Recife	9
Piauí (PI)	Teresina	12
Paraná (PR)	Curitiba	15
Rio de Janeiro (RJ)	Rio de Janeiro	13
Rio Grande do Norte (RN)	Natal	13
Rondônia (RO)	Porto Velho	15
Roraima (RR)	Boa Vista	10
Rio Grande do Sul (RS)	Porto Alegre	11
Santa Catarina (SC)	Florianópolis	10
Sergipe (SE)	Aracaju	11
São Paulo (SP)	São Paulo	13
Tocantins (TO)	Palmas	12

Candidate Biographical Data

For all the candidacies approved by the TSE, we collected information regarding the electoral district, demographic characteristics, party affiliation, and

electoral performance. Candidates were categorized based on their name, gender, party, and coalition membership, and the state and city where they contested the elections.

Electoral performance data includes i) votes by candidate in the first and, second rounds;[2] ii) a dichotomous variable indicating whether a candidate disputed the second round of election (1 is attributed to cases where the candidate disputed the second round of elections, 0 if not); iii) a dichotomous variable indicating whether the candidate won the election (1 if winner, 0 if not); iv) for winning candidates, the margin of victory, and, v) a dichotomous variable identifying incumbents (1 if incumbent, 0 if not).

Classification of Party Alignment with Jair Bolsonaro Government

To measure the positions of parties relative to Bolsonaro´s government, we decided to construct a government/opposition measure using the data provided by "Radar do Congresso."[3] This data measures the votes of each parliamentary in the Legislative Chamber (first house) and Senate (second house). With this, they obtained means for the parliamentarians' votes of each party and compared it with the position of Bolsonaro´s government.

This results in a percentage of how often each party votes with the President's party or his propositions. This percentage ranges from 0% to 100%, indicating how often a party's parliamentarians had similar positions with Bolsonaro´s government positions in Congressional voting.

Following this classification for each party with Congressional representation between 2019 and 2020, constructed by the "Radar do

[2] In Brazilian municipal elections, candidates win in the first round if they gather 50%+1 votes. In cases where no candidate accumulates enough votes, a second round is performed, including only the two best positioned candidates in the first round.

[3] "Radar do Congresso" is a production of the "Congresso em Foco" with financial support from Google. The website can be accessed here: https://radar.congressoemfoco.com.br/parlamentares/senado. During Bolsonaro´s government (2019-2023) they used the data to produce analyses of governism. Now, the website contains just information about the Lula's government (2023-), but varies analyses can be accessed in the Congresso em Foco website: https://congressoemfoco.uol.com.br/

Congresso,"[4] we decided to divide into groups based on each party's percentage. A government party voted with Bolsonaro´s government with more than 80% of the legislative votes. A neutral party voted with the government between 50% and 80% of the time. An opposition party voted less than 50% of the legislative votes with the government. Table 2 reports the percentage of votes for each party aligned with the Bolsonaro government between 2019 and 2020 in parenthesis and whether they were classified as government, neutral, or opposition.

Table 2. Party's Alignment (%) with Bolsonaro Government

Party	**Government/Opposition Position**
PSL (97%), Patriota (94%), DEM (93%), PSC (93%), NOVO (92%), PSDB (92%), MDB (91%), PP (91%), Republicanos (91%), PL (90%), PSD (90%), PTB (90%), SD (89%) and Cidadania (87%).	Government Party
Podemos (77%), Pros (75%), Avante (74%) and PV (68%)	Neutral Party
PDT (48%); PSB (46%); Rede (36%); PCdoB (29%); PT (20%) and PSOL (15%)	Opposition Party

Source: Radar do Congresso

Classification of Candidates Aligned or Endorsed by Jair Bolsonaro

We classified candidates' alignment with president Jair Bolsonaro during the election campaign period in 2020. To determine the alignment of candidates with President Jair Bolsonaro to political and ideological positions, two distinct variables were created: "*endorse_president"* and "*align_president"*.

For both variables, social media (Twitter, Facebook, and Instagram), news sites, and interviews of all candidates were consulted. The posts made during 2020 that were identified as aligned with Bolsonaro were verified. Using Google's search

[4] We used the information published in this article to classified the parties into group of governism, considerer the percentage of similar votes with the Bolsonaro´s government: https://congressoemfoco.uol.com.br/area/governo/exclusivo-os-12-partidos-que-formam-a-base-fiel-do-governo-na-camara/

engine, we also searched for the names of the candidates and keywords such as "is supported by the president/Bolsonaro" or "supports/is aligned with the president/ Bolsonaro."

The variable "*endorse_president*" refers to candidates who Bolsonaro publicly endorsed during the 2020 mayoral elections campaign. These candidates received official support from Bolsonaro in either television, radio, social networks, or other mass media endorsements.

Of the 300 candidacies presented, only 11 candidates, spanning across different parties, received endorsements from Jair Bolsonaro. Except for Sebastião Bocalom (PP/Rio Branco-AC), all candidates endorsed by the former president were defeated at the polls.

The variable "*align_president*" refers to those candidates who, despite not receiving a formal endorsement from Bolsonaro during the 2020 campaign, declared that, if elected, they would govern following the policies and guidelines adopted at the national level by Bolsonaro. Only candidates who declared themselves aligned with the Bolsonaro government were classified as such.

Among the candidates who expressed alignment with Jair Bolsonaro but did not receive his official endorsement, we identified 48 individuals who based their campaigns on the former president's ideology and an additional 11 whom he endorsed. These 59 candidates, aligned with or supported by the former president, utilized Bolsonaro's image during the 2020 elections as part of their campaigns in promotional materials, including flyers and campaign promotional materials. Table 3 summarizes the candidates who supported or aligned with Jair Bolsonaro in the 2020 municipal elections.

Table 3. Candidates Endorsed* or Aligned with Jair Bolsonaro in the 2020 Municipal Elections by State Capital.

State	Capital	Candidate endorsed or aligned with Bolsonaro (Party)
AC	Rio Branco	Roberto Duarte (MDB)* Sebastião Bocalom (PP)*

AL	Maceió	Josan Leite (PATRIOTA)
AM	Manaus	Capitão Alberto Neto (REPUBLICANOS) Coronel Menezes (PATRIOTA)* Chico Preto (DC) Romero Reis (NOVO)
AP	Macapá	Cirilo Fernandes (PRTB) Guaracy Júnior (PSL) Haroldo Iram (PTC) José Alcolumbre (DEM)* Patrícia Ferraz (PODE)
BA	Salvador	Cézar Leite (PRTB)
CE	Fortaleza	Heitor Freire (PSL) Capitão Wagner (PROS)*
ES	Vitória	Halpher Luiggi (PL) Delegado Pazolini (REPUBLICANOS) Capitão Assumção (PATRIOTA)
GO	Goiânia	Gustavo Gayer (DC) Major Araújo (PSL) Vanderlan Cardoso (PSD)
MA	São Luís	Eduardo Braide (PODE) Sílvio Antônio (PRTB)
MG	Belo Horizonte	Bruno Engler (PRTB)* Lafayette Andrada (REPUBLICANOS)
MT	Cuiabá	Roberto França (PATRIOTA)*
PA	Belém	Delegado Federal Eguchi (PATRIOTA)* Guilherme Lessa (PTC) Vavá Martins (REPUBLICANOS)
PB	João Pessoa	Nilvan Ferreira (MDB) Wallber Virgolino (PATRIOTA)
PE	Recife	Coronel Feitosa (PSC) Mendonça Filho (DEM) Delegada Patrícia (PODE)*
PI	Teresina	Major Diego Melo (PATRIOTA)
PR	Curitiba	Fernando Francischini (PSL) Zé Boni (PTC) Marisa Lobo (AVANTE)

RJ	Rio de Janeiro	Luiz Lima (PSL) Marcelo Crivella (REPUBLICANOS)*
RN	Natal	Coronel Azevedo (PSC) Coronel Hélio Oliveira (PRTB) Delegado Leocádio (PSL)
RO	Porto Velho	Sargento Eyder Brasil (PSL)
RR	Boa Vista	Antônio Nicoletti (PSL) José Ottaci (SOLIDARIEDADE)
RS	Porto Alegre	Gustavo Paim (PP)
SC	Florianópolis	Alexander Brasil (PRTB) Hélio Bairros (PATRIOTA)
SE	Aracaju	Delegada Danielle (CIDADANIA) Georlize Oliveira (DEM) José Almeida (PRTB) Lúcia Flávio (AVANTE) Delegado Paulo Márcio (DC) Rodrigo Valadares (PTB)
SP	São Paulo	Celso Russomanno (REPUBLICANOS)*
TO	Palmas	Eli Borges (SOLIDARIEDADE) Gil Barison (REPUBLICANOS) Dr. Joaquim Rocha (PMB)

Notes: * These are the candidates who were formally endorsed by former President Jair Bolsonaro.

The average number of candidates declaring alignment with Jair Bolsonaro in each municipality was about two. Among them, the municipality of Aracaju (SE) stood out with the highest number of candidates linked to the former president, totaling six competitors in 2020. Interestingly, the municipality of Campo Grande (MS) was the only one in the sample with no candidate aligned with Bolsonaro.

2020 Electoral Results of Candidates

Information was collected about the winning candidate in each capital of the sample (*electoral_result*), whether the candidate had won in the first or second round (*disputed_second_round*), the respective margin of victory

(*margin_victory_candidate*), and if a candidate was the incumbent mayor (*incumbent*). In the 2020 elections, 7 of 26 mayors received a majority share in the first round and, therefore, did not have to face a runoff second round. Table 4 shows the winner for each capital, the round of victory, and the margin of victory between the first and second place for candidates in the 26 state capitals.

Table 4. Capital Elections Winners and Margins of Victory (%) in 2020

State	Capital	Name of Elected Mayor (Party)	Round of Victory	Margin of Victory between 1st and 2nd place
AC	Rio Branco	Sebastião Bocalom (PP)	2	25.86%
AL	Maceió	João Henrique Caldas (PSB)	2	17.27%
AM	Manaus	David Almeida (AVANTE)	2	2.55%
AP	Macapá	Antônio Furlan (CIDADANIA)	2	11.34%
BA	Salvador	Bruno Reis (DEM)	1	45.34%
CE	Fortaleza	José Sarto (PDT)	2	3.38%
ES	Vitória	Lorenzo Pazolini (REPUBLICANOS)	2	17.00%
GO	Goiânia	Luiz Maguito Vilela (MDB)	2	5.21%
MA	São Luís	Eduardo Braide (PODE)	2	11.06%
MG	Belo Horizonte	Alexandre Kalin (PSD)	1	53.41%
MS	Campo Grande	Marcos Trad (PSD)	1	50.06%
MT	Cuiabá	Emanuel Pinheiro (MDB)	2	2.29%
PA	Belém	Edmilson Rodrigues (PSOL)	2	3.53%
PB	João Pessoa	Cícero Lucena (PP)	2	6.33%
PE	Recife	João Campos (PSB)	2	12.54%
PI	Teresina	José Pessoa (MDB)	2	24.63%
PR	Curitiba	Rafael Greca (DEM)	1	46.48%
RJ	Rio de Janeiro	Eduardo Paes (DEM)	2	28.14%
RN	Natal	Álvaro Dias (PSDB)	1	42.20%

RO	Porto Velho	Hildon Chaves (PSDB)	2	8.90%
RR	Boa Vista	Arthur Henrique (MDB)	2	70.72%
RS	Porto Alegre	Sebastião Melo (MDB)	2	9.26%
SC	Florianópolis	Gean Loureiro (DEM)	1	35.33%
SE	Aracaju	Edvaldo Filho (PDT)	2	15.71%
SP	São Paulo	Bruno Covas (PSDB)	2	18.76%
TO	Palmas	Cínthia Ribeiro (PSDB)	1	21.73%

If we consider all the incumbent candidates (candidates serving their first terms as mayor during the 2020 elections), the number of incumbents is 13, with 10 of them reelected to a second term. These candidates are identified by a dichotomous incumbent variable (0 for candidates not seeking reelection and 1 for candidates pursuing a second term). The incumbents seeking reelection and the outcome of the 2020 election are listed in Table 5.

Table 5. Incumbent Mayors seeking Reelection and 2020 Re-election Outcomes

State	**Capital**	**Name of the Incumbent (Party)**	**Electoral Result**
AC	Rio Branco	Maria do Socorro Neri (PSB)	Not reelected
MG	Belo Horizonte	Alexandre Kalil (PSD)	Reelected
MS	Campo Grande	Marcos Trad (PSD)	Reelected
MT	Cuiabá	Emanuel Pinheiro (MDB)	Reelected
PR	Curitiba	Rafael Greca (DEM)	Reelected
RJ	Rio de Janeiro	Marcelo Crivella (REPUBLICANOS)	Not reelected
RN	Natal	Álvaro Dias	Reelected
RO	Porto Velho	Hildon Chaves (PSDB)	Reelected
RS	Porto Alegre	Nelson Marchezan Júnior (PSDB)	Not reelected
SC	Florianópolis	Gean Loureiro (DEM)	Reelected
SE	Aracaju	Edvaldo Filho (PDT)	Reelected
SP	São Paulo	Bruno Covas (PSDB)	Reelected

TO	Palmas	Cínthia Ribeiro (PSDB)	Reelected

Bolsonaro 2018 Electoral Results in each capital

The *Political Elites Dataset* further includes information about the electoral results, for each capital, obtained by elected president Jair Bolsonaro in the 2018 presidential elections. While a dichotomous variable (*bolsonaro_municipality_victory*) is employed to signal Bolsonaro´s victory in a particular location, the respective margins of victory in the second round of elections (*margin_victory_bolsonaro*) are also included in the dataset.[5] Table 6 exhibits 2018 electoral results, and the respective margins of victory (or defeat) for Bolsonaro in all Brazilian state capitals.

Table 5. Electoral Results and Victory Margins in the 2nd Round for Jair Bolsonaro in the 2018 Presidential Elections for all state capitals

State	Capital	2nd Round Margin	Bolsonaro 2018 Electoral Result
AC	Rio Branco	65.54%	Won
AL	Maceió	23.26%	Won
AM	Manaus	31.44%	Won
AP	Macapá	10.30%	Won
BA	Salvador	-37.18%	Lost
CE	Fortaleza	-11.22%	Lost
ES	Vitória	26.38%	Won
GO	Goiânia	48.40%	Won
MA	São Luís	-15.56%	Lost
MG	Belo Horizonte	31.18%	Won
MS	Campo Grande	42.54%	Won
MT	Cuiabá	33.88%	Won

[5] The 2018 presidential election was decided in the second round. The candidate defeated was Fernando Haddad (PT). In the first round, Bolsonaro, in the first position, had 46.03% of votes, followed by Haddad who had 29.28%. In the second round, Bolsonaro won after having 55.13% of votes against 44.87% of Haddad.

PA	Belém	9.86%	Won
PB	João Pessoa	9.60%	Won
PE	Recife	-5.00%	Lost
PI	Teresina	-25.46%	Lost
PR	Curitiba	53.08%	Won
RJ	Rio de Janeiro	32.70%	Won
RN	Natal	5.96%	Won
RO	Porto Velho	37.88%	Won
RR	Boa Vista	57.22%	Won
RS	Porto Alegre	13.70%	Won
SC	Florianópolis	29.72%	Won
SE	Aracaju	-5.52%	Lost
SP	São Paulo	20.76%	Won
TO	Palmas	29.76%	Won

Considering the 26 state capitals, Bolsonaro received the majority vote share in 20 capitals and lost in 6 others in the 2nd round of the 2018 election. The margin of victory in the municipalities he won varied from 65.54% in Rio Branco to 5.96% in Natal. In the municipalities he lost, the loss margin varied from -37.18% in Salvador to -5.00% in Recife.

Twitter ID Retrieval

Based on data registered in the TSE (Superior Electoral Court), a list of all candidates running for mayor positions in the 2020 elections in the 26 state capitals of Brazil was used to locate active Twitter accounts used by these candidates within the research period (2019 and 2021). Of the 300 candidates, we could not identify a Twitter account for 57 (19% of all candidates) of these candidates. Table 6 presents the candidates 253 candidates who had a Twitter account and the 57 ones without a Twitter account. In all state capitals, there were

candidates with an active Twitter account. The capitals with candidates without an active Twitter account were: Salvador (BA), São Luiz (MA), Rio de Janeiro (RJ), and Porto Alegre (RS).

Table 6. Mayoral candidates in 2020 from the 26 state capitals with and without active Twitter accounts

State	Capital	Candidates with active Twitter accounts	Candidates without Twitter accounts
AC	Rio Branco	Tião Bocalom; Daniel Zen; Jamyl Asfury; Minoru Kinpara; Roberto Duarte; Socorro Neri	Belcladio Jarbas Soster
AL	Maceió	Alfredo Gaspar de Mendonça; Corintho Campelo; Cicero Filho; Davi Davino Filho; Jhc; Lenilda Luna; Valeria Correia; Ricardo Barbosa	Josan Leite Pereira Barros; José Cícero Soares de Almeida
AM	Manaus	Amazonino Mendes; Capitão Alberto Neto; Coronel Menezes; Chico Preto; David Almeida; Marcelo Amil; Ricardo Nicolau; Romero Reis; Alfredo Nascimento; Zé Ricardo	Gilberto Vasconcelos da Silva
AP	Macapá	Cirilo Fernandes; Dr. Furlan; Haroldo Iram; Josiel; Patrícia Ferraz; Paulo Lemos; Gianfranco; Professor Marcos	João Alberto Rodrigues Capiberibe; Guaracy Batista da Silveira Júnior
BA	Salvador	Bruno Reis; Rodrigo Pereira; Celsinho Cotrim; Cezar Leite; Bacelar; Hilton Coelho; Major Denice; Olívia; Pastor Sargento Isidório	-
CE	Fortaleza	Capitão Wagner; Célio Studart; Paula Colares; Heitor Férrer; Heitor Freire; Luzianne Lins; Anizio; Renato Roseno; Sarto	Samuel Moraes Braga
ES	Vitória	Capitão Assumção; Coronel Nylton; Gandini; João Coser; Mazinho; Namy Chequer; Neuzinha; Sergio Sá	Eron Domingos Souza Lima; Gilberto Batista Campos; Halpher Luiggi Monico Rosa; Lorenzo Silva de Pazolini;

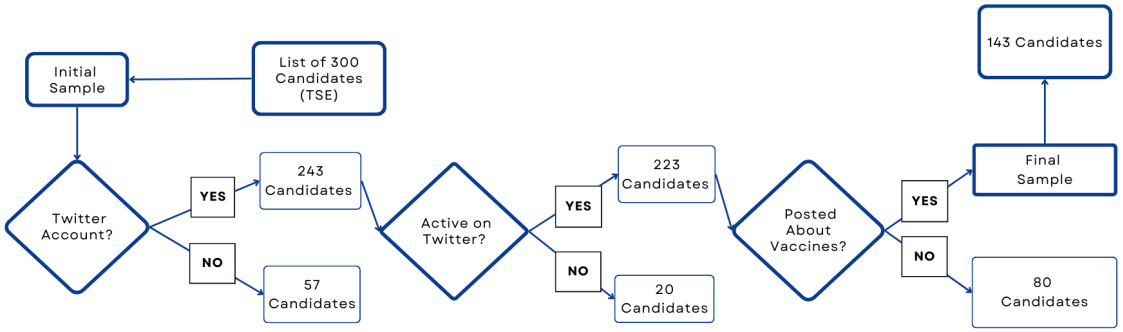
			Raphael Góes Furtado
GO	Goiânia	Delegada Adriana Accorsi; Alysson Lima; Major Araújo; Elias Vaz; Fábio Junior; Gustavo Gayer; Maguito Vilela; Manu Jacob; Samuel Almeida; Talles Barreto; Vanderlan Cardoso; Virmondes Cruvinel	Antônio Vieira Neto; Cristiano de Moraes Cunha
MA	São Luís	Bira; Duarte; Eduardo Braide; Hertz Dias; Jeisael; Neto Evangelista: Professor Franklin; Rubens Junior; Silvio Antonio; Yglésio Moyses	-
MG	Belo Horizonte	Alexandre Kalil; Áurea Carolina; Luisa Barreto; Bruno Engler; Fabiano Cazeca; João Vitor Xavier; Lafayette Andrada; Marcelo Souza e Silva; Marília Domingues; Nilmário Miranda; Rodrigo Paiva; Wadson Ribeiro; Wanderson Rocha; Professor Wendel Mesquita; Cabo Xavier	-
MS	Campo Grande	Dagoberto; Márcio Fernandes; Esacheu Nascimento; Guto Scarpanti; João Henrique; Marcelo Bluma; Marquinhos Trad; Vinícius Siqueira; Paulo Matos; Pedro Kemp	Cristiane Pinheiro Duarte; Ednei Marcelo Miglioli; Sidnéia Catarina Tobias
MT	Cuiabá	Aécio Rodrigues; Gilberto Lopes Filho; Emanuel Pinheiro; Paulo Henrique Grando; Gisela Simona	Abilio Jacques Brunini Moumer; Julier Sebastião da Silva; Roberto França Auad
PA	Belém	Cássio Andrade; Cléber Rabelo; Delegado Federal Eguchi; Thiago Araújo; Edmílson Rodrigues; Gustavo Sefer; Priante; Vavá Martins	José Jerônimo de Sousa; Luiz Guilherme Lessa de França; Jair Lopes Correia; Mário Couto Filho
PB	João Pessoa	Anísio Maia; Camilo Duarte; Cícero Lucena; Edilma Freire; Ítalo Guedes; Nilvan Ferreira; Raoni; Ricardo Coutinho; Ruy Carneiro; Wallber Virgolino	Carlos Antônio Araújo Monteiro; João Almeida de Carvalho Junior; Rafael Freire Santana; Severina dos Ramos Silva Dantas

PE	Recife	Cláudia Ribeiro; Coronel Feitosa; João Campos; Marília Arraes; Mendonça Filho	Carlos Antonio Gomes de Andrade Lima; Charbel Elias Maroun; Patricia de Oliveira Domingos; Thiago de Oliveira Santos
PI	Teresina	Dr. Pessoa; Fábio Novo; Fábio Abreu; Gessy Fonseca; Fábio Sérvio; Gervásio Santos; Kleber Montezuma; Lucineide Barros; Major Diego Melo; Major Rogério	Pedro Laurentino Reis Pereira; Simone Pereira de Farias Araujo
PR	Curitiba	Camila Lanes; Christiane Yared; Dr. João; Guilherme do Novo; Eloy Casagrande; Fernando Francischini; Goura; João Arruda; Letícia Lanz; Marisa Lobo; Professor Mocellin; Paulo Opuszka; Rafael Greca; Zé Boni	Caroline Arns de Santa Cruz Arruda; Samara Garrantini
RJ	Rio de Janeiro	Cyro Garcia; Benedita da Silva; Delegada Martha Rocha; Clarissa Garotinho; Eduardo Paes; Glória Heloiza; Marcelo Crivella; Bandeira de Mello; Paulo Messina; Luiz Lima; Renata Souza; Fred Luz; Suêd Haidar	-
RN	Natal	Álvaro Dias; Coronel Azevedo; Carlos Alberto (Beto); Coronel Hélio Oliveira; Hermano Morais; Kelps Lima; Delegado Leocádio; Nevinha Valentim; Jaidy Oliver; Rosália Fernandes; Senador Jean	Afrânio Ferreira de Miranda Filho; Fernando Carvalho de Freitas
RO	Porto Velho	Leonel Bertolin; Dr. Breno Mendes; Hildon Chaves; Sargento Eyder Brasil; Ramon Cujui; Vinícius Miguel	Cristiane Lopes da Luz Bernarrosh; Edvaldo Rodrigues Soares; Geneci Gonçalves dos Santos; Leonardo Severo da Luz Neto; Lindomar Barbosa Alves; Mauro Ronaldo Flores Correa; Nascimento Antônio da Silva; Samuel Costa Menezes; Williames Pimentel de Oliveira

RR	Boa Vista	Arthur Henrique; Nicoletti; Shéridan; Fábio Almeida; Gerlane; Linoberg; Luciano Castro; Ottaci	Isamar Pessoa Ramalho; Shaolyn Gomes Bezerra
RS	Porto Alegre	Fernanda Melchionna; Gustavo Paim; João Derly; Juliana Brizola; Julio Flores; Manuela; Nelson Marchezan Júnior; Rodrigo Maroni; Montserrat Martins; Sebastião Melo; Valter	-
SC	Florianópolis	Alexander Brasil; Angêla Amin; Dr. Ricardo; Gabriela Santetti; Gean Loureiro; Orlando; Pedrão; Professor Elson	Helio Cesar Bairros; Jair Fernandes de Aguiar Ramos
SE	Aracaju	Alexis Pedrão; Delegada Danielle; Almeida Lima; Rodrigo Valadares; Edvaldo; Georlize; Juraci Nunes; Márcio Macedo; Delegado Paulo Márcio	Gilvani Alves dos Santos; Lúcio Flávio Miranda da Rocha
SP	São Paulo	Andrea Matarazzo; Arthur do Val Mamãe Falei; Bruno Covas; Celso Russomanno; Guilherme Boulos; Jilmar Tatto; Joice Hasselmann; Levy Fidelix; Marcio França; Marina Helou; Orlando Silva; Vera	Antônio Carlos Silva
TO	Palmas	Alan Barbiero; Barison; Cinthia Ribeiro; Eli Borges; Professor Bazolli; Marcelo Lelis; Professor Júnior Geo; Thiago Amastha Andrino; Vanda Monteiro	João Heldes Vilela; Joaquim Rocha Pereira; Max Dornellys Borges de Oliveira

Figure 1 depicts the final sampling frame of candidates who were the object of study of this project.

Figure 1. Sampling Frame of Candidates whose Tweets were Identified as Relevant to COVID-19 Vaccines and Vaccinations



III. Tweet Classification Process

The categorization of tweets from candidates for mayor in the Brazilian capitals in 2020 and 2021 took place in four distinct stages. Initially, 2.335 tweets were extracted for 2020, and 17,000 tweets for 2021. Of the total tweets of 2021 that were collected, we selected a random sample of 5,000 tweets to annotate for the training data set. So, for the combined years, we have 7,335 publications that were annotated. The second stage involved defining the sample used in this study based on classifying tweets as relevant or not relevant. In the third stage, tweets classified as relevant to the study were further annotated by stance and sentiment type. The tasks in stage 3 were done contemporaneously by two different groups of coders. Relevant tweets were also classified and analyzed concerning the variables of interest in this study. Each of these stages is described in detail below. Figure 2 illustrates all adopted stages mentioned above.

Figure 2. Stages of the Tweet Classification Process

III. I. Sample Selection

The tweets were collected using the Python library Twarc (Summer, 2013). Twarc is a tool that facilitates the collection of Twitter data through the Twitter API. Each line in our dataset represents a unique Tweet by a specific candidate on a

given date. For each tweet, we collected the link/URL, content (including images, videos and links), date and time, and the number of likes, retweets, and quoted tweets associated with each post. Only the text was maintained in the annotation.

For data collection, we defined keywords by specific topics. Initially, 79 terms related to COVID-19 vaccines and vaccination were included. The list comprises terms related to vaccination, immunization, vaccine brands and laboratories responsible for developing and distributing vaccines, clinical trials, and vaccine policies.[6] Alternative spelling was considered to capture possible spelling mistakes.[7] For each term, we considered both the upper and lower case.

Additionally, after the manual classification of the entire sample, 13 terms were added to the list of keywords, due to the recognition of their relevance in the debate associated with COVID-19 vaccination. The 13 additional terms are: *'DoriaVac'*; *Cobaia*; *Jacaré*; *Jacare*; '*Ditadória'*; 'Ditadoria'; *Va-china*; '*Vachinação'*; '*Va-chinacao'*; *Colateral*; *Efeito Colateral*; *Obrigatoriedade*; *Obrigar.*

For these additional terms, most were observed in tweets with negative stances about COVID-19 vaccines and posted by five candidates - Alexander Brasil (PRTB); Capitão Assumção (PATRIOTA); Cezar Leite (PRTB); Fred Luz (NOVO); Marisa Lobo (AVANTE). These terms include: '*DoriaVac'* and '*Va-china,'* which are intended to associate the COVID-19 vaccine with a specific political leader or country. Moreover, terms commonly used by then President Jair Bolsonaro while mentioning or referring to vaccines and vaccination in interviews, official speeches, and social media posts (e.g., *cobaia* (guinea pig) and *jacaré[e]* (alligator)) were similarly included. Table 8 summarizes the final 92 keywords in Brazilian Portuguese.

Table 7. According to the topics, COVID-19 Vaccine and Vaccination Keywords used to collect Tweets from candidates in state capitals in 2020 and 2021.

Topic	Keywords

[6] The original R script used in the filtering process is available upon request.

[7] We are well aware the terms included in this analysis do not exhaust all the possibilities. The most common variations were selected, however, for practical purposes.

Vaccines and Vaccination	[Vv]acin; [Vv]assina; [Vv]acinacao [Vv]asina; [Ii]munização; [Ii]munisação; Vaccine Symbol (0);[Oo]brigatoriedade; [Oo]brigar
Covid-19 Vaccines and Laboratories	CoronaVac - [Cc]orona[Vv]ac; [Cc]ova[Xx]in; [Cc]omuna[Vv]ac; [Ss]inovac AstraZeneca - [Aa]stra[Zz]eneca; [Aa]stra[Zz]enica; [Oo]xford; [Oo]xfort; [Oo]xfor; [Vv]axzvria Pfizer - [Pp]fizer; [Pp]eizer; [Pp]pfaizer; [Ff]aizer; [Ff]eizer; [Bb]arat; [Bb]iontech; [Bb]iontec; [Cc]omyrnaty; [Cc]omimaty; [Bb]iontech [Mm]anufacturing [Gg]mbh; Moderna - [Vv]acina da [Mm]oderna; [Vv]acina [Mm]oderna; [Ss]pikevax; [Mm]oderna [Bb]iontech; mRNA-1273; CX-024414 Sputnik - [Ss]putnik; [Ss]putinik; [Ss]putink; [Ss]putinic; [Ss]putinikV; [Gg]amaleya; [Gg]amaleia Janssen - [Jj]ansen; [Jj]anssen; [Jj]&[Jj]: [Jjohnson & [Jjohnson: [Jj]honson & [Jj]honson: [Jj]onson: [Jj] & [Jj]: [Jjohnson: [Jjjohnsons; [Jj]honson; [Jjancen; [Aa]d26.COV2S Covaxin - [Cc]ovaxin; [Cc]ovachin; [Bb]harat [Bb]iotech Novavax - [Nn]ovavax; [Cc]ovavax; [Nn]uvaxovid; NVX-CoV2373; TAK-019; SARS- CoV-2 rS with Matrix-M1 adjuvant; [Ss]erum [Ii]nstitute of [Ii]ndia; [Nn]ovavax; [Ff]ormulation Sinopharm - [Ss]inopharm; BIBP; [Ss]inofarm Other Laboratories - [Bb]utantan; [Bb]utanta; [Ff]iocruz; @fiocruz; [Ff]iocrus
Geography	[Vv]achina; [Vv]achinada; [Vv]achin@da; [Vv]axina; [Vv]acina da [Cc]hina; [Vv]acina [Cc]hinesa; [Vv]acina [Bb]ritânica; [Vv]acina [Cc]ubana; [Vv]acina [Rr]ussa; [Vv]acina da [Rr]ussia
Demography	[Ii]doso[s]; [Aa]dulto[s]; [Aa]dolescente[s]; [Jj]oven[s]; [Cc]riança[s]; [Mm]enin[oas]; [Rr]ecem-[Nn]ascido[s]; [Gg]uri[s]; [Aa]vôs; [Aa]vós; [Mm]oleque[s]; [Vv]ovô; [Vv]ovó; [Nn]eto[s]; [Ff]ilh[oas]; [Bb]ebês; [Gg]rávidas; [Pp]ai; [Mm]ãe; [Óó]rfão[s]; [Gg]arot[oa];
Adverse and Side Effects	[Ee]efeito [Cc]olateral; [Ee]feito [Aa]verso; [Cc]hoque [Aa]nafilático; [Aa]nafilaxia; [Ss][índrome de [Gg]uillain-[Bb]arré (SGB); [Mm]iocardite; [Pp]eriocardite; [Tt]rombose; [Tt]rombocitopenia; [Tt]erapia [Gg]ênica; [Tt]erapia [Gg]enética; [Aa]taque de [Cc]oração; [Aa]utismo; [Pp]aralisia; [Cc]onvulsões; [Dd]errame; AVC; [Ss]índrome Inflamatória Multissistêmica; [Ss]índrome de Kawasaki; [Dd]or no [Cc]oração; [Dd]or no [Pp]eito; [Óo]bito; [Aa]menoreia; [Rr]eação [Aa]lérgica; [Pp]arada [Cc]ardíaca; [Ll]esões

	[Gg]raves;[Cc]omorbidades; [Cc]âncer; [Mm]ortalidade; [Mm]orte [Ss]úbita; [Mm]al [Ss]úbito; [Aa]borto; [Cc]oagulação; [Ii]nfarto; [Rr]eação [Aa]deversa; [Dd]oença [Aa]utoimune; [Cc]olateral; [Ee]feito [Cc]olateral
Additional Terms	[Dd]oriavac; [Cc]obaia; [Jj]acaré; [Jj]acare; [Dd]itadória; [Dd]itadoria; [Vv]a-china; [Vv]achinação; [Vv]a-chinacao;

Based on the specified keywords, a filtered sample of 2.335 tweets were extracted for 2020, and for 2021, 17,000 tweets were obtained. However, for 2021, we annotated a random sample of 5.000 tweets.

III. 2. Sample Definition: Relevant COVID-19 Vaccine Tweets

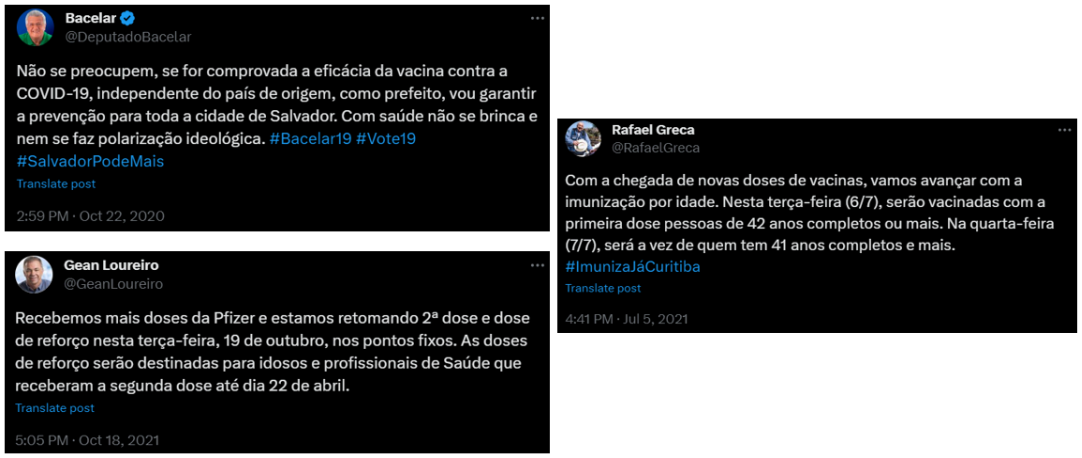
Using the corpus composed of Twitter 2.335 posts in 2020 and 5.000 posts in 2021, the coders identified posts that did not refer to COVID-19 vaccines or vaccination (even if they contained one or more of the keywords). Posts in which the contents referred to COVID-19 vaccines and vaccination received a score of 1, while posts that only contained keywords, but did not address COVID-19 vaccines and vaccination received a score of 0.

Posts that were classified as **relevant** included:

a. Direct citation of COVID-19 vaccines/vaccination;
b. Indirect reference to COVID-19 vaccines and vaccination (e.g. the battle against COVID-19);
c. Terms that are specific, or can be inferred as, to COVID-19 vaccines, such as “second and third doses/shots”, “booster doses”;
d. There is reference about the vaccine or vaccination in Brazil or other countries;
e. There is mention of vaccine or anti-vaccine, even in hashtags (#); or,
f. Vaccination campaigns and public service announcements mentioning specific and quite limited age groups (e.g., “Tomorrow starts the

vaccination for those 37-39") because age-targetted announcements were almost entirely for COVID-19 vaccination campaigns.

Figure 3. Examples of Twitter Posts Relevant to COVID-19 Vaccines and Vaccination



Posts that were deemed as **not relevant** include messages referring to:

a. Vaccination in animals;
b. Vaccines as a metaphor to refer to another topic (e.g. transparency as a vaccine against corruption); or
c. Other vaccines/vaccination (Influenza, Measles, etc.).

Figure 4. Examples of Twitter Posts Not Relevant to COVID-19 Vaccines and Vaccination

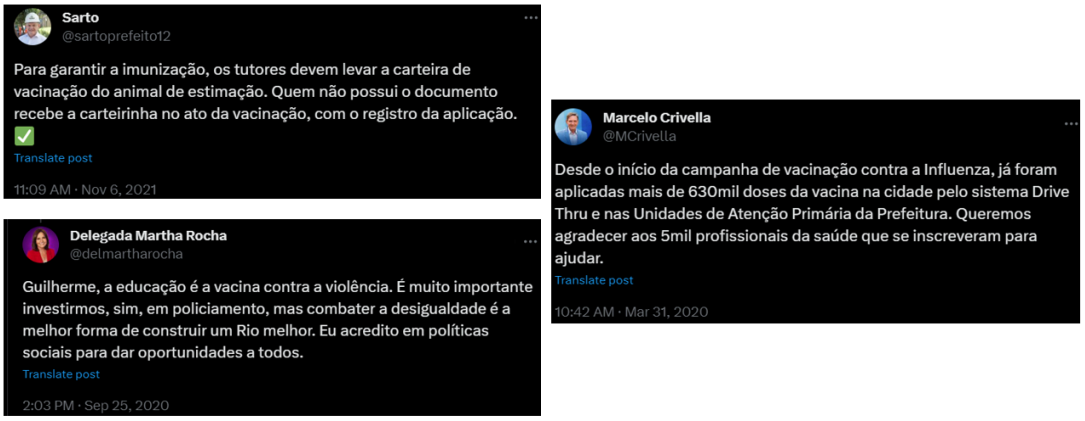


Table 8 presents the candidates who actively tweeted about the COVID-19 vaccines and vaccination in 2020 and 2021, as well as those who did not, that is,

those who posted tweets classified or not as relevant to the objectives of this study.

Table 8. Candidates and Parties with active Twitter accounts conditional on whether they published posts relevant to COVID-19 vaccines and vaccination in 2020 and 2021*

State	Capital	Candidates who published relevant tweets about Covid-19 vaccines/vaccination	Candidates who have not published relevant tweets about Covid-19 vaccines/vaccination
AC	Rio Branco	Daniel Queiroz (PT)	Minoru Kinpara (PSDB) Roberto Duarte (MDB) Sebastião Bocalom (PP) Socorro Neri (PSB)
AL	Maceió	João Henrique Caldas (PSB) Lenilda Luna (UP) Maria Valéria Correia (PSOL)	Alfredo Gaspar (MDB) Cícero Filho (PC do B) Corintho Campelo (PMN) Davi Davino (PP)
AM	Manaus	Amazonino Mendes (PODE) Alberto Neto (REPUBLICANOS) David Almeida (AVANTE) Elson Marcelo Lima (PC do B) José Ricardo Wendling (PT) Romero Reis (NOVO)	Alfredo Menezes (PATRIOTA) Marco Antônio da Costa (DC) Ricardo Nicolau (PSD)
AP	Macapá	Antônio Paulo Furlan (CIDADANIA) Gianfranco Gusmão (PSTU) José Samuel Alcolumbre (DEM) Patrícia Ferraz (PODE)	Haroldo Iram (PTC) Paulo Lemos (PSOL)
BA	Salvador	Bruno Reis (DEM) Celso Coelho (PROS) Cézar Leite (PRTB) Denice Santiago (PT) Hilton Coelho (PSOL) João Carlos Bacelar (PODE) Olívia Santana (PC do B) Rodrigo Pereira (PCO)	-
CE	Fortaleza	Anízio Santos (PC do B) Célio Studart (PV) Heitor Férrer (SOLIDARIEDADE)	Wagner Gomes (PROS)

		Heitor Freire (PSL) José Sarto (PDT) Luizianne Lins (PT) Paula Colares (UP) Renato Roseno (PSOL)	
ES	Vitória	João Coser (PT) Lucínio Castelo (PATRIOTA) Nylton Rodrigues (NOVO) Sérgio Sá (PSB)	Fabrício Aquino (CIDADANIA) Edmar Lorencini (PSD) Neuza de Oliveira (PSDB)
GO	Goiânia	Adriana Accorsi (PT) Elias Vaz (PSB) Fábio Júnior (UP) Hemanuelle Jacob (PSOL) Júnio Araújo (PSL) Talles Barreto (PSDB) Vanderlan Cardoso (PSD)	Alysson Lima (SOLIDARIEDADE) Luiz Vilela (MDB) Samuel Almeida (PROS) Virmondes Cruvinel (CIDADANIA)
MA	São Luís	Eduardo Braide (PODE) Franklin Ferreira (PSOL) Hildelis Duarte (REPUBLICANOS) Rubens Júnior (PC do B) Sílvio Antônio (PRTB) Ubirajara Sousa (PSB) Yglésio Moysés (PROS)	Hertz Dias (PSTU) Jeisael de Jesus (REDE) José Evangelista (DEM)
MG	Belo Horizonte	Áurea Carolina (PSOL) Bruno Engler (PRTB) João Vitor Xavier (CIDADANIA) Lafayette Andrada (REPUBLICANOS) Luísa Barreto (PSDB) Nilmário Miranda (PT) Rodrigo Paiva (NOVO) Wadson Ribeiro (PC do B) Wanderson Rocha (PSTU) Wendel Mesquita (SOLIDARIEDADE)	Alexandre Kalil (PSD) Edmar Xavier (PMB) Marcelo de Souza (PATRIOTA) Marília Domingues (PCO)
MS	Campo Grande	Dagoberto Nogueira (PDT) Esacheu Nascimento (PP) Guto Scarpanti (NOVO) João Catan (PL) Pedro Kemp (PT) Vinícius Siqueira (PSL)	Marcelo Bluma (PV) Márcio Fernandes (MDB) Marcos Trad (PSD) Paulo Matos (PSC)

MT	Cuiabá	Emanuel Pinheiro (MDB)	Aécio Rodrigues (PSL) Gilberto Lopes (PSOL) Paulo Grando (NOVO)
PA	Belém	Edmilson Rodrigues (PSOL) Gustavo Sefer (PSD) Thiago Araújo (CIDADANIA) Wagner Martins (REPUBLICANOS)	Cássio Andrade (PSB) Everaldo Eguchi (PATRIOTA) José Priante (MDB)
PB	João Pessoa	Anísio Maia (PT) Cícero Lucena (PP) Ítalo Guedes (PSOL) Ruy Carneiro (PSDB) Wallber Virgolino (PATRIOTA)	Camilo Duarte (PCO) Edilma Freire (PV) Nilvan Ferreira (MDB) Raoni Mendes (DEM) Ricardo Coutinho (PSB)
PE	Recife	Alberto Feitosa (PSC) João Campos (PSB) Marília Arraes (PT)	José Filho (DEM)
PI	Teresina	Fábio Novo (PT) Fábio Sérvio (PROS)	Diego Melo (PATRIOTA) Fábio Abreu (PL) Gervásio Santos (PSTU) Gessy Fonseca (PSC) José Pessoa (MDB) Kleber Montezuma (PSDB) Lucineide Barros (PSOL)
PR	Curitiba	Camila Lanes (PC do B) Christiane Yared (PL) Fernando Francischini (PSL) João Arruda (MDB) João Moraes (NOVO) Jorge Brand (PDT) José Boni (PTC) Marisa Lobo (AVANTE) Paulo Opuszka (PT) Rafael Greca (DEM)	Eloy Casagrande (REDE) Renato Mocellin (PV)
RJ	Rio de Janeiro	Benedita da Silva (PT) Clarissa Garotinho (PROS) Cyro Garcia (PSTU) Eduardo Paes (DEM) Frederico Luz (NOVO) Glória Silva (PSC) Luiz Lima (PSL) Marcelo Crivella (REPUBLICANOS) Martha Rocha (PDT) Paulo Messina (MDB)	Suêd Haidar (PMB)

		Renata Souza (PSOL)	
RN	Natal	Carlos Medeiros (PV) Jaidy Oliveira (DC) Jean Prates (PT) Rosália Fernandes (PSTU)	Álvaro Dias (PSDB) André Azevedo (PSC) Hélio Oliveira (PRTB) Hermano Moraes (PSB) Kelps Lima (SOLIDARIEDADE) Maria Valentim (PSOL) Sérgio Leocádio (PSL)
RO	Porto Velho	Hildon Chaves (PSDB) Ramon Cujui (PT) Vinícius Miguel (CIDADANIA)	Breno Mendes (AVANTE) Eyder do Carmo (PSL) João Bertolin (PTB)
RR	Boa Vista	Antônio Nicoletti (PSL) Gerlane Baccarin (PP) Linoberg Almeida (REDE) Shéridan Oliveira (PSDB)	Arthur Machado (MDB) Fábio Almeida (PSOL) Luciano Castro (PL) Otaci do Nascimento (SOLIDARIEDADE)
RS	Porto Alegre	Fernanda Melchionna (PSOL) Gustavo Paim (PP) João Derly (REPUBLICANOS) Juliana Brizola (PDT) Manuel d'Ávila (PC do B) Montserrat Martins (PV) Nelson Marchezan Júnior (PSDB) Sebastião Melo (MDB) Valter Nagelstein (PSD)	Júlio Flores (PSTU)
SC	Florianópolis	Alexander Brasil (PRTB) Ângela Amin (PP) Elson Pereira (PSOL) Gean Loureiro (DEM) Orlando Neto (NOVO)	Gabriela Santetti (PSTU) Pedro Silvestre (PL)
SE	Aracaju	Alexis Pedrão (PSOL) Edvaldo Filho (PDT) Márcio Macedo (PT) Rodrigo Valadares (PTB)	Danielle Soares (CIDADANIA) Georlize Teles (DEM) Juraci Nunes (PMB) Paulo Cruz (DC)
SP	São Paulo	Ângelo Matarazzo (PSD) Arthur do Val (PATRIOTA) Celso Russomanno (REPUBLICANOS) Guilherme Boulos (PSOL)	Levy Fidelix (PRTB)

		Jilmar Tatto (PT) Joice Hasselmann (PSL) Márcio França (PSB) Marina Helou (REDE) Orlando Silva (PC do B) Vera Lúcia Salgado (PSTU)	
TO	Palmas	Alan Barbiero (PODE) Cínthia Ribeiro (PSDB) Tiago Andrino (PSB) Vanda Monteiro (PSL)	Gil Barison (REPUBLICANOS) João Bazzoli (PSOL) José Júnior (PROS) Marcelo Lelis (PV)

Note: Those candidates with an * did not tweet in 2021.

III. 3. Classification of Stance and Sentiment of Relevant Tweets

a. Stance

The written content of the posts was classified as belonging to one of four categories: (i) favorable; (ii) unfavorable; (iii) neutral; and, (iv) unsure towards COVID-19 vaccines and vaccination.

Tweets were classified as (i) “favorable” if they promoted COVID-19 vaccines and vaccination. These are tweets that:

a) called for the development and approval of COVID-19 vaccines;
b) emphasized the urgency and the necessity of COVID-19 vaccines;
c) defended the vaccination of the population using one or all COVID-19 vaccines available;
d) expressed confidence in the development of COVID-19 vaccines and science;
e) informed or celebrated clinical trials, scientific breakthroughs, and agreements between governments and laboratories related to COVID-19 vaccine development;

f) announced significant events related to COVID-19 vaccine procurement, approvals and the beginning of immunization campaigns;

g) supported mandatory COVID-19 vaccine mandates and/or restrictions for unvaccinated; or,

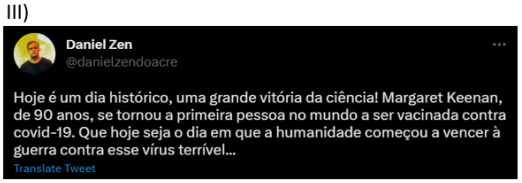
h) provided information to enhance accessibility to COVID-19 vaccines, such as announcing a new vaccine center, or guidelines on how the vaccination process works; or new groups that are eligible for vaccination.

Figure 5. Examples of Twitter Posts with Stance Favorable to COVID-19 Vaccines and Vaccination

I)

II)

III)



The second category, “unfavorable” (ii), is composed of tweets that express unfavorable positions regarding COVID-19 vaccination and vaccines. These are tweets that:

a) criticized and/or questioned the approval, procurement, and adoption of one or all COVID-19 vaccines and vaccinations campaigns, as well as the need for booster shots;

b) discouraged and/or questioned COVID-19 vaccine brands, efficacy and confidence in vaccines and/or clinical trials;

c) emphasized side effects, lack of security and/or lack of confidence in clinical trials or COVID-19 vaccine development;

d) criticized international health organizations (such as the World Health Organization - WHO), pharmaceutical companies, laboratories, national health institutions (such as the Ministry of Health, Butantan and Fiocruz), and public regulatory health agencies (such as ANVISA), along with their policies aimed at ensuring the safety and use of COVID-19 vaccines;

e) criticized and questioned the restriction of activities in the absence of mass vaccine coverage;

f) opposed mandatory COVID-19 vaccination, vaccine passports, etc;

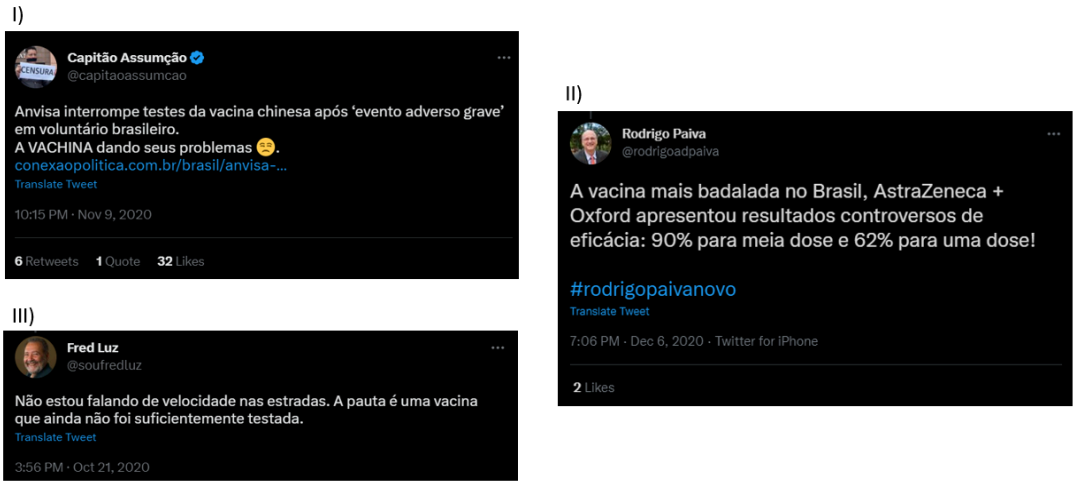
g) raised concerns about long-term effects or unknown consequences of the COVID-19 vaccine;

h) contribute to conspiracies and controversies surrounding the ingredients used in manufacturing COVID-19 vaccines;

i) express refusal/rejection and/or reluctance to COVID-19 vaccine uptake; or,

j) talk about delay in getting vaccinated, for example, mentioning that they might get the vaccine in the future upon some condition, etc.

Figure 6. Examples of Twitter Posts with Stance Unfavorable to COVID-19 Vaccines and Vaccination



The third category, "neutral" (iii), comprises posts that refer to COVID-19 vaccination and/or vaccines without expressing value judgments. Posts categorized

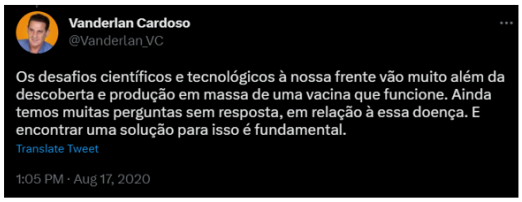
as “neutral” are tweets in which the candidates did not adopt a position on COVID-19 vaccines or vaccination. Neutral tweets are ones which:

1. reported the number of COVID-19 vaccinations administered in a specified timeframe without associating it with any opinion, encouragement, or discouragement;
2. remained ambiguous in the sense that their opinions could be interpreted as neither favorable nor unfavorable; or,
3. reported news regarding vaccination-related events that may affect people's daily life, such as protest actions or other developments, without expressing a specific opinion.

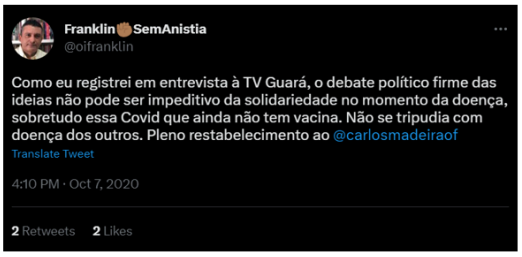
The fourth category, “unsure” (iv), is a category that the coders can use to categorize tweets where they are unsure about the stance (rather than classifying it as “neutral”). Tweets classified as “unsure” will be classified by a third coder. The number of Tweets classified as “unsure” by a coder will also be used to measure the coder’s understanding of the annotation guidelines provided, i.e. if there are too many Tweets classified as “unsure,” the coder might need to be retrained.

Figure 7. Examples of Twitter Posts with Stance Characterized as Neutral towards COVID-19 Vaccines and Vaccination

I)



II)



III)

b. Sentiment

The written content of the tweets was classified as belonging to one of three categories: (i) Positive; (ii) Negative; (iii) Neutral.

Tweets were classified as **"Positive"** if they transmitted positive feelings. These are posts where:

a) the speaker transmits positive emotions, for example, admiration, positive attitude, hope, fostering, success, gratitude, positive emotional state (happiness, optimism, pride, etc.);
b) the state of the tweet is positive: there is an explicit or implicit clue in the text suggesting that the speaker is in a positive state, i.e., happy, admiring, relaxed, supportive, etc.;
c) the tweet was dominated by mostly positive emotions;
d) the tweet was written in an optimistic tone; or,
e) the tweet expresses relief.

Figure 8. Examples of Twitter Posts with Sentiment Characterized as Positive towards COVID-19 Vaccines and Vaccination

Tweets were classified as **"Negative"** if they contained more negative than positive words and feelings. These include posts where:

a) the speaker is using negative language, for example, expressions of criticism, judgment, uncooperativeness, pessimism, negative emotion, fear, doubt, disappointment, anger, regret, etc.;
b) tweets that question validity/competence or highlight failures;

c) tweets that also included neutral language, but where negative messages dominated;

d) Skepticism/tweets that share feelings of distrust; or

e) Tweets that share negative experiences.

Figure 9. Examples of Twitter Posts with Sentiment Characterized as Negative towards COVID-19 Vaccines and Vaccination

Tweets were classified as **"Neutral**" if the speaker used neither positive nor negative language. These include:

a) tweets that are reporting on vaccine-related statistics but where it's unclear whether what they're saying is positive or negative (mostly due to lack of context); or,

b) Feelings of hesitancy, such as tweets that emphasize feelings of fear to potential side effects. Feelings of hesitancy that should be classified as "neutral" include "delay in acceptance" as per the definition of COVID-19 vaccine hesitancy by the WHO.

Figure 10. Examples of Twitter Posts with Sentiment Characterized as Neutral towards COVID-19 Vaccines and Vaccination

III. 4. Additional Classification of Tone and Topics of Tweets

a. Sarcasm and Irony

For those tweets classified as relevant, the written content of the posts were classified between two categories: (i) Sarcastic/Ironic; (ii) Not Sarcastic/Ironic.

Tweets were classified as **"Sarcastic"** if the speaker was using expressions of sarcasm, ridicule, or mockery. In the absence of these expressions, they were classified as "Not Sarcastic."

Figure 11. Examples of Twitter Posts with Sarcasm and Irony towards COVID-19 Vaccines and Vaccination

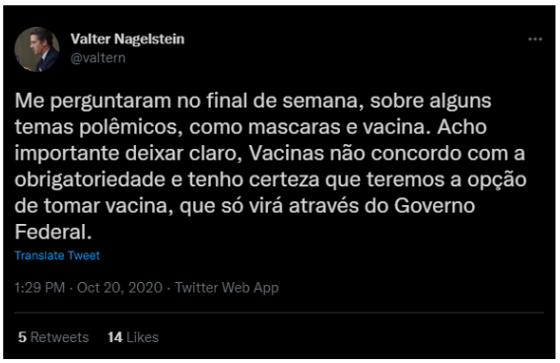
b. Mandatory Vaccination

Tweets received a score of 1 if their content was related to mandatory vaccination and/or the implementation of vaccine passports. All other tweets that didn't concern mandatory vaccination received a score of 0 in the dichotomous classification. Then, all tweets that had relevance for the discussion on mandatory vaccination (posts classified previously as "1" if they referred to mandatory vaccination, and "0" otherwise). Figure 12 presents examples of Twitter posts about mandatory vaccination for COVID-19.

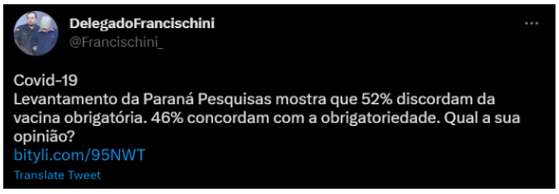
Figure 12. Examples of Twitter Posts regarding Mandatory Vaccination for COVID-19

I) Support Mandatory

II) Contrary Mandatory



III) Neutral



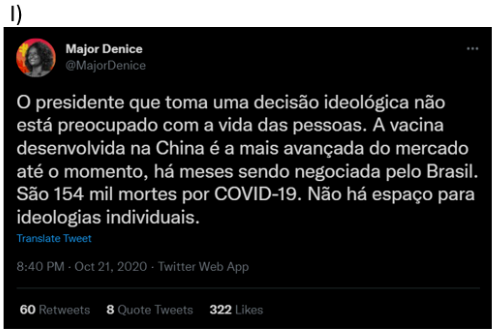
c. COVID-19 Vaccine Brands

Each tweet was also coded if it referred to specific COVID-19 vaccine brands. Direct references (by the names of the COVID-19 vaccines) or indirect references (names of the producing companies, countries of origin, ironic or even xenophobic ways to refer to COVID-19 vaccine brands) were identified for the specific vaccine brand/manufacturer. One example of xenophobic ways to refer to a COVID-19 vaccine brand was using the term "vachina" to refer to Coronavac from Sinovac. In this case, the use is associated with a xenophobic distrust of the brand,

because of the origin country of the company which produces the vaccine. Figure 12 presents examples of Twitter posts about specific COVID-19 vaccine brands.

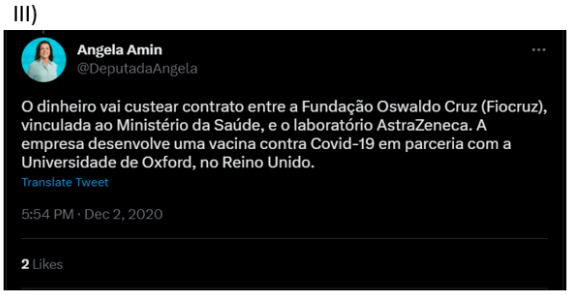
Figure 13. Examples of Twitter Posts mentioning specific COVID-19 Vaccine Brands

I)



II)

III)



d. Children and Adolescents

Each tweet was also coded if it referred to children or adolescents. Figure 13 presents examples of Twitter posts referring to infants, children, and/or teens.

Figure 14. Examples of Twitter Posts mentioning Children and Adolescents

IV. Description of Variables

In this section, we provide an overview of all the variables included in the final dataset, along with a brief description of each variable. Variables are ordered following the order in which they appear in the dataset.

Table 9. Summary of Description of the variables in the data

Variable	Description
date_post	Numeric variable with the date of posts according to Twitter registration.
author_id	Numeric variable with the numeric ID associated with each candidate's profile.
username	String variable with the candidate´s username on Twitter accounts.
name_candidate	String variable with the candidate's complete name.
gender	String variable that identifies the candidate's gender according to the TSE classification.

party_id	String variable with the ID of the candidate´s affiliation party at the time of the elections, as stated in the TSE.
followers	Numeric variable with the number of followers for each active Twitter account on the day of collection, according to the Tweet log.
media	String variable that identifies social network originating publications[8].
tweet_id	Numeric variable with unique numeric ID associated with each specific post.
content	String variable with full transcription of the textual content of the posts[9].
message_type	Numeric variable that identifies if the post contains text, images, videos and/or links.
is_quote	Dummy variable that identifies if posts are 'quotes tweets' - a retweet with a reply.
is_reply	Dummy variable that identifies posts that are responding to other posts.
is_retweet	Dummy variable that identifies posts that are retweets.
likes	Numeric variable with the number of likes associated with individual posts on the day of collection, according to the Tweet log.

[8] This variable attributes a single value to all observations, as only Twitter posts were included in the dataset.

[9] It is worth noting that for this variable only textual content was considered, that is, no images, videos or contents of other formats were considered or included.

quotes	Numeric variable with the number of quotes associated with individual posts on the day of collection, according to the Tweet log.
replies	Numeric variable with the number of replies associated with individual posts on the day of collection, according to the Tweet log.
retweets	Numeric variable with the number of retweets associated with individual posts on the day of collecion, according to the Tweet log.
terms	String variable that list the terms present in posts that correspond to terms used in content filtering.
vaccine_brand	String variable that identifies vaccine brand referenced in the post.
post_vaccine	Dummy variable that identifies posts about vaccines and COVID-19 vaccination.
positions_vac	Categorical variable that identifies positions on the vaccines and COVID-19 vaccination in each post.
mandatory_vaccines	Dummy variable that identifies posts about mandatory COVID-19 vaccination.
positions_mandatory_vaccines	Categorical variable that identifies positions regarding mandatory COVID-19 vaccination in each post, according to their content.

endorse_president	Dummy variable that identifies candidates whom Bolsonaro publicly endorsed during the electoral campaign in 2020.
align_president	Dummy variable that identifies candidates who, despite not receiving formal endorsement from Bolsonaro in 2020 elections, declared that they, if elected, would govern following the policies and guidelines adopted by Bolsonaro at the national level.
mentions_president	Dummy variable that identifies the presence of references to the Federal Government and to the president in posts.
president_terms	String variable that list the terms present in posts that correspond to mentions of the Federal Government and/or to the president.
category	String variable that classifies the content of a post into theme categories.
subcategory	String variable that classifies the content of a post into theme subcategories referred to the previous category classification.
status_url	String variable for link to individual posts.
hashtags	String variable with a list of hashtags present in posts.
state	String variable for the federal unit for enlisting mayoral candidates.

city	String variable for municipality of enlistment of mayoral candidates.
votes_first_round	Numeric variable expressed in percentage votes received by each candidate in the first round of the 2020 municipal elections, according to TSE data.
disputed_second_round	Dummy variable that identifies the presence of a candidate in the second round of the 2020 municipal elections, according to TSE data.
votes_second_round	Numeric variable expressed in percentage votes received by each candidate in the second round of the 2020 municipal elections according to TSE data.
margin_victory_candidate	Numeric variable expressed in percentage that reports the difference in votes between the winner of the 2020 elections and candidates who ended in second place in the dispute, according to TSE data.
electoral_result	Dummy variable that identifies candidates who were elected in the 2020 municipal elections, according to TSE data.
incumbent	Dummy variable that identifies incumbent candidates.
bolsonaro_municipality_victory	Dummy variable that identifies municipalities where Bolsonaro won the 2018 national elections, according to TSE data.

votes_bolsonaro_second_round	Numeric variable expressed in percentage votes for Bolsonaro in a given municipality, in the second round of the 2018 national elections, according to TSE data.
margin_victory_bolsonaro	Numeric variable expressed in percentage that reports the difference in votes between Bolsonaro and the second place candidate in the 2018 national elections in each municipality, according to TSE data.
vaccine_covid_children	Dummy variable that identifies posts about COVID-19 vaccines for children.

References

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