

From sharing misinformation to debunking it: How Coordinated Image Text Sharing Behaviour is used in political campaigns on Facebook

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Abstract. This study aims to understand how Coordinated Image Text Sharing Behaviour (CITSB) was used on Facebook during the 2022 Brazilian election, focusing on posts containing images about Lula da Silva or Jair Bolsonaro, the candidates in the Brazilian run-off election (n=509,219 Facebook posts). The analysis is based on a script to identify CITSB on Facebook and includes social network analysis and a manual review of the most shared content. Findings show that both sides of the political divide engaged in CITSB to share promotional campaign-related content, which included criticising their opponents and promoting social media lives. Partisan accounts engaged in CITSB not only in their silos but also in other spaces on Facebook, such as local buy-and-sell Facebook groups. This indicates that CITSB was used to get the vote of undecided voters. Finally, while pro-Bolsonaro accounts engaged in CITSB to spread conspiracy theories and misinformation, pro-Lula accounts engaged in CITSB to debunk false claims about Lula.

Keywords: Coordinated Behaviour, Election, Misinformation, Political Campaign, Social Science.

1 Introduction

Coordinated behaviour on social media has been widely associated with negative outcomes, such as misinformation spread and harassment campaigns. Coordinated behaviour refers to the coordination of social media accounts, usually malicious or fake users, to influence public opinion and online discussions [6, 7, 14]. Coordinated behaviour can be a problem for several reasons. Misinformation campaigns fuelled by coordinated behaviour can undermine trust in institutions and cause harm to individuals and communities [8]. When used to manipulate public opinion, coordinated behaviour can also influence elections and interfere with democratic processes [6]. Finally, coordinated behaviour can create a toxic online environment when used to promote hate or harassment campaigns [23].

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Similar to this study, previous research has focused on coordinated behaviour behind link sharing on social media during elections. During the 2018 and 2019 Italian elections, coordinated behaviour was used by right-wing groups to promote links containing misinformation and partisan content in an effort to manipulate public opinion [6]. During the 2019 UK elections, another study found evidence of coordinated behaviour on both sides of the political divide and that not only inauthentic fake accounts were engaged in coordinated behaviour, but also political activists [14]. Many of the accounts involved in coordinated behaviour during the UK election were later suspended by Twitter. Similarly, most coordinated posts during the 2019 Philippine election were later removed or deleted, indicating that they contained content that violated Facebook moderation policies [25].

During the Covid-19 pandemic, one study identified that botnets mostly associated with right-wing and far-right sentiments often used coordination to promote conspiracy theories [7]. Another study related to Covid-19 identified that groups from both sides of the political divide engaged in coordinated behaviour, but content posted by right-wing accounts was more often deleted or removed from Facebook [8]. They also identified an international spread of links containing misinformation and partisan content, as accounts from Brazil, France, and some African countries also engaged in coordinated link sharing behaviour.

Building on previous research, this study focuses on coordinated behaviour around images on Facebook. This study uses a method called Coordinated Image Text Sharing Behaviour (CITSB). CITSB refers to the technique used to identify social media accounts that repeatedly share images with identical text in a short period of time from each other [4]. Previous studies mostly focused on coordinated link sharing behaviour [6, 8] and coordinated behaviour around specific hashtags [7, 14]. This study fills a gap by looking at how images are used in coordinated campaigns. Images have a powerful emotional impact [15], which can help them go viral on social media and mobilise online participation [2]. Additionally, previous research has found that visual misinformation can be seen as more credible than textual misinformation [9]. There is also a large prevalence of visual misinformation on social media. For example, a study on visual misinformation on Facebook found that 20% of their sample of images consisted of misinformation, which indicates that a large volume of misinformation has been potentially ignored by previous research that mostly focused on links [24].

To explore the role of CITSB, this research focuses on the 2022 Brazilian Election on Facebook. Political campaigns in Brazilian social media tend to be highly polarised, favouring the emergence of partisan content and misinformation from both sides of the political divide [18]. In 2022, incumbent Jair Bolsonaro ran against former President Lula da Silva. Jair Bolsonaro and his supporters were associated with misinformation campaigns during the previous election [11, 17, 22] and, particularly, during the Covid-19 pandemic [16, 19, 21]. This research focuses on Facebook because, at the time of the election, it was both the second most used social media platform in Brazil (67%) and the second most popular social media for news consumption in Brazil (40%), only behind YouTube [12].

Three research questions guide this study. *RQ1. What is the network structure based on accounts involved in coordinated behaviour?* Previous studies found mostly segregated networks of coordinated accounts involved in coordinated behaviour, indicating that each cluster is usually engaged in promoting different content from other clusters. In some cases, clusters were identified around different geographic locations or specific languages [7, 8]. Clusters of coordinated accounts were also identified around specific political ideologies or radicalised communities, such as QAnon groups [6–8, 14].

RQ2. What are the political affiliations of Facebook accounts engaged in coordinated behaviour? Coordinated behaviour has been mostly associated with right-wing accounts, particularly those promoting conspiracy theories and anti-vaccine content [6–8]. There is also evidence of left-wing accounts involved in coordinated behaviour, but previous research has identified that posts from right-wing coordinated accounts were more often deleted or removed [8, 14]. Overall, findings from previous studies indicate that both sides of the political divide might engage in coordinated behaviour, but the spread of misinformation and problematic content is more strongly associated with right-wing communities.

RQ 3. What is the content shared in different clusters of coordinated accounts? Coordinated behaviour is often used to spread partisan content, misinformation, hateful content, and spam [6, 7, 23]. Previous research identified that posts from coordinated accounts are frequently deleted or removed from the platforms, indicating the presence of problematic content [8, 14].

2 Methods

CrowdTangle was used to collect Facebook posts during the 2022 Brazilian run-off election. CrowdTangle is a Meta-owned tool that allows researchers and journalists to access and analyse public content on Facebook. It tracks the content of over 7 million influential Facebook pages, groups, and verified profiles, including all pages with 25K+ followers or likes, all public groups with 95K+ members (or 2K+ members for US-based public groups), and all verified profiles.

The search query for data collection was “Lula OR Bolsonaro”, the names of the two candidates in the run-off of the election. While this means that posts that did not contain their names were excluded from the sample, it also narrows down the search query to make the analysis more focused on the two candidates. Data collection was also limited to the period of the campaigns in the run-off, 3rd-29th of October 2022. Posts removed by Facebook or deleted by users become unavailable on CrowdTangle. Therefore, data was collected on the 1st of November, soon after the election, to ensure the completion of the dataset. Finally, only posts containing images were collected for this analysis. In total, the dataset contained 509,219 public Facebook posts.

A specialised R script was used to identify coordinated accounts and the images they shared during the 2022 Brazilian run-off election. The R script called Coordinated Image Text Sharing Behaviour (CITSB) [4] reuses some of CoorNet [5]

codes and logics to detect Facebook accounts repeatedly sharing images with identical text in a short period of time from each other. For this analysis, the coordination interval was set to 60 seconds, as established by previous research [7, 10]. This means that coordination is identified when two or more Facebook accounts share an image with the exact same text within 0-60 seconds of each other. Focusing on the image text poses some limitations, as this technique is less likely to identify manipulated images posted out of context as evidence for false claims. On the other hand, previous research in Brazil has identified that the most viral visual misinformation posts about Covid-19 on Instagram (an image-based platform) heavily relied on textual elements, such as posting screenshots of news headlines and posts from other platforms, overlaying text in front of images to provide context, and adding subtitles to videos [20].

Using CITSB, a network of coordinated accounts was created based on 126,730 coordinated posts. In the network, Facebook accounts (nodes) were connected when they shared images with the same text within the set threshold of 60 seconds. The resulting network consisted of 7295 Facebook accounts and 83276 edges connecting them. Gephi [1] was used to analyse the network, with a particular focus on the clusters of accounts that often shared images with the same text in a coordinated manner identified based on a community detection algorithm embedded in the CITSB script.

The community detection algorithm used by CITSB returned over one thousand clusters, most of them with less than 10 accounts within. Therefore, this analysis focuses on the main clusters of the coordinated network, based on an arbitrary threshold that only considers clusters containing at least 5% of the nodes in the network (i.e. at least 365 accounts). Three clusters met this threshold: cluster 1 (n= 1942 nodes, 26.5%), cluster 2 (n= 1224 nodes, 16.8%), and cluster 3 (n= 510 nodes, 7%). To make the analysis more focused, only accounts that engaged in coordinated behaviour at least twice were kept in the network, to avoid including accounts that might have coincidentally shared an image with the same text as other coordinated accounts on just one occasion. After the second filtering step, 1694 nodes remained in cluster 1, and they engaged in a total of 50,022 coordinated shares. Cluster 2 contained 1092 that engaged in 35,189 coordinated shares. Cluster 3 contained 465 nodes that engaged in 3,237 coordinated shares. The main accounts within each cluster, as well as the content they shared were manually reviewed to identify their political affiliation and provide insights about the strategies behind CITSB.

3 Results

3.1 What is the network structure based on accounts involved in coordinated behaviour?

The network (Fig.1) discovered in data analysis has a mostly polarised structure showing high segregation, especially between the two biggest clusters (1 and 2). To illustrate it, 96.6% of the edges of nodes within cluster 1 are internal (connecting two nodes within cluster 1), 94.1% of the edges of nodes within cluster 2 are internal, and

70% of the edges of nodes within cluster 3 are internal. Nodes within cluster 3 are similarly connected to cluster 1 (16.1%) and cluster 2 (13.9%). In response to RQ1, the segregated structure of the network indicates that most of the coordinated campaigns occurred within the clusters. This reflects on the political ideology of the cluster, as discussed below.

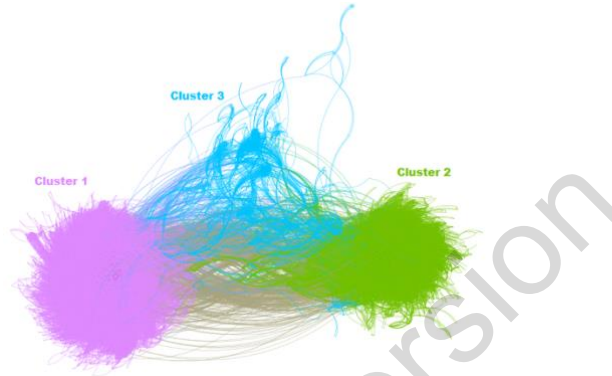


Fig. 1. Network of accounts that engaged in CITSB (3251 nodes, 64331 edges).

3.2 What are the political affiliations of Facebook accounts engaged in coordinated behaviour?

The polarised structure of the network reflects the political affiliations of Facebook accounts engaged in CITSB. While cluster 1 was mostly associated with the far-right politician Jair Bolsonaro, cluster 2 was mostly associated with the leftist Lula da Silva. Cluster 3, on the other hand, did not have a clear association with a political ideology, rather it is mainly composed of Facebook groups related to buying and selling products in specific locations. These types of Facebook groups are very popular in Brazil and have been found to be associated with misinformation spread during the Covid-19 pandemic [16].

The Facebook accounts with the highest degree (those that more often engaged in CITSB) within cluster 1 mostly make references to Bolsonaro (also referred to as “myth” and “Captain”) and the political party he is trying to create (Alliance for Brazil), such as: “*Mito 22* (Myth 22)” (2253 degree), “*Aliança pelo Brasil 22* (Alliance for Brazil)” (1135 degree), “*O Capitão Do Povo – Jair 22* (The People’s Captain – Jair 22)” (1038 degree), “*Bolsonaro 2022*” (1007 degree), “*BOLSONARO ATÉ 2026* (Bolsonaro until 2026)” (909 degree). Some accounts also make general references to nationalism and conservatism, such as “*FORÇABRASIL* (Go ahead Brazil)” (1237 degree), “*Direita Política* (Right-wing politics)” (1096 degree). Finally, there are also accounts linked to some of his supporters, such as the conservative polemicist Olavo de Carvalho, who supported Bolsonaro’s campaign in 2018, but died in 2022 before the election: “*GRUPO OLAVO DE CARVALHO* (Olavo de Carvalho group)” (1040 degree).

The Facebook accounts with the highest degree within cluster 2 mostly include pro-Lula, pro-Workers' Party (his political party), and left-wing Facebook groups: "APOIO A VOLTA DO LULA (I support Lula's return)" (479 degree), "*Militantes de Esquerda* (Left-wing militants)" (449 degree), "*LULA PRESIDENTE* (Lula President)" (438 degree), "*A Gazeta Petista* (Workers' Party Gazette)" (429 degree), "*NOSSO ETERNO PRESIDENTE LULA* (Our eternal President Lula)" (410 degree), "*Todos contra a globo e todos a favor do Lula* (Everybody against Globo and everybody pro-Lula)" (398 degree), "*Lula*" (389 degree). The Facebook group with the highest degree within this cluster was created to mock conservatives, pejoratively called "Coxinhas" (the term was originally used to mock military police and posh Brazilians): "*Perolas dos Coxinhas* (Gems from Coxinhas)" (530 degree).

Finally, most accounts within cluster 3 were Facebook groups associated with specific locations that aimed to be a space for buying and selling products. For example: "*CLASSIFICADOS DE MANACAPURU AMAZONAS* (Classified ads Manacapuru Amazonas)" (106 degree), "*VUCO VUCO de NATAL GRANDE NATAL e RIO GRANDE DO NORTE* (Mess in Natal, Greater Natal, and Rio Grande do Norte)" (62 degree), "*Compra, Venda e Troca – Tocantins* (Buy, Sell, Exchange – Tocantins)" (58 degree), "*Vila Velha – Vitória – Cariacica – VENDAS e TROCAS – ES27* (Vila Velha – Vitória – Cariacica – Sell and Exchange – ES27)" (57 degree), "*Desapega Tijucal e Região* (Let go Tijucal and Region)" (57 degree), "*Classificados Espírito Santo* (Classified ads Espírito Santo)" (52 degree), "*VENDA.COM – Feirão de Palmas-TO* (Sell.com – Sale in Palmas-TO)" (52 degree). Just one of the main accounts within the cluster was related to politics, but not to a specific party or ideology: "*POLÍTICA* (Politics)" (76 degree).

In response to RQ2, this analysis shows that both sides of the political divide engaged in coordinated behaviour, similar to findings from previous research [8, 14]. Nevertheless, CITSB was most prevalent within the right-wing cluster 1, composed of over half of the accounts in the final network (52.8%). Additionally, nodes within cluster 1 were also those with the highest degree in the network (as high as 2253 degree, meaning that the node engaged in CITSB with over two thousand accounts during the run-off election). Nodes within cluster 1 had an average degree of 44.5, compared to 37.5 within cluster 2 and 11.2 within cluster 3. One account within cluster 1 (*Mito 22*) engaged in as many as 6037 coordinated shares, while other eight accounts within this cluster engaged in over 500 coordinated shares. For comparison, only four accounts within cluster 2 engaged in over 500 coordinated shares (the account with the most coordinated shares engaged in CITSB 727 times), and none within cluster 3 (38 was the most coordinated shares by an account within this cluster). This shows that there were more Facebook accounts supporting Bolsonaro engaging in CITSB and that they were also more active than accounts supporting Lula. A somewhat unexpected finding was the presence of buy-and-sell local groups within cluster 3, but these were also engaged in political disputes, as discussed below.

3.3 What is the content shared in different clusters of coordinated accounts?

The most prevalent content shared from accounts within cluster 1 was promotional content related to Bolsonaro's campaign. Many images promoted live streams organised by Bolsonaro and his supporters (see Fig. 2A and 2B for example). There were also images criticising his opponent Lula da Silva and showing support for Bolsonaro (see Fig. 2C).



Fig. 2A. Shared in a coordinated manner 213 times within cluster 1. In Portuguese: - Soon, at 19:00, we will make an important announcement on our social media. I ask you to share this invitation with all your contacts so that our announcement reaches all Brazilians. We'll be back soon!



Fig. 2B. Shared in a coordinated manner 180 times within cluster 1. In Portuguese: Super Live. On the 22nd at 17:00. Lasting 22 hours. With Neymar, Tarcísio, Silas Malafaia, Sérgio Moro and +.



Fig. 2C. Shared in a coordinated manner 190 times within cluster 1. In Portuguese: Minas Gerais, Rio de Janeiro and São Paulo governors declare support for Jair Bolsonaro's re-election against the Workers' Party.

Some of the most prevalent content within cluster 1 also included conspiracy theories and misinformation. In terms of conspiracy theories, the content most frequently shared in a coordinated manner focused on Brazilian electronic ballots and election fraud. This is a recurrent conspiracy theory reproduced by Bolsonaro and his supporters in Brazil [13]. Bolsonaro and his supporters claim that there is a conspiracy involving the left-wing Workers' Party, the mainstream media, the Brazilian Supreme Court, the Brazilian Superior Electoral Court, among others, to manipulate electronic ballots and the result of elections in the country. Fig. 3A-C illustrates some of the images shared in a coordinated manner to spread such conspiracy theory.

In terms of misinformation, the main target of false and misleading claims was Bolsonaro's opponent Lula da Silva. Among the content most often shared in a coordinated manner, images reproduced a major misinformation narrative linking Lula to traffic and criminal factions in Brazil (see Fig. 4A and 4B). During the campaign, Lula visited *Complexo do Alemão* (German's Complex), one of the largest groups of favelas in Rio de Janeiro, and wore a cap with the letters "CPX". They mean *Complexo* in reference to what neighbourhoods with a group of favelas are called in Brazil. Bolsonaro's son, Flávio, fuelled the spread of a misinformation

narrative on social media by associating Lula's cap with criminal factions in the country. The narrative claimed that CPX referred to the word *cupinxá*, which refers to those who are friendly to criminal factions, and a clear indication that Lula was backed by *Comando Vermelho* (Red Commando), a major criminal faction in Brazil involved in drugs and arms trafficking. One of these images (Fig. 4B) was fact-checked and identified as false by Facebook, so it appeared blurred to users with a message that it was false information and users would only be able to see it after clicking to see why it was false and then clicking to see the post.



Fig. 3A. Shared in a coordinated manner 185 times within cluster 1. In Portuguese: Urgent. Bolsonaro summons commanders of the armed forces after the Brazilian Supreme Electoral Court decisions. President Jair Bolsonaro called an emergency ministerial meeting for this Wednesday, 26, at the Alvorada Palace, with the presence of the commanders of the Army, Freire Gomes; Navy, Almir Garnier Santos; and Aeronautics, Carlos de Almeida Baptista Junior.



Fig. 3B. Shared in a coordinated manner 95 times within cluster 1. In Portuguese: #ElectoralCrime. Urgent: the Brazilian Supreme Electoral Court exonerates the employee responsible for insertions of electoral propaganda.

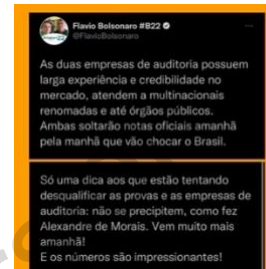


Fig. 3C. Shared in a coordinated manner 94 times within cluster 1. In Portuguese: Both auditing firms have extensive experience and credibility in the market, serving renowned multinationals and even public organisations. Both will release official notes tomorrow morning that will shock Brazil. Just a tip to those who are trying to disqualify the evidence and auditing companies: do not rush, as Alexandre de Moraes did. There's a lot more tomorrow. And the numbers are impressive!



Fig. 4A. Shared in a coordinated manner 111 times



Fig. 4B. Shared in a coordinated manner 109



Fig. 4C. Shared in a coordinated manner 98 times

within cluster 1. In Portuguese: Everybody knows that in areas dominated by traffic, only those who are friends with the bandits enter in peace. By claiming that he visited a community controlled by one of the biggest factions without any protection, something that not even the police can do, Lula shows once again that he is the candidate of the crime.

times within cluster 1. In Portuguese: Bolsonaro visits the Basilic Church of Our Lady of Aparecida and appears on another occasion wearing a Federal Highway Police cap. Lula visits “Red Commando headquarters” in Alemão, RJ, and wears a cap that means *cupinxa* (partner) of crime”.

within cluster 1. In Portuguese: Lula was investigated and he was arrested and convicted in three instances of corruption and \$\$\$ laundry. He won nothing, he received a hand to be released and restart the processes. The crimes existed! And about that “victory” in the United Nations, it’s as real as democracy in Nicaragua.

Another piece of misinformation focused on Lula’s corruption trial. Lula was in prison for over a year as part of the corruption investigation called Car Wash, led by judge Sergio Moro. After Lula’s arrest, Sergio Moro openly supported Bolsonaro’s election in 2018 and became the Justice Minister of his administration. Leaked Telegram conversations later showed that Sergio Moro was releasing insider information to prosecutors and engaging in partial behaviour during the legal process, in a journalistic investigation named #VazaJato or Car Wash Leak [3]. Lula’s trial was later claimed invalid, and he was released from prison. In Fig. 4C, Bolsonaro claims that Lula should be in prison and criticises the United Nations for saying that Lula should have been able to run for the presidency in 2018 (when he was in prison).

The most prevalent content within cluster 2 includes campaigning images associated with Lula’s campaign. These include images criticising Bolsonaro, such as in Fig. 5A and 5B. The first one highlights a corruption investigation that involves Bolsonaro. The second one, mentions a case during a political debate on TV that the presenter (William Bonner) received the right to reply to accusations made by Bolsonaro. Usually, only political candidates have the right to reply to each other when a candidate accuses or lies about another, but in this case Bonner responded to Bolsonaro’s accusation that the presenter was the only one to absolve Lula from his charges. There were also images promoting Lula and his campaign events (see Fig. 5C). These images either promoted Lula’s ideas or invited social media users to participate in social media lives and other events.

Some content within cluster 2 also focused on debunking accusations against Lula, including misinformation. A major recurring misinformation narrative pushed by Bolsonaro’s supporters during the campaign was that Lula worships the Devil and does not believe in God. Some also said that Lula was planning to shut down churches around the country. Brazil is a majorly Christian country, so this narrative had the potential to hurt Lula’s chances in the election. Fig. 6A-C shows how CITSB was used to debunk misinformation targeting Lula. Different from cluster 1, there were no misinformation pieces among the most shared content within cluster 2.



Fig. 5A. Shared in a coordinated manner 254 times within cluster 2. In Portuguese: Urgent. Federal Police bust Bolsolao and arrest people linked to Bolsonaro's secret budget.



Fig. 5B. Shared in a coordinated manner 119 times within cluster 2. In Portuguese: Bolsonaro lies so much that even Bonner had the right to reply.



Fig. 5C. Shared in a coordinated manner 93 times within cluster 2. In Portuguese: Today, 19:00. Live with Lula on Janone's Facebook.



Fig. 6A. Shared in a coordinated manner 60 times within cluster 2. In Portuguese: Stop lying, Bolsonaro! The Superior Electoral Tribunal orders Facebook and Twitter to delete 31 Bolsonaro's posts lying that Lula persecutes Christians and supports the invasion of churches.



Fig. 6B. Shared in a coordinated manner 50 times within cluster 2. In Portuguese: Fake News. Lula and the Devil. 1 Lula believes in God and is a Christian. 2 Lula has no pact nor has he ever talked to the Devil. 3 Lula believes that a president should take care of those who are hungry. 4 With Lula in the presidency, Brazil lived a moment of prosperity and the country became the 6th largest economy in the world. 5 With Lula, the salary was enough to buy food, gas, pay the rent and even have a barbecue.



Fig. 6C. Shared in a coordinated manner 31 times within cluster 2. In Portuguese: "The story that Lula is going to close churches is a lie, but that Bolsonaro is practically closing universities, federal schools and kindergartens, this is indeed true. Today, the government saw fit to broaden the cuts."

Finally, cluster 3 included content from both sides of the political divide. Nevertheless, there was a higher prevalence of pro-Bolsonaro content promoted by CITSB. This content was mostly similar to what was shared within cluster 1 in terms of campaigning. CITSB was used within cluster 3 to criticise Lula and the Workers' Party (see Fig. 7A) and to promote Bolsonaro (see Fig. 7B and 7C). When promoting

Bolsonaro, images also contained his number (22), which is used on election day in Brazil to vote for a candidate.

Pro-Lula content shared within cluster 3 was also similar in terms of campaigning. CITSB was mostly used to promote Lula. In Fig. 8A, Lula is with Simone Tebet and Ciro Gomes, presidential candidates who finished third and fourth in the first round and decided to support Lula in the run-off election. This image also includes Lula's number (13). Fig. 8B and 8C are examples of posts sharing results from polls that showed that Lula would likely win the election.

The most prevalent content shared within cluster 3 indicates that supporters of both candidates were engaging in CITSB to convince undecided voters to vote for their candidates. This is likely due to the characteristics of cluster 3, as it included mostly Facebook groups for buying and selling products in specific locations (therefore, not intrinsically partisan groups). To convince undecided voters, pro-Bolsonaro content criticised Lula and highlighted Bolsonaro's number. Pro-Lula content highlighted the support he received from other presidential candidates who did not go to the run-off election and electoral polls showing Lula's advantage.

In response to RQ3, both clusters 1 and 2 mostly focused on partisan content aligned with their side of the political divide. Cluster 1 engaged in CITSB to promote Bolsonaro, but also to spread conspiracy theories and misinformation. Cluster 2 engaged in CITSB to promote Lula and debunk false narratives about him. Finally, cluster 3 contained content from both sides of the political divide, with the campaigns seemingly having used CITSB to convince undecided voters.



Fig. 7A. Shared in a coordinated manner 37 times within cluster 3. In Portuguese: “Lula says he will develop Brazil”. Really? The Workers’ Party stayed in power for 14 years, created the biggest corruption scandal in history and left 13 million unemployed.



Fig. 7B. Shared in a coordinated manner 32 times within cluster 3. In Portuguese: Now is 22.



Fig. 7C. Shared in a coordinated manner 24 times within cluster 3.



Fig. 8A. Shared in a coordinated manner 28 times within cluster 3. In Portuguese: We are in the second round with Lula.



Fig. 8B. Shared in a coordinated manner 24 times within cluster 3. In Portuguese: Leader Lula. Datafolha poll points out Lula to be the next Brazilian president.



Fig. 8C. Shared in a coordinated manner 18 times within cluster 3. In Portuguese: Lula goes ahead and increases the difference. The Quaest poll that was contracted by Genial bank shows Lula with 54% of the valid votes. Bolsonaro has only 46%.

4 Discussion

This research shows how CITSB was a strategy used by both sides of the political divide in Brazil. This finding is similar to previous research on elections in the United Kingdom [14] and discussions about unproven drugs for Covid-19 in the United States [8]. Facebook accounts engaging in coordinated behaviour on Facebook might contribute to fuelling polarisation during the election, since partisan content shared in a coordinated manner gains more prevalence in public discussions [6]. This is particularly problematic in Brazil, given the country's history of polarisation, partisanship, and misinformation spread seen in the previous election in 2018 [18]. Nevertheless, this analysis also showed that coordination can be used to debunk misinformation.

Both sides used CITSB to share content associated with Bolsonaro's (for the right-wing accounts within cluster 1) and Lula's (for the left-wing accounts within cluster 2) campaigns. They had similar strategies to promote their candidate, sharing information about events and social media live streams, and criticising their opponent. Interestingly, promotional content was not locked into clusters of their supporters. This research has found evidence of CITSB in local buy-and-sell Facebook groups (within cluster 3). These were spaces of dispute, where content from both sides of the political divide was shared in a coordinated manner. This was likely used to convince undecided voters. This finding shows that CITSB is not restricted to ideological "echo chambers", but crosses ideological borders to convince others and gather votes for either Bolsonaro or Lula in the studied case. This is different from what has been seen in previous research, where coordination was mostly happening within partisan clusters [6–8, 14]. Future research can expand on this study's findings to further explore how coordination is used on social media beyond ideological silos.

While both sides engaged in CITSB to spread promotional content about their campaigns, there were major differences in terms of misinformation and conspiracy theories. Similar to previous research, the spread of misinformation and conspiracy theories in a coordinated manner was strongly associated with right-wing accounts [7, 8, 25]. Two main narratives were shared in a coordinated manner by conservative accounts: the recurring claim that electronic ballots are unreliable and an instrument for election fraud, and the narrative trying to link Lula with criminal factions. Left-leaning accounts, on the other hand, engaged in CITSB to debunk false claims about Lula, such as the narratives that he would shut down churches if elected or that he had a pact with the Devil. Therefore, while there is a higher prevalence of coordinated behaviour being associated with negative outcomes, coordination is not intrinsically negative and can also be used to debunk misinformation. Future studies can further explore how coordinated behaviour might be used for good, such as by sharing fact-checked information.

Although there was evidence of CITSB being used to spread conspiracy theories and misinformation, only one of the most shared images was flagged by Facebook. Additionally, most of the content shared in a coordinated manner was still available on the platform as of March 2023, almost five months after the election. This finding is different from previous research, which identified that much of the content shared in a coordinated manner was later removed or excluded from social media [8, 25]. There are two potential explanations for why most of the content was still available after the election. While previous research focused on coordinated link sharing behaviour, this study focused on image text. Therefore, the first potential explanation is that content moderation of images might be more challenging than monitoring external links. For example, a previous study on Brazilian Instagram found that most posts containing misinformation continued to be available on the platform, and very few were flagged as false [20]. More studies are necessary to explore how Facebook and other social media platforms' content moderation deal with visual misinformation.

Previous research has also found that most links containing Covid-related misinformation shared in Portuguese in a coordinated manner by Brazilian accounts continued to be available on Facebook [8]. Therefore, a second potential explanation for most of the content shared by accounts that engaged in CITSB continue to be available on Facebook is that the platform is not as effective in monitoring non-English content in countries like Brazil. Future studies can also further explore how Facebook and other social media platforms' content moderation might be less effective when dealing with non-English content.

As with any empirical research, this study has limitations that motivate future research and further development in the study of coordinated behaviour on social media. CITSB has limitations since it focuses on the text, not the image. Although visual misinformation often relies on text to spread misleading claims [20], CITSB does not cover manipulated images without text or other types of media such as deepfakes. Future research can explore other ways to analyse how these media are shared in coordinated campaigns. CITSB also relies on a specific time frame to define coordination (in the case of this research, posts shared within 60 seconds of each other). Some of the accounts in the network might have shared the same image as

others without planning or coordination. Nevertheless, even if some of these accounts were not involved in coordinated behaviour, the analysed network indicates that they were part of highly partisan campaigns by sharing political content and, in some cases, conspiracy theories and misinformation.

5 Conclusion

This study explored how Facebook accounts engaged in CITSB during the 2022 Brazilian election. Findings include that both sides of the political divide engaged in coordinated behaviour. Both Bolsonaro's and Lula's supporters used CITSB to share promotional campaign-related content on Facebook, such as criticising their opponents, promoting lives on Facebook, and highlighting politicians who were supporting the candidates. This research has also found evidence that CITSB was used beyond their ideological silos, since there was evidence of CITSB in local and buy-and-sell Facebook groups without a particular political ideology. This was likely a strategy to convince undecided voters. In terms of differences, pro-Bolsonaro accounts engaged in CITSB to spread misinformation and conspiracy theories. Pro-Lula accounts, on the other hand, engaged in CITSB to debunk false claims against Lula.

While this study included a mostly exploratory analysis, it identified paths for future research. First, pro-Bolsonaro and pro-Lula clusters engaged in CITSB for similar goals (sharing campaign content), but also for different purposes (spreading misinformation vs. debunking it). Future studies can further explore these different strategies in other political contexts. Additionally, these results show that coordination can also be used to fight misinformation, and future research can focus on how coordination might be used for good. Findings also included that content moderation might be failing to tackle visual misinformation and non-English content, which encourages future studies in these areas. Finally, this study identified how coordination was used beyond political silos, likely to target undecided voters. Future research can focus on coordination during political campaigns with a particular focus on strategies used to target undecided voters.

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