

Article

When Politicians Meet Experts: Disinformation on Twitter About Covid-19 Vaccination

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Abstract

The Covid-19 vaccination has meant a huge challenge for crisis communication. After months of lockdowns, mass vaccination was a silver lining moment, but it was under threat from disinformation boosted by misinformation on social media. This research explores how opinion leaders among political leaders and health experts used Twitter to create and manage messages about the vaccination process. Specifically, we show the issues (issue frame) and strategies (game frame) applied by these actors. This study employs a corpus on the words “Covid-19” and “vaccines” used on Twitter by the heads of government and 10 recognized health experts (two for each country) in the US, the UK, France, Portugal, and Spain. We also analyze the accounts of fact-checking projects on those countries (@PolitiFact, @FullFact, @decodeurs, @JornalPoligrafo, and @maldita). The sample allows the comparison of countries with different political cultures that participated differently in the production of vaccines. The data were captured from the beginning of the vaccination drive (December 14th, 2020) until most of the population above 60 were vaccinated (May 14th, 2021). A manual content analysis was performed on the tweets ($n = 2,607$). The results illustrate that the politicians mostly disagreed with experts regarding issues and strategies. This finding can foster distrust in the elites and, therefore, threatens the long-term success of a public health campaign. Our study contributes to discussions on the role of networks for social cohesion, arguing that the public conversation on Twitter about the vaccination has revealed high levels of controversy.

Keywords

Covid-19; disinformation; experts; fact-checking; public communication; public health; social cohesion; Twitter; vaccination

Issue

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1. Introduction

Social cohesion suffers from a crisis that affects the international public sphere since the impact of Covid-19 has increased the dependence on social networks (Strauß et al., 2021) and Google (Lee et al., 2014). After the first stage of public communication marked by ignorance of the virus (Ureta et al., 2021), a second phase arises on Covid-19 vaccines. One of the threats is that the opinion of scientists may be undervalued because it does not rep-

resent the “people” (Waisbord, 2018). Disinformation and polarization are intensifying in a time of weakness of governments (Ali & Gatiti, 2020). On this matter, doubts about vaccines are mixed with public distrust of institutions. The politicization of uncertainty during the pandemic further weakened a democratic system that was already in decline (Wardle & Derakhshan, 2017).

In a global crisis, the partisan discourse between liberal democracies and populist regimes becomes central (Levitsky & Ziblatt, 2018; Mounk, 2018). Additionally,

the Covid-19 vaccination drive has accelerated conflict among countries in a multipolar world. This highlights the need to rethink how international governance can increase cooperation. Indeed, the UN has established a convention against corruption to promote government accountability, integrity, and transparency in vaccine communication.

However, the influence of background facts such as Donald Trump's fraud speech in the US elections (Pérez-Curiel et al., 2021) and the conspiracy theories about vaccines, together with the advance of populism (Bennett & Pfetsch, 2018), have led to an increase in citizen disaffection with politics (European Commission, 2018; Tyson et al., 2021). Some governments even contributed to the proliferation of fallacies and hoaxes at the beginning of the pandemic (López-García, 2020). Extant research approaches the role of social media on this phenomenon. Many individuals now choose to get informed only through their peers on social networks rather than actively seeking news. This type of consumption fostered a lower political interest in and less knowledge about public affairs (Lee & Xenos, 2019), which caused distrust in vaccines prior to Covid-19 (Broniatowski et al., 2018).

At the beginning of the pandemic, more than 100 million tweets about Covid-19 were shared in just one month (Larson, 2020). Many messages on this social network were apocalyptic and produced fear among citizens (Aleixandre-Benavent et al., 2020). In this regard, public authorities faced the challenge of communicating in order to convey confidence and minimize the social and economic effects of the pandemic. This happened while there was a wide variety of strategy frames in political communication (Strömbäck & Kaid, 2008); although, how they are used remains largely understudied by academia (Aalberg et al., 2017). Drawing upon content analysis, our research aims to shed light on the employment of these strategy frames (game frames) compared to the classic issue frames since strategies are able to mobilize political distrust.

The public sphere is not only composed of political leaders but also experts and the fact-checking platforms that have become a journalistic tool. Knowing their communicative actions is relevant as they operate as one of the causes of the fragmentation of the democratic system (Wardle & Derakhshan, 2017). In a global health crisis, trust in public powers is especially required to control the situation, which overlaps with greater democratic transparency (Gutiérrez-Rubí, 2020). Indeed, according to opinion polls (Tyson et al., 2021), the audience demands a coordinated response to health issues. However, social cohesion is fragmented due to the collapse of the old news order and the chaos of contemporary public communication (Casero-Ripollés, 2020). This concept of cohesion is understood as a social commitment that enhances trust in public institutions (Friedkin, 2004).

Bearing this in mind, the following hypothesis is given:

H1: Political leaders and health experts will present mismatches on the use of game frames when tweeting about the Covid-19 pandemic.

We aim to (a) analyze the topics and strategies of opinion leaders on Twitter to inform about the coronavirus vaccination process, (b) to compare the institutional discourse of governments and health experts in different geographical areas, and (c) to check the impact of misinformation through verification tools provided by fact-checking agencies. In short, this exploratory research seeks to clarify the items that make up the public discourses about a controversial topic and whether or not they contribute to social cohesion.

2. Theoretical Framework

The economic, social, and health consequences of Covid-19 have been deep, including in the field of communication (Bertin et al., 2020). Beyond social distance or lockdowns, the vaccines mean the main hope to end the pandemic (Carrasco-Polaino et al., 2021). Nevertheless, there is a postmodern cultural context that questions the legitimacy of science (Hornsey et al., 2018), which is added to political confrontation among countries, immersed in a story that places them as winners of a war against a virus (Chiang & Duann, 2007). World leaders decided to increase the number of press conferences during the pandemic (Rivas-de-Roca et al., 2021). However, the absence of a contingency plan adapted to conflict situations described a communication model that did not respond to the needs of the media or citizens (Xifra, 2020).

Addressing communication in a crisis situation means managing credibility (Túñez, 2012). Vaccines are an opportunity for democracy to explain technical and global health procedures and reinforce transparency and good governance (Westphalen & Libaert, 2008). However, politicians and scientists sometimes seem to show a lack of consensus, which directly impacts citizens. Proof of this could be observed when the data analytics firm Fleishman Hillard (Hightower, 2021) asked the French people to assess their most reliable source of information on the Covid-19 vaccination. The overall confidence index was very low, with respondents ranking their local doctor (50%) first, followed far behind by national scientific experts (13%) and the WHO (12%). Government sources of information were poorly rated, as confidence in their own government obtained just -19%; meanwhile, the EU was also rated badly (-13%).

The aforementioned climate of skepticism indicates the limits of public communication strategies and mistrust in the system (Thelwall et al., 2021). This means that the necessary alliance of the states with the scientific community to reduce the effects of disinformation may have been replaced by a narrative that spurred conspiracy theories (Mounk, 2018). For instance, an article published before the pandemic (Kennedy, 2019) pointed

to a positive correlation between the percentage of people who vote for populist political parties and the number who believe that vaccines were unnecessary or ineffective.

When it comes to employing social media, the spectacularizing game frames feature the messages of politicians (Larsson & Ihlen, 2015). The strategic game frame refers to a way of treating information focused on strategies and character frames, which goes beyond the news coverage and affects the whole political system (Esser & Strömbäck, 2012). This links to the fact that campaigning styles are now more professionalized, putting the focus on politicians. These frames predispose the audience to pay attention and remember strategic rather than substantive information (Cappella & Jamieson, 1997). Consequently, power struggles replace concrete proposals, undermining political engagement and activating political cynicism (Shehata, 2014).

The literature on political communication has widely studied the role of Twitter. This social network adapts very well to the current immediacy of politics because of its ability to set the agenda and capture the interest of the public (Bracciale & Martella, 2017), as well as its immediacy in the mass-dissemination of messages (Alonso-Muñoz & Casero-Ripollés, 2020). Twitter has multiple possibilities, such as exchanging information on political issues or learning about the users' debate on vaccines (Milani et al., 2020). However, the use of this platform has been reduced to a low level of genuine interaction and a high level of propaganda messages (Pérez-Curiel & Molpeceres, 2020). Therefore, the public campaign to defeat the virus turns Twitter into a risky space for citizens.

The lack of scientific evidence (Cuesta-Cambra et al., 2019), the influence of political leaders through game frames, or the information overload (Wardle, 2017) could have marked the homogeneity of the institutional discourse facing the pandemic. In this turbulent context, transparency or the credibility of the sources have been reinforced as values for journalism. The development of basic journalistic skills among users is needed for them to be able to differentiate the truth from the lie (Journell, 2017). As part of this process, the rise of fact-checking agencies is noteworthy (Rúas-Araújo et al., 2020) since they try to raise the public knowledge of citizens (Palau-Sampio, 2018). Perhaps a crisis situation is an opportunity to enhance the democratic roots of public communication by prioritizing those efforts, such as the work of fact-checking initiatives that can resist destabilization strategies.

In both journalism and political communication, strategies emerge that contribute to division rather than cohesion in social networks; as such, there is a need to foster debate on how to ensure stability, ethics, and media literacy (Casero-Ripollés, 2020). The concept of social cohesion has to do with the feeling of belonging to a society and the cohesiveness of that society (Friedkin, 2004). Besides that, Sartori's (1987) classic doc-

trine of democracy states that this system is based on the identification between the rulers and the ruled, arguing that social cohesion is entailed in democracy to function effectively. Because of Covid-19, health and science are placed on the political agenda. However, the sensitivity of these issues in a crisis communication scenario is likely to promote disinformation (Thelwall et al., 2021), which endangers trust in democratic societies.

3. Methodology

This study aims to further our understanding of the disinformation on Twitter about Covid-19 vaccination. To meet these objectives, we applied the social media analysis method (Brand & Gómez, 2006). First, data from this study were obtained through Twitonomy, a web-based tool that gets visual analytics on accounts' activity. The tool provided us with an Excel document for each of the analyzed profiles, collecting all the tweets posted. Then, we use a quantitative content analysis on the thematic agenda (issue frame) and the strategic communication (game frame) since these mechanisms are key in the current public communication (Aalberg et al., 2017). In addition to that, the discourse of political leaders on Twitter is captured to observe the presence of propaganda mechanisms (van Dijk, 2015).

Our research design analyzes the Twitter accounts of heads of governments as political leaders and fact-checking projects, as well as the profiles of health experts who assumed an important role during the Covid-19 pandemic. We compare countries from different media and political cultures, studying the US and four European countries (UK, France, Spain, and Portugal). This sample allows us to analyze the North-American case, where former president Trump denied the pandemic, in relation to long-standing democracies in Europe, such as the UK and France. The sample also includes countries from Southern Europe (Spain and Portugal), whose democratic history is more recent. These different backgrounds could describe possible divergences in the level of public trust. Furthermore, the nations covered have also participated differently in the worldwide vaccine production program.

Health experts were chosen due to their influence on the network and number of followers, but their work also has to be connected with the Covid-19 pandemic. The word "virus" is always present on their Twitter bios. Although there are many other experts, we selected a sample of the most relevant in terms of dealing with the pandemic information on Twitter. Regarding the criteria for selecting the fact-checking services, we rely on their importance in their national contexts. They all have over 20 k followers, being the most popular fact-checking accounts in each country.

The complete list of accounts is as follows, most of which have Twitter's blue tick (the Spanish experts being the only exception, although they are recognized in their country):

- US: Joe Biden (<https://twitter.com/potus>; president), PolitiFact (<https://twitter.com/politifact>; fact-checking service), Faheem Younus (<https://twitter.com/FaheemYounus>; expert), and Marc Lipsitch (<https://twitter.com/mlipsitch>; expert).
- UK: Boris Johnson (<https://twitter.com/borisjohnson>; prime-minister [PM]), Full Fact (<https://twitter.com/FullFact>; fact-checking service), Neil Stone (<https://twitter.com/DrNeilStone>; expert), and Christina Pagel (<https://twitter.com/chrischirp>; expert).
- France: Emmanuel Macron (<https://twitter.com/EmmanuelMacron>; president), Les Décodeurs (<https://twitter.com/decodeurs>; fact-checking service), Guillaume Rozier (<https://twitter.com/GuillaumeRozier>; expert), and Gérald Kierzek (<https://twitter.com/gkierzek>; expert).
- Spain: Pedro Sánchez (<https://twitter.com/sanchezcastejon>; PM), Maldita.es (<https://twitter.com/maldita>; fact-checking service), Pepe Martínez Olmos (<https://twitter.com/PmOlmos>; expert), and Ester Lázaro (<https://twitter.com/EsterLzaro1>; expert).
- Portugal: António Costa (<https://twitter.com/antoniocostapm>; PM), Polígrafo (<https://twitter.com/JornalPoligrafo>; fact-checking service), Otavio Ranzani (https://twitter.com/otavio_ranzani; expert), and Atila Iamarino (<https://twitter.com/oatila>; expert).

The sample is composed of all the tweets on the words “Covid-19” and “vaccines” (“Covid-19 AND vaccines”) published by the accounts selected. This specialized search on specific words allows us to retrieve an overview of the digital conversation (Cuesta-Cambra et al., 2019). Own tweets and responses are included in this research, but retweets are excluded because they replicate content, making it less useful to find out the strategic agenda of each account (Larsson & Ihlen, 2015). The corpus was captured for a period of five months from the beginning of the vaccination drive (December 14th, 2020) until most of the population above 60 were vaccinated (May 14th, 2021). From 4,302 tweets, 2,607 units of analysis were content-analyzed for this research. Some tweets of the whole corpus present general information about the pandemic; thus, we employ the criteria of only including messages that truly refer to the coronavirus and the vaccination campaign. The data were processed with IBM SPSS Statistics, version 28.

The codification was carried out manually by three members of the research team. To assess the intercoder reliability, a pretest was conducted on 5% of the sample (130 units), reaching remarkable levels ($\alpha = 0.83$) according to Krippendorff’s alpha values (Neuendorf, 2002). Two previous rounds of coding training were applied on variables that scored below, adding new instructions to the codebook to achieve better reliability. This sort of manual analysis is aligned with prior scholarship that has

systematically identified the ways of political disinformation on social media (Cano-Orón et al., 2021).

We developed an analysis template (Table 1) with dichotomous and exclusive categories to study the thematic and strategic items used in public communication. The variables derived from previous research about political agenda (Alonso-Muñoz & Casero-Ripollés, 2020; Pérez-Curiel et al., 2021). A content analysis method was used following the adaptation to social networks such as Twitter defined by Crespo (2014). This means covering complex themes posted on short messages. As previously noted, this article draws upon the issue/game frame theory, as the current communication is marked by conflictive approaches that oppose the classic topics (Cartwright et al., 2019).

In this sense, 12 variables were created within the issue frame main category, coming from an observance of the most frequent topics during the range of dates. The four variables regarding the game frame are the traditional ones stated by the literature (Aalberg et al., 2017). These categories want to comprise all the units of analysis (Table 1). For the whole sample ($n = 2,607$), the number of tweets using an issue frame was 2,394, while the game frame reached 213. Two examples of how tweets correspond to the two main groups are offered (Figure 1).

Our data are presented in an aggregated manner, although the number of tweets by country was not proportional. There was more information about Covid-19 vaccination in the US (721 tweets) than in the rest of the countries: the UK (530), France (451), Spain (279), and Portugal (626). One of the reasons is the high presence of the US fact-checking initiative PolitiFact on Twitter since it was the only profile producing over 250 tweets in the five-month period. In addition to that, Portugal is over-represented in the number of tweets, taking into account its small population and its number of Twitter users compared to other countries. The reason is the wider activity of the experts’ accounts analyzed: Otavio Ranzani (https://twitter.com/otavio_ranzani) posts 9.79 tweets per day, while Atila Iamarino (<https://twitter.com/oatila>) publishes 11.85 tweets per day. It should be noted that those people act as experts for the Lusophone world, making up Brazil and Portugal, which may explain that finding. By contrast, as an example, Pepe Martínez Olmos (<https://twitter.com/PmOlmos>), in Spain, publishes only 1.95 tweets per day, which is similar to the rest of the experts that were considered: Faheem Younus (US), Marc Lipsitch (US), Neil Stone (UK), Christina Pagel (UK), Guillaume Rozier (FR), Gérald Kierzek (FR), and Ester Lázaro (ES).

Some content published on the whole sample was general or acted as repetitions of previous posts. Hence, the selection of 2,607 units of analysis as the principal corpus tries to refine the interest of the data captured. Regarding the discursive analysis of leaders, a range of categories on political language is applied, using a classification of fallacies and propaganda mechanisms: appeal to authority, appeal to emotion, fallacy against the man,

Table 1. Categories used for the quantitative study of the agenda on Twitter.

	Items	Description
Issue frame	Conspiracy theories	Possible conspiratorial explanations for health problems, as those mentioning 5G
	Denial of hoaxes	Verifying hoaxes specially related to the pandemic
	Data of Covid-19 cases	Number of Covid-19 cases and its evolution
	Health public recommendations	Dealing with Covid-19 and other diseases from a health approach
	Vaccination data	Figures of Covid-19 vaccinations
	Benefits of vaccination	Positive impact of being vaccinated
	Vaccination campaigns	Promotion of the vaccination public health campaign, focusing on dates and technical information
	Restrictive measures	Government measures imposed against Covid-19
	Elections and electoral program	Future, current, or past elections, including electoral polls
	Social policy	Connecting the vaccination process to social issues such as education, youth, or nursing homes
	Economy	Economic issues such as unemployment or industry
Foreign affairs	International affairs such as trade or relations between countries	
Game frame	Horse race and governing frame	Opposing positions, post-electoral pacts, or government strategies
	Politicians as individuals' frames	Aspects of the personal lives of leaders
	Political strategy frame	Political events, such as debates or meetings with citizens
	News management frame	Media content, such as interviews or the existence of discrepancies with journalistic work
Other	Unclassifiable tweets in the previous categories	

appeal to force, appeal to ignorance, attributions, tendentious claims, emphasis, stereotypes, false analogy, speaking through other sources, opinions as facts, selecting information, and use of labels.

A descriptive analysis of frequencies by categories about vaccines is mixed up with statistical tests to check whether the differences found are statistically significant. This approach has been useful for other studies on anti-vaccine controversies (Carrasco-Polaino et al., 2021; Rivas-de-Roca et al., 2021). Specifically, we operate through bilateral tests for the proportion of columns based on the Bonferroni correction, illustrating the divergences among the analyzed actors. The specific test carried out is a z test for the pairwise comparison of column proportions, where the null hypothesis is that the two columns under consideration are equal.

4. Results

4.1. Topics and Strategies for a Public Health Campaign

The use of topics (issue frames) and strategies (game frames) is different between political leaders and health experts, as is seen in Tables 2 and 3. First, Table 2 provides detailed information about the agenda on Twitter of the heads of government during the Covid-19 vaccination program. They all frequently referred to their own national vaccination campaigns, even statistically significant for Biden and Macron. However, some divergences emerge for the rest of the issues. Findings show that the vaccination data was a relevant topic for Johnson (35.1%), Biden (14.7%), and Macron (11.8%), but not for Sánchez or Costa (0.8%): The Spanish and Portuguese



One third of adults in the UK have now had their second dose of the COVID vaccine, a testament to the extraordinary efforts of NHS staff and volunteers.

Thank you to everyone who has made this happen. Get your jab when called.



Yesterday I traveled to Texas to visit an emergency operations center, food bank, and vaccination site. Each stop represented our nation at its best—people coming together to help their fellow Americans. It’s a reminder that there’s nothing we can’t do when we do it together.

Figure 1. Examples of issue frame (vaccination data) and game frame (political strategy frame).

Table 2. Issues and strategies in the tweets of the heads of government (%).

		Joe Biden (US)	Boris Johnson (UK)	Emmanuel Macron (FR)	Pedro Sánchez (ES)	António Costa (PT)
		a	b	c	d	e
Issue frame	Conspiracy theories	—	—	—	—	—
	Denial of hoaxes	—	—	2	—	1.6
	Data of Covid-19 cases	1.7	—	7.8	—	4.8
	Health public recommendations	8.6	1.1	—	2.9	—
	Vaccination data	14.7 *, e	35.1 *, a, c, e	11.8 *, e	—	0.8
	Benefits of vaccination	3.4	3	—	—	7.2
	Vaccination campaigns	40.5 *, b	19.1	49 *, b, d, e	25	26.4
	Restrictive measures	—	1.1	—	—	9.6 *, b
	Elections and electoral program	—	—	—	5.9	—
	Social policy	19 *, b, c, d	4.3	5.9	4.4	6.4
	Economy	3.4	11.7 *, a, e	—	5.9	2.4
	Foreign affairs	5.2	7.4	21.6 *, a	26.5 *, a, b	35.2 *, a, b
Game frame	Horse race and governing frame	2.6	14 *, a, c, e	2	20.6 *, a, c, e	1.6
	Politicians as individuals' frames	—	3.2	—	—	2.4
	Political strategy frame	0.9	—	—	8.8	—
	News management frame	—	—	—	—	—
Other	—	—	—	—	1.6	

Note: Data with a significance level of 0.05 (*), based on two-tailed tests for the column proportion (Bonferroni correction); the letters after a number refer to specific columns, whose data are significant compared to the mentioned number; every letter (a, b, c, d, e) represents a single column.

leaders paid little attention to figures of Covid-19 vaccinations, such as doses administered.

Results also show a preference for foreign affairs as an issue for Costa (35.2%), Sánchez (26.5%), and Macron (21.6%), which was not found in their international counterparts. This may overlap with the fact that France, Spain, and Portugal belong to the EU; hence these leaders demanded a European response to the health crisis. In this sense, the coronavirus pandemic was considered by the tweets collected in Continental Europe as a global problem that needed a transnational solution in the EU framework. By contrast, Biden (5.2%) and Johnson (7.4%) did not consider the pandemic in such an international sphere.

Regarding the strategic communication (game frame), this sort of approach was only common in the tweets of Johnson and Sánchez. British and Spanish leaders mostly used the horse race and governing frame (14% and 20.6%). This strategy is typical of electoral contests, mentioning the opposition or post-electoral pacts. It is a striking finding, as there had been no call for elections at that time, except for two regional elections in Catalonia and Madrid (Spain). Accordingly, Sánchez sometimes employed the political strategy frame, although his percentage (8.8%) was not statistically significant.

As is shown in Table 3, health experts do not always focus on the same issues and strategies as political leaders. For instance, the experts considered in the US mostly talked about vaccination data (39.1%), while Biden preferred the vaccination campaigns over the rest of the cat-

egories. There was an opposite trend in the UK: experts referred to the campaigns (54%), and Johnson as PM tended to refer to the data. Hence, there were differences between the politicians and the specific scientists by country.

On this matter, the experts in France show a strong interest in the data of Covid-19 cases (26.2%), significantly different from the US and Spain. In Spain and Portugal, agendas were focused on the vaccination campaigns (32.9% and 22.6%), although we found interesting figures for data regarding Covid-19 cases (13.6%) and vaccination data (12.6%) in the Portuguese context not seen before. In fact, this proportion of vaccination data is significant compared to the British one. It must be highlighted that the Portuguese experts selected also manage information about Brazil, which explains some differences. Regarding Spain, its scientific practices on Twitter seem a bit more strategic, using all the game frames defined. This finding was in line with the practices of Sánchez, who devoted great priority to the horse race and governing frames.

Moreover, the agenda of the experts was fragmented, dealing with many more topics and strategies than the leaders. They address a broader range of content in their communication on Twitter, as indicated by the level of the "others" parameter in the data coming from Portugal (7.1%) and France (6.9%). Nevertheless, the plurality of categories applied does not mean proper strategic communication, not reaching the percentages of Johnson and Sánchez in terms of game frames.

Table 3. Issues and strategies in the tweets of the health experts by country (%).

		US	UK	France	Spain	Portugal
		a	b	c	d	e
Issue frame	Conspiracy theories	2.6	2.6	1.1	0.6	—
	Denial of hoaxes	2.6	—	7.3	4.4	9.8
	Data of Covid-19 cases	2.6	19.8 *, a	26.2 *, a, d	10.4	13.6
	Health public recommendations	4	3.9	9.4	3.2	6.9
	Vaccination data	39.1 *, b, c, d, e	3.9	20.8 *, b, d, e	10.1	12.6 *, b
	Benefits of vaccination	13 *, c, e	6.6	4.4	16 *, b, c, e	1.4
	Vaccination campaigns	13.5	54 *, a, c, d, e	14.9	32.9 *, a, c	22.6
	Restrictive measures	2.1	7.9 *, c, e	1.1	1.9	0.6
	Elections and electoral program	1.3	—	—	—	—
	Social policy	3.4	—	5.5	5.9	12.4
	Economy	2.6	—	0.9	3.3	1.2
	Foreign affairs	4.1	—	—	3.2	4.9
Game frame	Horse race and governing frame	1.4	1.3	0.2	1.3	5
	Politicians as individuals' frames	2.9	—	0.2	2.5	—
	Political strategy frame	1.8	—	—	0.6	—
	News management frame	1.8	—	1.1	3.1	1.9
Other	1.2	—	6.9	0.6	7.1	

Note: Data with a significance level of 0.05 (*), based on two-tailed tests for the column proportion (Bonferroni correction); the letters after a number refer to specific columns, whose data are significant compared to the mentioned number; every letter (a, b, c, d, e) represents a single column.

4.2. The Role of Fact-Checking Platforms Against Propaganda on Twitter

Political leaders usually resort to propaganda mechanisms on social networks to spread their messages (Lee & Xenos, 2019). Table 4 presents information about the discourse of the heads of government during the Covid-19 vaccination program since the aforementioned issues and strategies are applied in a rhetorical way that fact-checking projects must tackle. Most leaders used appeals to emotion and emphasis as tools, but there were exceptions to this trend.

For Biden, the appeals to emotion (30.2%) and authority (23.3%) were key, and to a lesser extent, emphasis (19%). The US president built an image of authority that tried to convey feelings in his tweets. This emotional pattern was not present in Johnson, who used emphasis (28.7%) and speaking through other sources (24.5%) as his main propaganda mechanisms. In the same vein, these two approaches were also common in Costa, but in combination with appeals to authority and emotion. Our results show that the propagandistic approach of the Portuguese PM was fragmented, mixing many different discursive mechanisms, but his level of appeals to authority was significantly different.

As to France, Macron expressed a process of selecting information in 37.3% as the main difference in his tweets, followed by emphasis (23.5%) and appeal to emotion (19.6%). Sánchez also used the selecting information (41.2%) and the appeal to emotion (23.5%), whereas the mechanism of emphasis came up less often

than the rest of the leaders. Besides that, opinions as facts were featured in 19.1% of his tweets, meaning that the Spanish politician was the only one applying it to a significant degree.

When propaganda escalates, the role of fact-checking initiatives becomes especially significant. Table 5 offers evidence on the type of coverage of national fact-checking projects during the period covered in this study. From an issue/game perspective, the data illustrates a preference for thematic content, with the denial of hoaxes being important in Portugal (95.1%), the UK (80%), and the US (49.6%). This finding can be considered logical, given that the objective of these projects is to verify information.

One particularly relevant aspect in the US case (PolitiFact) is how much more common vaccination data (21.9%) was among health experts' tweets (39.1%) than Biden's (14.7%). Comparing the findings in Spain (Maldita.es), the great use of vaccination campaigns (19.6%) was detected in both the heads of government and the national experts. By contrast, the level of public health recommendations (18.6%) observed in France was not previously found in Macron.

Regarding foreign affairs, this topic was only frequent (16.3%) in the French fact-checking platform (Les Décodeurs), although three of the five leaders studied (Costa, Sánchez, and Macron) mentioned it a lot. It seems that this international issue was not important for verification at the time of the Covid-19 vaccination drive. The thematic agenda of all the fact-checking projects is oriented toward the denial of hoaxes and health issues.

Lastly, at this point, our research provides two inter-related insights. First, most of the tweets come from fact-checking applied issue frames rather than game frames, underscoring the role of themes for these projects. The only exception is the remarkable presence of game

frames in Spain (Maldita.es), which could be grounded on the strategic communication of the Spanish PM. Second, the agenda of the fact-checking platforms was sparsely fragmented; that is, it addressed only few topics and strategies. This finding is aligned with the data of

Table 4. Propaganda mechanisms on Twitter by leader (%).

	Joe Biden (US)	Boris Johnson (UK)	Emmanuel Macron (FR)	Pedro Sánchez (ES)	António Costa (PT)
	a	b	c	d	e
Appeal to authority	23.3 ^{*, b, c, d}	8.5	3.9	4.4	24 ^{*, b, c, d}
Appeal to emotion	30.2 ^{*, b}	4.3	19.6 ^{*, b}	23.5 ^{*, b}	16.8
Fallacy against the man	—	—	—	—	—
Appeal to force	5.2	4.3	—	—	8
Appeal to ignorance	0.9	1.1	11.8 ^{*, a, b}	—	—
Attributions	5.2	10.6 ^{*, d}	—	1.5	8.8 ^{*, d}
Tendentious claims	—	—	—	—	2.4
Emphasis	19 ^{*, d}	28.7 ^{*, d}	23.5 ^{*, d}	2.9	20 ^{*, d}
Stereotypes	—	—	—	—	0.8
False analogy	—	5.3	—	—	2.4
Speaking through other sources	3.4	24.5 ^{*, a, d}	—	7.4	10.4
Opinions as facts	2.6	2.1	3.9	19.1 ^{*, a, b, c, e}	2.4
Selecting information	7.8	10.6	37.3 ^{*, a, b, e}	41.2 ^{*, a, b, e}	4
Use of labels	—	—	—	—	—
Not present	2.6	—	—	—	—

Note: Data with a significance level of 0.05 (*), based on two-tailed tests for the column proportion (Bonferroni correction); the letters after a number refer to specific columns, whose data are significant compared to the mentioned number; every letter (a, b, c, d, e) represents a single column.

Table 5. Issues and strategies in the tweets of the fact-checking projects (%).

	PolitiFact (US)	Full Fact (UK)	Les Décodeurs (FR)	Maldita.es (ES)	Polígrafo (PT)	
	a	b	c	d	e	
Issue frame	Conspiracy theories	2.6	—	9.3	1.8	—
	Denial of hoaxes	49.6 ^{*, c, d}	80 ^{*, a, c, d}	16.3	28.6	95.1 ^{*, a, c, d}
	Data of Covid-19 cases	—	4.7	8.1	5.4	—
	Health public recommendations	—	—	18.6	10.7	—
	Vaccination data	21.9 ^{*, b}	5.9	9.3	—	—
	Benefits of vaccination	2.2	1.2	3.5	14.3 ^{*, a, b}	—
	Vaccination campaigns	12.2 ^{*, c}	—	2.3	19.6 ^{*, c, e}	3.7
	Restrictive measures	1.1	—	3.5	—	—
	Elections and electoral program	—	—	—	—	—
	Social policy	8.1	2.4	7	3.6	—
	Economy	0.4	—	1.2	—	—
	Foreign affairs	1.9	—	16.3 ^{*, a, d}	1.8	—
Game frame	Horse race and governing frame	—	5.8	3.5	14.2	1.2
	Politicians as individuals' frames	—	—	1.2	—	—
	Political strategy frame	—	—	—	—	—
	News management frame	—	1.2	—	14.3 ^{*, b}	—
Other	0.7	2.4	—	—	1.9	

Note: Data with a significance level of 0.05 (*), based on two-tailed tests for the column proportion (Bonferroni correction); the letters after a number refer to specific columns, whose data are significant compared to the mentioned number; every letter (a, b, c, d, e) represents a single column.

heads of government but differs from the thematic plurality of health experts.

5. Conclusions and Discussion

With the initial goal of exploring how political leaders and health experts managed Twitter regarding the Covid-19 vaccination process, this article extensively describes the flow of information among some of the main public actors. Our study contributes to the literature on social cohesion, providing three conclusions that follow the objectives defined. First, this research offers insightful evidence on the mismatch between topics and strategies (game frames) between political leaders and health experts. Thus, H1 was supported. The agenda of the scientists is much more fragmented, probably because politicians communicate with a purpose, omitting some topics. However, the importance of vaccination campaigns is shared by heads of government and experts.

Our second contribution lies in the different priorities by country. Foreign affairs are a recurring issue frame in the leaders of Portugal, Spain, and France. Beyond that, strategic communication is only frequent in Sánchez (Spain) and Johnson (UK). These findings are not related to the pandemic and reveal a disruptive practice that may affect the trust in the vaccination. Third, our study furthers our understanding of the work of fact-checking platforms and the propaganda mechanisms used by politicians. These verification services' Twitter messages are focused on thematic issues over strategy. The findings also underline that they have a compact agenda in line with heads of government, showing that those actors are the principal object for fact-checking. Indeed, our results indicate a clearly propagandistic communication in the political leaders, based on the tools of emphasis and appeal to emotion.

More generally, the data reveal a connection between the heads of government and the fact-checking projects, being the tweets of the latter a kind of response to the leaders. Both actors presented an adaptation to national spheres. However, health experts' messages differed minimally among countries; thus, their interests are the same in the international field, showing less dependence on the political context. Taking these insights together, we argue that the prominence of fallacious political language in the leaders is a worrying aspect that could damage the social cohesion in a crisis. The fact-checking initiatives work to avoid the spread of disinformation, responding to the few issue and game frames applied by politicians, whereas the health experts move on a different level characterized by a fragmented agenda.

This study contributes to the wider scholarly debate on the impact of social media on democracy and social cohesion. Prior scholarship points out the negative effects of these networks on vaccine confidence (Bertin et al., 2020), fueled by a long-term populist movement (Bennett & Pfetsch, 2018). Twitter is a notewor-

thy space in which these debates on health issues occur (Milani et al., 2020), as evidenced by this article. In our research design, leaders, experts, and fact-checking services use Twitter to disseminate messages on Covid-19. However, the discrepancy found between political leaders and health experts may damage society's cohesiveness, upon which trust in public institutions is based (Friedkin, 2004).

In this regard, the literature underlines the negative effects of strategic communication, predisposing the audience to political cynicism (Cappella & Jamieson, 1997; Shehata, 2014). Our findings align with prior scholarship that identified some frequency of game frames in modern political communication (Esser & Strömbäck, 2012), but we suggest that this is not applicable for other actors of the public sphere, such as experts. Considering the harmful effects of strategic communication, it seems reasonable that some public opinion polls (Hightower, 2021) reveal greater levels of trust in experts than government sources.

Finally, the results regarding the fact-checking services also have practical and theoretical implications. These organizations are part of the public sphere (Rúas-Araújo et al., 2020) and have the challenge of dealing with a huge presence of propaganda mechanisms employed by the political leaders on social networks, as illustrated by our study. The fact-checking projects report more on thematic frames than strategic ones, but the thematic issues are devoted to the same topics as chosen by political leaders. Therefore, this study shows that the agenda of fact-checking accounts is determined more by leaders than experts. We could argue that fact-checking is doing a good job by monitoring those in power. However, the inferences of this observation refer to a political-centered agenda that is far from the people's interest, once again endangering the required separation between politicians and the public (Sartori, 1987).

Our article's principal limitation concerns the sampling method. It generates unequal sample sizes, so the results should be considered as interesting cases in a highly relevant time frame. We seek to assess the scope of political messages in the fact-checking accounts and their subsequent influence on the social audience. In this sense, another limitation is the selection of only two experts per country, making it difficult to generalize the results for an entire nation. This might have biased findings, but we assume that the experts' cases are relevant in their contexts. We supplied data that would be useful in relation to a much bigger number of accounts.

As previously stated, addressing communication in a crisis situation means managing credibility. For example, vaccines were an opportunity for democracy to ameliorate transparency and good governance, but the literature highlights the lack of political knowledge acquisition through social media (de Zúñiga & Diehl, 2019). This could happen on Twitter during the Covid-19 vaccination because of the disagreement among public actors in terms of issues and strategies. In short, our empirical

findings reveal a huge presence of propaganda in the leaders' communication and divergence between those politicians and health experts, threatening a hypothetical social cohesion. In this regard, the framing theory still looks valid for social media (Cartwright et al., 2019), explaining the purposes of communication and its possible effects. Future research may consider expanding the present work to bigger samples and performing an in-depth observation of those elements involved in social cohesion during the Covid-19 vaccination drive.

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Conflict of Interests

The authors declare no conflict of interests.

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