From Ignorance to Distrust: The Public "Discovery" of COVID-19 Around International Women's Day in Spain

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In the weeks around March 8, 2020, Spanish political authorities moved from denying and minimizing COVID-19 (veiling international recommendations) to establishing a State of Alarm. This uncertainty scenario is a natural experiment for exploring how concealment and diffusion of critical messages in official discourse affected public and published media, information transmission, and collective risk assessment. This study explores, through Natural Language Processing (NLP) and network theory, press, and Twitter agendas those days when (after international warnings, chaos on data, and the authorization of large demonstrations) Spain made the "alarming discovery" of COVID-19. Results show a swift change in the climate of opinion, from the week before to the week after Women's Day (March 8). Noninformation influenced agendas in terms of themes, feelings, and behaviors. The way different societies made COVID-19's "discovery" became essential on the framing of the crisis and on the subsequent trust in authorities during the pandemic. The suppression of information in the first moments remains a key study question.

Keywords: public sphere, disinformation, deception, pandemic, transparency.

From their inception to their disappearance, health pandemics that become social problems go through an "issue-attention cycle" (Downs, 1972, p. 39), in which the role of public communication is crucial (see Figure 1). According to the stages of the cycle, in the "preproblem" stage, the illness affects a few, and is only known by some, when an event leads media to deal with the issue. One example was Gottlieb and colleagues's (1981) article, published in the *New England Journal of Medicine*, that sparked

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newspaper attention to HIV (Martín-Llaguno, 2000a, p. 3). As the number of stories suddenly increases, society makes an "alarming discovery" of the problem, in which frames that will guide the perception of citizens are set. The analysis of the way in which a crisis turns from the preproblem or "prodromal" to the "chronic" stage (Pan & Meng, 2016, p. 98) is essential for public health advocacy (Martín-Llaguno, 2000a, p. 4). Then, the issue comes into the "realizing the cost of significant progress" stage, in which media and public opinion reflect proposals for solutions (Downs, 1972, p. 40). After a time, there is a "gradual decline of intense public interest," which leads from the issue-attention cycle to the postproblem stage (Downs, 1972, p. 40).

On December 30, 2019, a Chinese medical doctor, Li Wenliang, sent a message to his colleagues in a chat, warning of the outbreak of a virus. This essential information, classified as a "rumor" by the Chinese government, was concealed, and only months afterward, the public became aware of it (Larson, 2020a, p. 306). One year later, on January 4, 2020, the World Health Organization (WHO) reported, on Twitter, strange cases of pneumonia in Wuhan. On February 11, after the lockdown of this city, the WHO labeled the new disease "COVID-19." By then, the virus had spread through 20 countries, including Spain (WHO, 2020).

In such an environment of threat and ambiguity (Nelkin, 1989), citizens increased their need for information (Lázaro-Rodríguez & Herrera-Viedma, 2020; Masip et al., 2020; Nielsen, Fletcher, Newman, Brennen, & Howard, 2020), and both traditional media and social networks multiplied their messages (Larson, 2020b; Masip et al., 2020). Societies became media dependent (Ball-Rokeach & DeFleur, 1976), as these institutions performed the fundamental function of pointing out and framing COVID-19 as a threat (McCombs & Valenzuela, 2014). On the other hand, to grant meanings, which play an essential role in the perception of risks (Woo, Brigham, & Gulotta, 2020), citizens merged their agendas with those of others (McCombs & Shaw, 1972; Shaw, McCombs, Weaver, & Hamm, 1999), collecting information from different sources (McCombs & Shaw, 1972; Shaw et al., 1999), especially WhatsApp, official websites, and Twitter (Moreno, Fuentes-Lara, & Navarro, 2020).
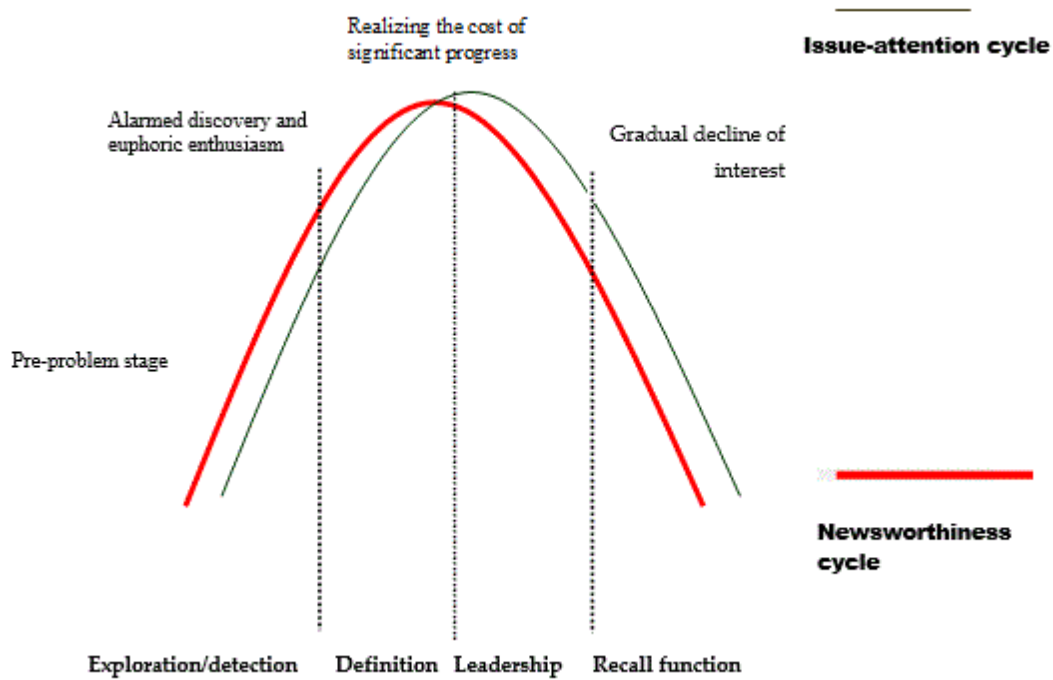
Figure 1. Issue-attention and newsworthiness cycles (Martín-Llaguno, 2000b).

Despite the increase in "demand for" and "production of" messages, in some Western countries, half the population has had problems finding reliable information and informants on COVID-19 (Edelman Trust Barometer, 2020). Overinformation soon turned into information saturation (Mohammed et al., 2021), conspiracy theories, hoaxes, and fake news, which began to be upheld (Berry, Wharf-Higgins, & Naylor, 2007; Gonçalves-Sá, 2020; Shih, Wijaya, & Brossard, 2008), and the traditional press started to be perceived as politically biased (Motta, Stecula, & Farhart, 2020). During the turning point of lockdowns, scientists, physicians, and global health organizations were trusted sources (Edelman Trust Barometer, 2020), while the citizens of the United States and Spain believed much less than citizens of other countries in their media and governments (Edelman Trust Barometer, 2020). Moreover, in the latter country, Spain, levels of confidence in both institutions had been plummeting (Nielsen et al., 2020).

The analysis of disinformation on COVID-19 has aroused great academic interest. There has been an exponential growth of articles on fake news and hoaxes; the role of the media, journalists, and networks; and communication strategies (Aleixandre-Benavent, Castelló-Cogollos, & Valderrama-Zurián, 2020; González-Harbour, 2020). Most of these analyses, however, have two essential characteristics:

First, they focused on public opinion once the coronavirus "crisis" was set (Coombs, 2012; Pan & Meng, 2016). The way in which different societies made the "alarming discovery" of COVID-19 (Downs, 1972) remains unexplored.

Second, an increasing number of articles analyzed hoaxes and fake news in the media and networks (Rosenberg, Syed, & Rezaie, 2020; Salaverría et al., 2020). Authors such as Larson pointed out that "a lack of information" became "misinformation" (Larson, 2020a, p. 306). However, few studies have revised the consequences of the omission or concealment of information (Seo & Faris, 2021) by institutions, which is a relevant factor for information theories and games, as well as for the sociology of communication.

Deception (defined as an action that aims to bring the second party to a false belief state or to maintain a false belief state) and its formulas and models (Kopp, Korb, & Mills, 2018) become a problem during the COVID-19 pandemic. Incomplete or asymmetric information occurs when a participant has information that others do not know (as it happens in the preproblem stages of a crisis). This phenomenon is mentioned in models by Borden-Koop. The "degradation" model hides information in noise (or other background messages) to introduce uncertainty or false perception (Kopp et al., 2018, p. 4). The "denial" model increases uncertainty by preventing the victim from collecting information, by disrupting or damaging the means employed to collect information (Kopp et al., 2018, p. 5).

From the field of sociology, the effects that the suppression of important information has been the object of concern of classics such as Ross's (1910), which wondered about the manipulative effects they could have on public opinion. The value of the article "The Suppression of Important News" is that it offers an early diagnosis of a phenomenon that is now obvious (Ross & López-Escobar, 2001).

It is not easy to find contexts in which the incidence of the suppression of relevant data in the shaping of public discourse can be explored. The uncertainty scenario in Spain around the first two weeks of March presents a natural experiment for exploring how concealment of important messages affects the public and published definitions of the problem, information transmission, and assessment of a collective risk. In less than 15 days, a sudden change in the epidemiological and communication strategies of the political authorities abruptly went from denying and minimizing COVID-19 as a health risk to having to report the establishment of a State of Alarm.

This study explores, by means of Natural Language Processing (NLP) techniques and network theory applied to press and social networks, published and public agendas when Spain made the "alarming discovery" of COVID-19, which resulted in a swift change in the climate of opinion, from one week before to one week after the weekend of March 8, when Women's Day was celebrated.

Literature Review

Pandemics, Mass Media, and Social Networks

Whenever there is an outbreak, people turn to the media for information (Anwar, Malik, Raees, & Anwar, 2020). The media coverage of the coronavirus has been unmatched by any other disease (Ducharme, 2020; Lázaro-Rodríguez & Herrera-Viedma, 2020; Masip et al., 2020). In Spain, the pandemic resulted in an initial vindication of television and science and health journalism (Fundación Española para la Ciencia y la Tecnología, 2021), as traditional media appeared as the most common source used by citizens (Moreno et al., 2020; Salaverría et al., 2020). Nevertheless, digital media were the most prolific distributors of news and, as Lázaro-Rodríguez and Herrera-Viedma (2020) stated, there was a constant increase in the volume of news until the period from March 14 to March 19, 2020, in which 45,294 news items were reached. Specifically, from March 9 to March 31, the volume of news spiked as media coverage was soon being perceived with a political bias (Masip et al., 2020).

On the other hand, during outbreaks, people also turn to social media for knowledge. Influenza A (H1N) was the first global pandemic in the Twitter era, and Chew and Eysenbach (2010) found that information, public behaviors, and attitudes about it varied over time. They discovered a lack of information from authorized sources, and that public concern and protective behaviors increased when official sources increased the threat of the outbreak (Chew & Eysenbach, 2010, p. 10).

Overinformation on social networks about COVID-19 was an unparalleled phenomenon. From January 1 to mid-March 2020, the Vaccine Confidence Project detected 240 million digital and social media messages about the coronavirus, with a daily average of 3.08 million (Larson, 2020b). The outbreak of hoaxes and fake news caught the attention of academic and international institutions (Fernández-Torres, Almansa-Martínez, & Chamizo-Sánchez, 2021) and, as it has become known later, social networks (36.1%) and instant messaging applications (36.1%) were the most relevant vehicles for hoaxes. Likewise, in Spain, hoaxes increased over time. In the month before the State of Alarm, 32.5% of hoaxes were reported, and this percentage increased to 67.5% in the following month (Sánchez-Duarte & Magallón-Rosa, 2020).

There are several analyses of COVID-19 on social media sentiment around the world (Cinelli et al., 2020; Gao et al., 2020). De Las Heras-Pedrosa, Sanchez Nuñez, and Peláez (2020) performed an emotion analysis in Spain, monitoring the digital ecosystem during March and April 2020. They concluded that the structure of the stakeholders involved did not determine clear and efficient communication that gave confidence to society. The COVID-19 pandemic created an added strain on emotional well-being, and the same information generated peaks in different emotions, indicating that they were mixed between sadness, disgust, anger, and fear (De Las Heras-Pedrosa et al., 2020).

The 8M Scenario in Spain

On January 30, 2020, the WHO declared an international emergency due to the outbreak of COVID-19. The following day, the Spanish Ministry of Health reported the first local infection—a case

imported by a German tourist. Ten days later, a second patient was reported. Although Spanish health authorities insisted the infection risk was "low" on February 12, the largest technology congress in the world, the Mobile in Barcelona, was cancelled (see Figure 2, in the Appendix).

For the next two weeks, several positive cases were reported throughout Spain.

On February 25, the Minister of Health stated, "There is no accredited transmission of the virus in Spain" (Salinas, 2020, para. 2). However, the next day, the first local infection was reported and, a week later, the first death related to the virus (see Figure 2). Despite these events, the level of containment was maintained, rejecting the preventive ban on events with large crowds as neighboring Portugal did.

On March 2, as the press reflected later, the European Centre for Disease Control and Prevention (ECDC) informed the Spanish Ministry of Health of documents and recommendations that explicitly urged to avoid massive concentrations because of COVID-19. Based on data from other epidemics, it recommended cancellation to reduce the transmission of the virus (Lamet, 2020, paras. 1–2). The government of Spain acknowledged receipt of these documents through the balance sheet of the Department of National Security. Without communicating this information, Moncloa recognized that they were evaluating and studying moving from containment to mitigation phase in some areas. However, after a meeting between the Ministry of Health and those responsible for health in some communities, it was decided to maintain the alert level in all areas (Hernández, 2020, para. 4).

It had been known, during that week, that infections by COVID-19 were increasing, although figures were not made public until months later. Furthermore, the data from the Monitoring of Daily Mortality (MoMo) in Spain, which is managed by the National Epidemiology Center, had not been a part of the official discourse in the whole communicative management of the pandemic (Costa-Sánchez & López-García, 2020).

At that time, public opinion already had doubts about whether the convenience of maintaining the call for concentrations on Women's Day; pools showed that 51.4% of Spaniards believed that the government had to suspend public acts with crowds of people (Europa Press, 2020e).

However, on March 7, the government party (Partido Socialista Obrero Español [PSOE]) posted on its Facebook page an interview with the vice president of the government, Carmen Calvo, where she encouraged women to fill the streets of Madrid on March 8. To the question of "What would you say to a woman who is hesitating to go to the demonstrations?" she replied, "I would tell her that her life is at stake. I will tell her to make decisions to protect her safety" (Nobile, 2020, para. 2). On the other hand, other authorized sources remained ambiguous. The director of the Health Coordination and Alert Centre of the Ministry of Health, Fernando Simon, when asked about the demonstrations on International Women's Day, said that he "will not tell anyone what to do" but that "if his son asks him, 'I will tell him to do what he wants'" (Stegmann, 2020, para. 11).

The weekend of March 8, a scenario of great epidemiological and communicative complexity was set; the concurrence of several large sports events and the political convention of VOX (a political party)

overlapped with 674 cases and ECDC report advising against large crowds. The government authorized the celebration of all those events and encouraged the celebration of 67 feminist demonstrations and gatherings, calling for a massive mobilization and downplaying the possible risk.

The following Monday, health authorities reported new cases, and regional governments started to raise their concerns to the national levels. On March 10, Madrid authorities decided not to wait any longer: They closed schools and sent nonvital employees' home.

On March 13, in a broadcast on public television, President Pedro Sánchez announced the State of Alarm, anticipating an extraordinary Council of Ministers to approve the exceptional measure to respond to an "emergency." The Spanish authorities finally closed down the country on March 15.

In Spain (where more than 45,000 people died in the first wave of the pandemic), there has been an intense public debate about the effects that the approval of these demonstrations had on the spread of the virus. Parliamentarians, citizens, and journalists have asked constant questions about international alerts and available data to the government during the first days of March. The State of Alarm suspended the administrative deadlines related to transparency. On April 27, 2020, through the NGO Access Info Europe, 30 organizations asked the government of Spain to guarantee the exercise of the right of access. On June 21, the transparency portal should have started to function regularly, but none of the questions had been answered.

In July 2021, the Spanish Council of Transparency and Good Governance (CTBG) issued 218 resolutions against the General State Administration, an average of 1.2 per day, mostly due to negative silence.

However, the indirect effects of the lack of transparency are reflected in opinion polls. On March 23, 67% of Spaniards already stated that they were concerned about the mismanagement of COVID-19, and 47% also believed that the government of Spain was not generating trust with their decisions (Mesias, 2020). According to a June 2020 poll from the European Council on Foreign Relations, 58% of Spanish voters had less confidence in government than they previously did, and they believed that it performed poorly (only France fared worse among the nine countries polled). Furthermore, only 21% of Spanish citizens trusted experts and the authorities (Royo, 2020).

One year after the concentrations, EL MUNDO-Sigma Two Panel showed on March 8, 2021, that seven of 10 Spaniards thought it was a mistake to celebrate the demonstrations on 8M because COVID-19 infections were already beginning to occur. This majority was even among PSOE voters, where 64% believed that the rallies should not have taken place.

In this context, this study aims to explore the evolution of the public (Twitter) and published (media) agendas from one week before to one week after March 8 about the mass events and the COVID-19 pandemic. We will analyze the amount of attention provided and the terms, sentiments, and sources in conversation about the virus in the two scenarios.

We assume that March 8 was the turning point that led Spanish society into an alarming discovery of COVID-19. Our research questions focus on (a) how attention and speeches changed when Spaniards discovered the imperfect information scenario, and (b) on how frames, for consequent distrust, were stated then.

Material and Methods

A total of 13,113 tweets related to COVID-19 were collected between March 1 and 15, both inclusive. *Covid, COVID-19*, and *Coronavirus* as keywords in the tweets and tags were used for the mining. The extraction was made with a Python script that connects to the premium search tweets 30-day API that provides access to historical data and offers the possibility to apply filters for extraction. The API searches against a random sampling of tweets published within the queries reflecting the public discourse.

As expected, we followed all the GDPR requirements and complied with the Twitter Developer Agreement and Policy guidelines and its Display Requirements and Automation Rules.

Tweets were stored in a JSON file, and then processed and analyzed using Python scripts and NLP libraries for sentiment analysis and word-cloud construction. The file was processed with Gephi software for the identification of communities and relationships among users that generate and interact with tweets that contain the keywords (Bastian, Heymann, & Jacomy, 2009; Jacomy, Venturini, Heymann, & Bastian, 2014).

Table 1. Press Headers Analyzed.

20 Minutos	El Periódico de Catalunya	El Diario Vasco
ABC	El Punt Avui	El Norte de Castilla
Diari ARA	Expansión	El País
Alerta Cantabria	Faro de Vigo	La Vanguardia
AS	Gara	La Verdad de Murcia
Canarias 7	Heraldo de Aragón	La Voz de Galicia
Cinco Días	Hoy Diario de Extremadura	Las Provincias
	La Nueva España	
Deia	La Razón	Levante Mercantil Valenciano
Diario de Avisos	La Rioja	Marca Primera Plana
Diario de Cádiz	La Tribuna de Albacete	Melilla Hoy
Diario de Navarra	El Correo Bizkaia	Mundo Deportivo
Diario de Teruel	El Diario Montañés	Sur
El Periódico de Aragón		Última Hora

Additionally, we used press summaries prepared by Kantar Media (https://www.kantar.com/es), which offers all the news articles published by Spanish newspapers and online news outlets in a searchable format, ordered by audience and reach. Information published in the 44 more representative printed headers for the 17 Spanish autonomous communities (shown in Table 1) whose headline contains the words *Coronavirus* and *COVID-19* (with all their variants) were collected between March 1 and 15.

A total of 1,247 articles were collected. The complete content of each was uploaded for analysis. Additionally, to clarify the journalistic account, a textual analysis of the covers was carried out during the 15 days of the investigation.

The analysis of data, both those from social networks and from the media, was divided into two distinct groups: those corresponding to the period between March 1 and 8, 2020, and those collected between March 9 and 15, 2020. We then applied lexicon-based sentiment analysis and network analysis.

The first is a classification for measuring the popularity of sentiment of a collection of documents that can estimate whether the sentiment of a tweet is positive, neutral, or negative, and a metric score for those sentiments. To execute sentiment analysis, we applied the Valence Aware Dictionary for Sentiment Reasoning (VADER) model, a rule-based model able to manage various content generated in social media and compute its sentiment polarity stage. It is a standard procedure to analyze lexicon-based sentiment analysis and classification, which is the most popular method for measuring the polarity of sentiment of a collection of documents (Ahuja & Shakeel, 2017). VADER is very robust; the model does not need to be trained in advance to make the classifications, and it is computationally efficient; it outperforms individual human raters.

The VADER NLP method evaluates, as described by Dahal, Kumar, and Li (2019), each lexical feature of a tweet written in English and calculates a metric score for the sentiment of the tweet. Then, it applies five different rules based on general syntactic and grammatical conventions to adjust the initial metric score. The final score ranges the sentiment's tweet from −1 (*strongly negative sentiment*) to 1 (*strongly positive sentiment*).

We then classify the sentiments of tweets into clusters: Those with scores ranking from −1 to −0.05 are considered negative, and those with scores ranking from 0.05 to 1 are considered positive. Neutral ones have scores from −0.05 to 0.05. The method avoids the bias involved in assigning the tweets with scores very close to 0 a positive or negative sentiment, minimizing the false positives and negatives.

On the other hand, there is a wide variety for social network analysis depending on many factors (e.g., the agents involved, the relationships reanalyzed). In this research, we analyze the social network topology of the sample and its dynamics with Gephi software and its ForceAtlas2 algorithm. ForceAtlas2 is a continuous graph layout algorithm available in Gephi that simulates a physical system to spatialize a network aiming to facilitate the interpretation of the data.

To confirm the difference among the drivers between the two periods we will focus on the centrality (Golbeck, 2013)—that is, the structure of the network and its measures that are conditioned by who retweeted about COVID-19 before and after March 8. We will look to see if the networks share audiences by using Gephi, open-source software used for network analysis and visualization (Jacomy et al., 2014).

To estimate the betweenness and closeness, centrality and eccentricity aiming to capture how important nodes are for a given network, we applied the methodology proposed by Brandes (2001). The

higher the centrality measure that gives the most meaningful results depends on the context of the network. Therefore, the centrality of a node depends primarily on its distance to other nodes. It addresses the question of who initiates threads, topics, and proposals in the network of interest.
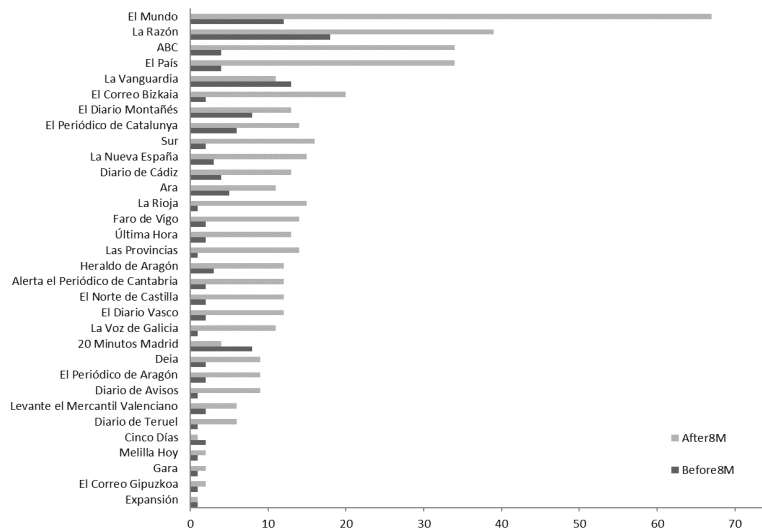
Results

Attention Paid to COVID-19

March 9 is the turning point in the public attention paid to the pandemic in networks. There are a greater number of tweets after 8M than before; the number grows to more than 8,000 tweets. This notable increase of more than 60% highlights a first differential element between periods.
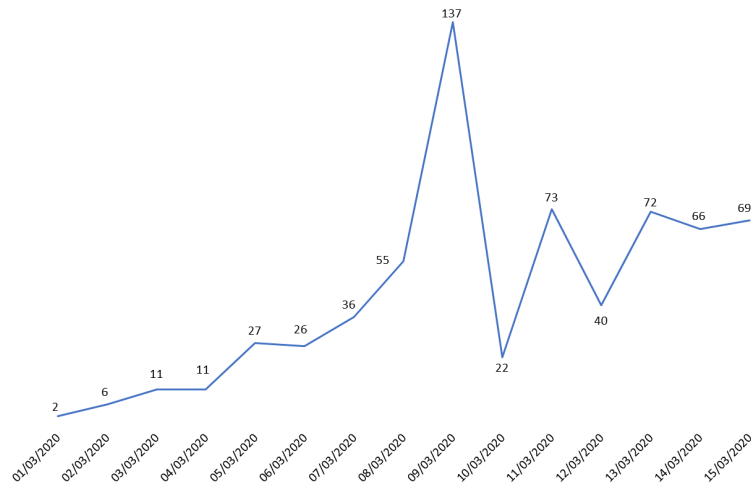
(a) Total number of news

(b) Number of news before and after 8M by newspaper
Figure 3. Evolution of news articles related to COVID-19.

This same trend appears in the press. Figure 3(a) shows the evolution of the media attention paid to the issue in the printed press over time. A few hours after the celebration of March 8, the number of news items rose from 55 this day to 137 the next day, in less than 24 hours. Indeed, in the first week of this month, 120 texts (18.3%) with an average of 17.15 articles/day were accumulated, while following the demonstrations of March 8 and up to the middle of that month, the figure rose to 534 (81.7%), with an average of 66.7 articles/day. One-way analyses of variance (ANOVAs) tests were conducted to confirm significant differences between the average number of news articles before and after March 8 (Shakeri, 2020). These differences were confirmed; the F value of 13.56 was less than the critical value of 4.66, and the p value was .0027.

As Figure 3(b) shows, altogether, the media that published the most pieces on the subject were *El Mundo*, *La Razón*, *ABC*, *El País*, *El Correo*, and *La Vanguardia*. However, there is a difference in the importance of journalistic sources before and after 8M. The increase in interest from 8M onward was not homogeneous. The cast of media that paid attention to the pandemic grew by 30% after 8M. Furthermore, within each media, the rise in attention was not uniform ($t = -6,358$, $p = .000$).

It is after 8M, when COVID-19 suddenly appears in one-third of analyzed media, and most media increased their coverage ($\chi^2 = 0,596$, $p < .001$).

Topics and Sentiment

Twitter Topics and Sentiment on COVID-19

In the first half of March, COVID-19 appears in Twitter basically as a social phenomenon with "people" and "us" repeated in a very prominent way, strongly associated with "case," framed very close to the reality of individual countries ("country") and to an inconclusive individuality ("one"). Relevant for social networks is also the immediacy, made evident by the frequency of use of the terms "day" and "today" (see Figure 4).[1]

Figure 4. Word cloud of words related to COVID-19 on Twitter (Ballestar, Martín, & Sainz, 2020).

Of the 13,113 tweets analyzed, 4,712 (35.9%) show positive, 4,844 (36.9%) negative, and 3,557 (27.1%) neutral sentiment in a quite balanced distribution. But when taking separately the data for the weeks before and after March 8 (see Figure 5), sentiment analysis poses some insights. There is a change in the discussions in both periods. In the first, a balance can be observed, while in the second, there is a significant fall in neutral terms, with an evident polarization of the talks.

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[1] All word, sentiment and network analysis of tweets and press news are done from the authors' data set.

(a) Tweets before March 8   **(b)Tweets after March 8**
**Figure 5. Sentiment analysis of COVID-19 tweets.**
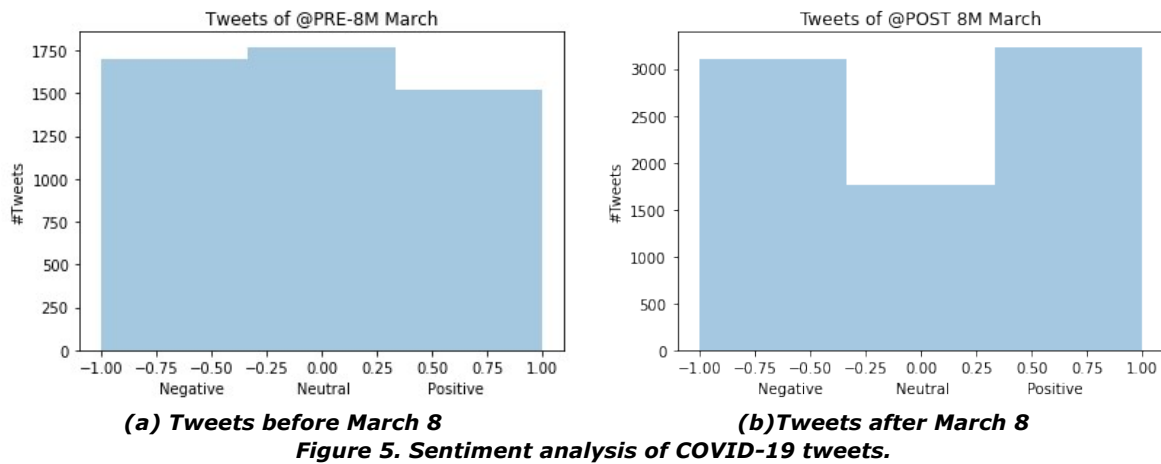
As with sentiment, there is a change in conversations (the prevalence of terms) between the two periods, as shown in Figure 5. In the period leading to March 8, the most frequent terms of positive feelings are "disease," "around the world," "wash hands," and "cases." Tweets also mention "SARS" and "MERS," for which there was no vaccine, and were overcome without many problems.

After March 9, the speech focuses on collective concern and care. Doing a reading of most frequent positive terms, it can be deduced that "People," "us," must "take care," as "day by day," "cases," and "patients," at "hospital," in this "new," "pandemic" increase (see Figure 6b, 6d).

Changes in the negative terms are also relevant. Before 8M (see Figure 6c), everything is much more concrete: a "virus," "son of bitch," "spreads," and "people," feel "fear." Twitter also focuses on certain "symptoms." Additionally, "Patients," and "cases," affect "Italy," although coronavirus can be present in any "country" (see Figures 6a, 6c).

After March 9 (see Figure 6d), the terms "people," "case," "patient," and "country" gain negativity. The decisions of the "government" are now being targeted as a negative, as evidence of the growing malaise, as Castillo-Esparcia, Fernández-Souto, and Puentes-Rivera (2020) detected. Finally, the term "death" turns up and gives everything a tragic perspective that was not previously clearly perceived.
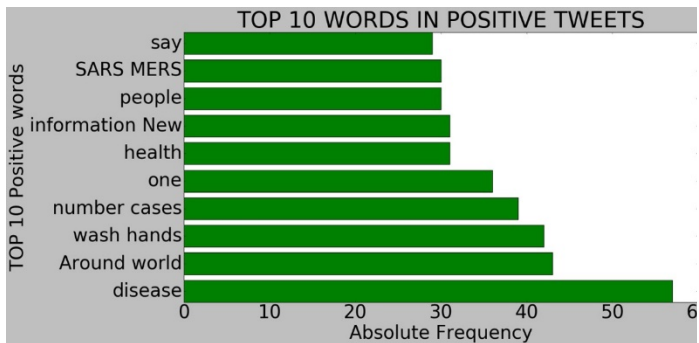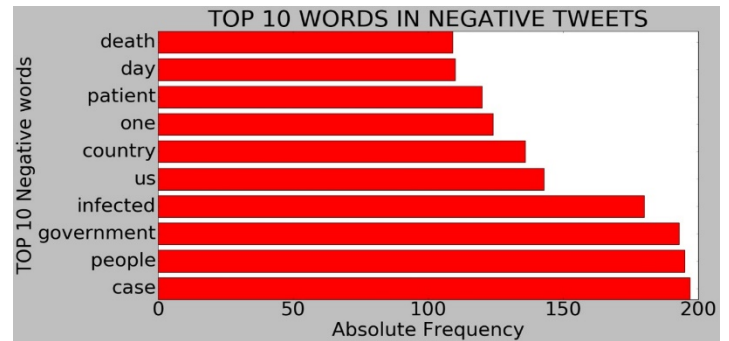
(a) Top 10 words with positive sentiment before March 8
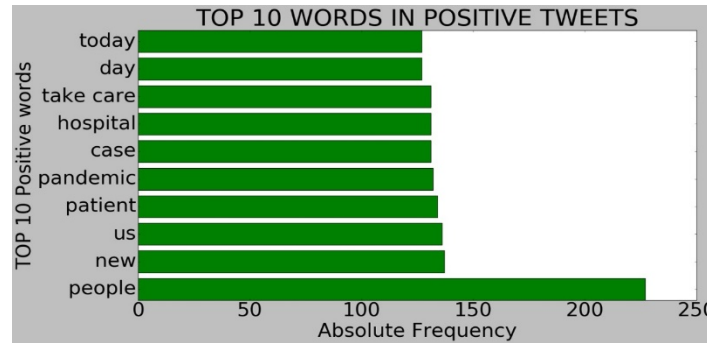
(b) Top 10 words with positive sentiment after March 8
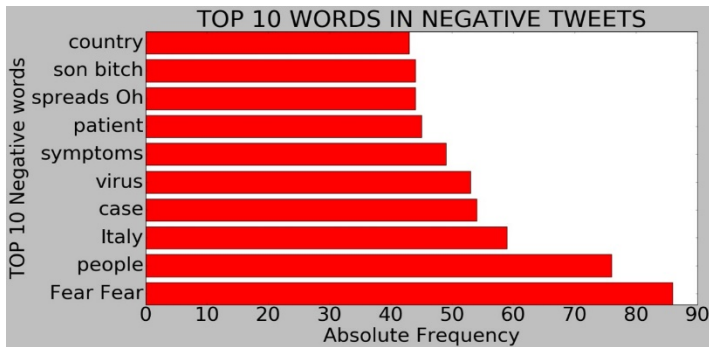
(c) Top 10 words with negative sentiment before March 8

(d) Top 10 words with negative sentiment after March 8

Figure 6. Frequency of words from tweets by positive or negative sentiment.

Topic and Sentiment in the Press

While on Twitter "people" ranks as the main actor, the press word cloud is dominated by "government" in a clear political direction (see Figure 7).

Figure 7. Word cloud of the most frequent words related to COVID-19 in the press.

The most relevant aspect in the analysis of terms in the news is the change in the pessimistic tone from 8M onward. Neutral sentiment remained at the same low levels as in the previous week, but positive sentiment declined sharply (see Figure 8). Of the 1,247 press articles, 666 (53%) showed negative, 418 (33.5%) positive, and 163 (13.07%) showed neutral sentiment. There is a clear difference in relation to social networks, as the press was much more pessimistic about the pandemic. The most relevant aspect was the change in the pessimistic tone of news from 8M onward. Neutral sentiment remained at the same low levels as in the previous week, but positive sentiment declined sharply (see Figure 8).
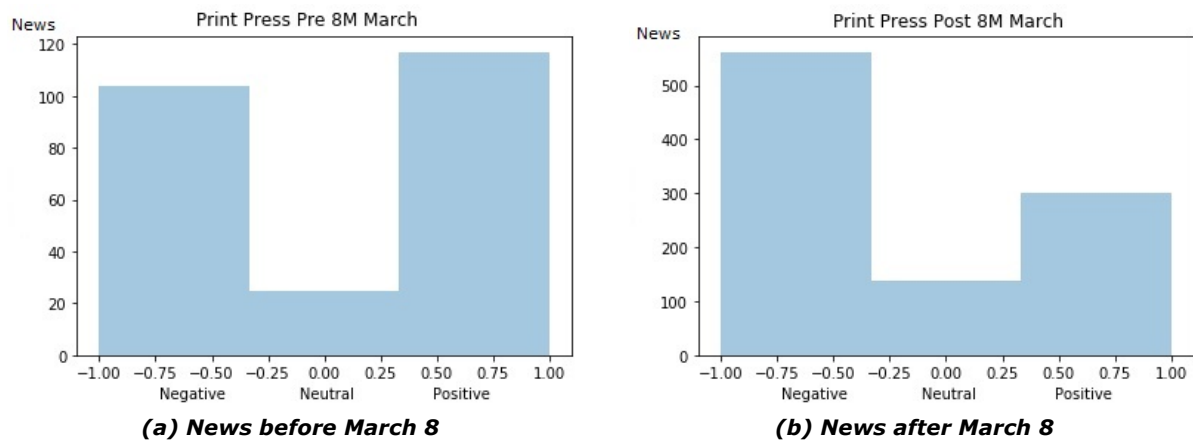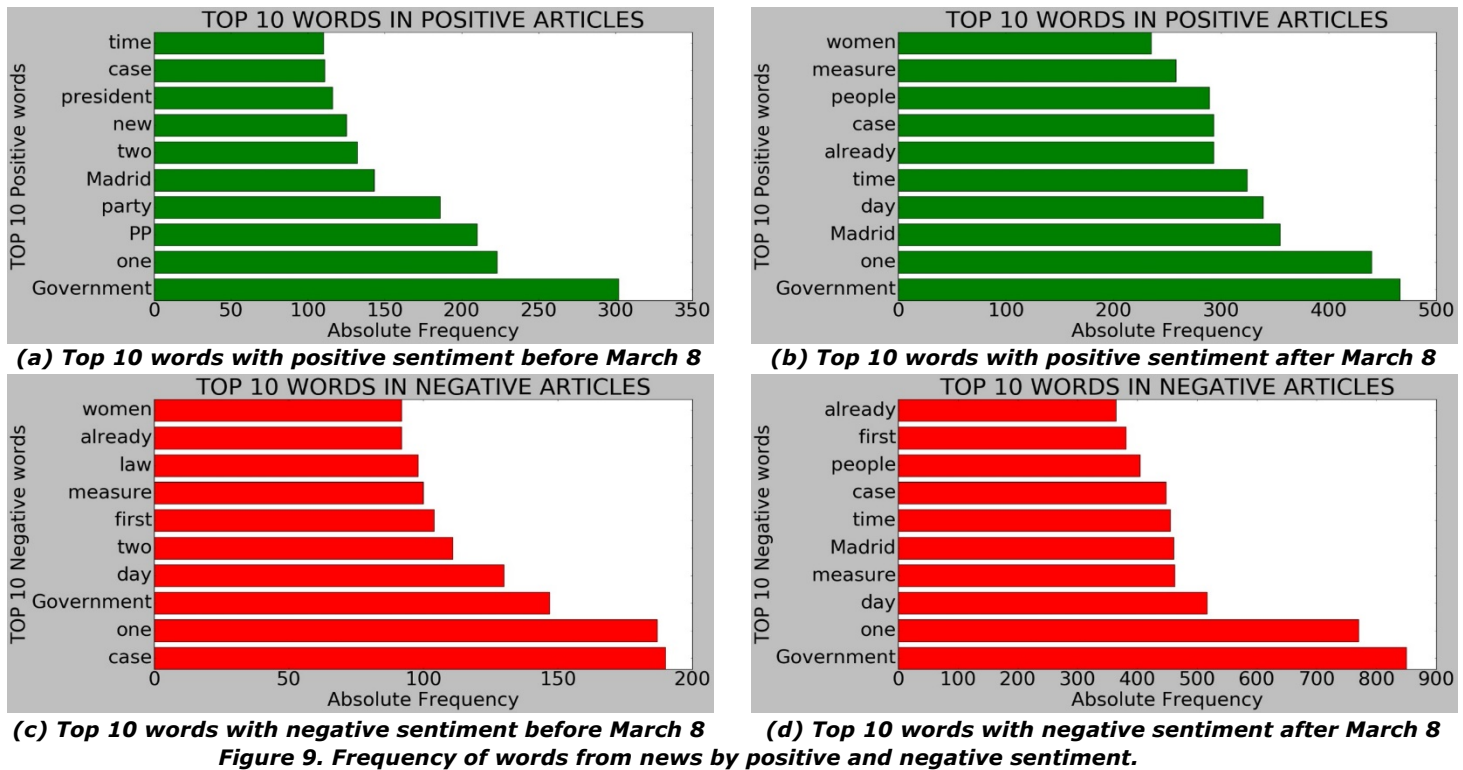

(a) News before March 8　　　　　　　　　*(b) News after March 8*

Figure 8. Sentiment analysis of COVID-19 news.

Before March 8, fighting against the pandemic required a response from the public authorities. Of the 10 terms with a positive feeling, three refer to politics: "government," "PP," and "president." "Madrid" marks the topology of the news, and "new" and "case" in the same way as individual "one" or "two" point the first deaths from COVID-19 (see Figure 9a).

"Government" is not the dominant term in the negative sentiment, but "case," also from a perspective of relative importance ("one," "two"). "Women" appeared here in the negative sentiment, but in an unremarkable place among the most frequent terms. As Castillo-Esparcia and colleagues (2020) pointed out, media do not clearly associate the increase in risk of contagion with massive concentrations (see Figure 9c).

However, from 8M onward, according to Figure 9 (b, d), nine of the first 10 terms in the press share both positive and negative sentiment, highlighting a radicalization of the news. "Government" ranks first, and the frequency as a negative sentiment double when used as a positive sentiment. "Madrid" gains strength as a geographical pole of politics, and "people," "already," and "measure" gain relevance in both sentiments. "Women," which had scarcely appeared linked to a negative sentiment in the previous week, now appears as a positive sentiment.

(a) Top 10 words with positive sentiment before March 8

(b) Top 10 words with positive sentiment after March 8

(c) Top 10 words with negative sentiment before March 8

(d) Top 10 words with negative sentiment after March 8

Figure 9. Frequency of words from news by positive and negative sentiment.

COVID-19 Discourses and Sources

Press

Performing a textual analysis of the coverage, it can be found that, during the first days of March, according to governmental communication, only some media reported on the expansion of the virus, without referring to the possible effects of the immediate mass concentrations, although referring to educational and work centers.

On March 5, the second death from COVID-19 in Spain and the closure of schools in Italy made headlines. On March 6, the political and economic dimensions of the pandemic gained ground in newspapers, such as *El Mundo*, while others, such as *El País*, remained focused on the health approach.

In any case, in the week leading up to 8M, not only a lack of information but also a lack of connection between the pandemic and the nearby concentrations, such as those called for by International Women's Day, are detected. Only *La Vanguardia* presented both realities, with a minimizing frame in the editorial on March 2, titled "Sexist Violence, The Most Serious Pandemic" (Sen, 2020), which presented a dichotomy between feminist manifestations and the risk of contagion. None of the newspapers mentioned any notification from different recommendations of international institutions about concentrations.

On March 7, most media reflected on the interview with the vice president of the government, where she encouraged women to fill the streets of Madrid on March 8. They also covered the statements of Fernando Simon, the director of the Health Coordination and Alert Center.

The disassociation between International Women's Day and the pandemic dominated headlines on March 8. Thus, *El País* and *El Mundo* divided their space between the feminist marches and COVID-19, but without connecting both realities. This disassociation continued on March 9.

However, on March 10, the panic over COVID-19 took hold in the Spanish press. *El País* wrote about "overflowing health systems," *El Mundo* spoke of the "lack of control of the virus" and "Black Monday." *ABC* headlines reported "The Threat, the Virus; the Enemy, Panic" (Europa Press, 2020a). The use of terms associated with the epidemic, the severity of numbers and the mass transmission belt gained momentum.

From March 11 onward, the shadow of the pandemic spread, and some newspapers, such as *El Mundo*, pointed out the problem of lack of control and started to connect concentrations with COVID. The seriousness of the tone was generalized. (Europa Press, 2020b). This trend continued the next day in a more polarized way. Thus, *El Mundo* noted that "Madrid Asked for Measures for 10 days and the Government Refused" and *ABC* reported "Pandemic: The WHO States That 'Levels of Inaction are Worrying'" (Europa Press, 2020c). On March 13, *El Mundo* reported that "Sanchez Doses the Response to the Virus Despite the Economic Emergency" with "55 Demonstrations in Madrid During 8M" (Europa Press, 2020d).

The speech of Sanchez, anticipating the State of Alarm to respond to a global "emergency," turned media coverage on March 13.

On March 14, *ABC* and *El Mundo* presented the new situation with a criticism of government management. *ABC* reported a "State of Confusion" ("Estado de confusion," 2020) on its front page. *El Mundo* stated, for the first time, "The EU Advised Against Allowing Crowds 6 Days Before the 8M" (Lamet, 2020), a key message that was reproduced in various antigovernment audio-visual media.

Finally, on March 15, with the State of Alarm declared, the headlines focused on the confinement. A group of newspapers avoided political criticism and shifted the responsibility to the citizens. For example, *El País* stated in an op-ed, "The hour of the citizens" (Villanueva, 2020). Others, in the line of *El Mundo* focused on the bad management of the situation as *ABC* ("Sánchez, Overcome" and "47 Chaotic Hours"; see front pages of *ABC* and *El Mundo* in El Periódico, 2020).

COVID-19 Network Analysis

Those who reacted and interacted on Twitter were not homogeneous in the different periods. The network representation shows that their structure characteristics and profiles differed, as did their messages. While, in the first period, humor was important, in the second period, information became much more relevant (see Figure 10).
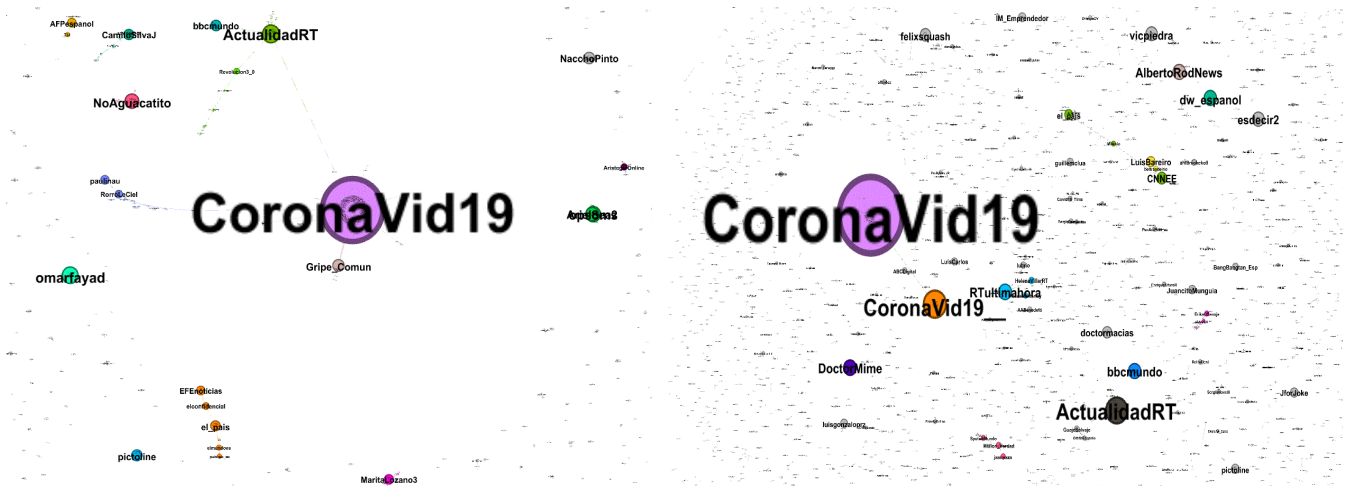
(a) Twitter network accounts before March 8   (b) Twitter network accounts after March 8
Figure 10. Audiences for COVID-19.

Centrality addresses the question of who initiates threads, topics, and proposals in the network of interest. While before March 8 the account with more interactions was, with a large difference (1.019 to 87), a satiric account (as three from the top accounts), after March 8, the image changed (see Table 2).

Table 2. Twitter Accounts in Spain About COVID-19.
a) Before March 8

Accounts	Out-Degree*	Account Description
@CoronaVid19	1,019	Satiric
@ActrualidadRT	87	News
@Gripe_Comun	43	Satiric
@bbcmundo	26	News
@sopitas	24	Satiric
b) After March 8		
Accounts	Out-Degree	Account Description
@CoronaVid19	254	Satiric
@ActrualidadRT	63	News
@bbcmundo	36	News
@el_pais	23	News
@ABCDigital	14	News

Note. **Out-degree is the number of ties that a node directs to others.

National newspapers started to appear closer to international media. Several humorous accounts disappeared from the ranks, as fewer people wanted to joke, and information took a central place for citizens (Montesi, 2020).

Official sources did not appear in the top positions of the rankings, neither in the first period nor in the second period.

Our results show that both networks were different (ANOVA results were robust to different specifications). The strong presence of the Twitter channel of Russia Today was interesting, which has a reputation for fake news, in both periods.

Discussion and Conclusions

This study aimed to monitor the way Spanish society dealt with the "alarming discovery" of COVID-19. March 9 (one day after concentrations) is the turning point between the precrisis and the outbreak. The appearance of the President immediately after the demonstrations creates suspicion and encourages the media and Internet users to seek information. Utter analysis in differences in how public and published opinion in other countries did their "alarming discovery" could help to understand the levels of trust in official sources.

Experts have pointed out the communication failures of the Spanish government since the lockdown of the country, such as the proliferation of spokespersons, long press appearances, self-promotion, and poorly justified rectifications (González-Harbour, 2020). But, as it has been known later, 8M Spain presented an asymmetric information scenario, where the government had relevant records that public opinion and the press did not know.

Before 8M, as Borden-Koop explained in his "degradation deception model" (Kopp et al., 2018, p. 4) official sources concealed data and reported in noise, with assessments as the vice president or the director of the Health Coordination and Alert Centre. Both were reflected by the press. This message and the lack of clear and efficient communication, as De Las Heras-Pedrosa and colleagues (2020) detected, introduced a false perception of the virus, framed in Twitter basically as a social phenomenon (remote and fun), whereas in the press, it described as a health and economic problem, which politicians had to address, but limited to isolated cases.

On the other hand, after 8M, the prevention of public opinion, press, and politicians from collecting information by denying responses to the transparency systems fits with the "denial deception model" described by Kopp and colleagues (2018) and has increased not only uncertainty but also certainty of the mistake of celebrating the demonstrations on 8M, as public opinion surveys have shown (p. 5).

From a theoretical point of view, this article introduces the nuance that suppression/concealment of information is one of the formulas of deception that must be further analyzed in other countries. The concealment of the message of Li Wenliang in China points out, as Larson (2020a) stated, that in the context of "deception," which is an increasing object of academic interest, it is also important to know to what extent and where "a lack of information" has become "misinformation" (p. 306).

From an empirical point of view, as other studies have found (Chew & Eysenbach, 2010; De Las Heras-Pedrosa et al., 2020), public concern and sentiment toward the COVID-19 pandemic on Twitter

varied over time. We also found a lack of information from authorized sources, as one of the most relevant points of Twitter analysis was that official sources did not appear in the top positions of the ranking.

Effects on the repercussions that noncommunication of warnings and data could have on the spread of the virus in Spain are beyond the objectives of this research. Results show that the climate of opinion changed in only a few days and became more negative, polarized, disappointed, and worried. Public concern and the recommendation of protective behaviors increased only when the governmental communication changed after 9M, as well as political critics, mainly in the press.

This was not an intermediate agenda setting study, which makes possible to quantify the interinfluence between the media and tweets. Anyway, a relative disconnection between both agendas, especially in the first week of the study, was detected. While the written press minimized the importance of the epidemic in quantitative terms, in line with the government approach, Twitter seemed to be ahead pointing out the malignancy of the virus, but minimizing the importance from a qualitative point of view, using humor in sarcastic accounts. This quantitative (in the print media) and qualitative (in the networks) minimization disappeared with the change in the government's communication strategy, and the discourse became serious, pessimistic, and polarized. Differences of network centrality among periods also showed traditional press only appears as a node that produces information after March 8.

Previous studies have detected negative feelings related to the uncertainty and the context of imperfect information (De Las Heras-Pedrosa et al., 2020). As stated by the degradation and denial deception models, the concealment of information, as well as the prevention from collecting evidence, increased not only attention but also pessimism and polarization after 8M. Further studies on how the public agenda on the debate and the mistrust about the lack of transparency in Spain should be carried out.

It can be deduced that the lack of truthful information was translated in different ways in the networks as compared with that in the press. A line of analysis is opened by proposing how noninformation can influence the construction of agendas, in terms of themes, feelings, and behaviors. These issues could be relevant, from a practical point of view, to refocus communication and public health strategies not just is Spain, but also in different countries and worldwide.

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Appendix

Jan	
1/30/2020	1/31/2020
Event 1: COVID declaration of international emergency	Event 2: Spain first local infection (German tourist)

Feb							
2/9/2020	2/13/2020	2/24/2020	2/25/2020	2/26/2020	2/27/2020	2/28/2020	2/29/2020
Event 3: Spain second local infection (British tourist). "Spain will only have a handful of cases" (Fernando Simón)	Event 4: First COVID death in Spain	Event 5: H10 Costa Adeje Palace Hotel (Tenerife) lockdown	Event 6: Four new cases	Event 7: First case of community transmission (Andalucía)	Event 8: Cases of Italian origin reperted in Cataluña, Castilla y León and Valencia	Event 9: Nine more cases in Andalucía and one in Madrid	Event 10: First cases in Asturias and Navarra. Cases in País Vasco, Castilla la Mancha and Extremadura

Mar						
3/2/2020	3/3/2020	3/5/2020	3/8/2020	3/9/2020	3/13/2020	3/15/2020
Event 11: Nine cases in Cantabria, 5 cases in Castilla y León, 3 cases in Cataluña, 2 in Extremadura, 29 in Madrid. First case in La Rioja	Event 12: Cases in Asturias, Islas Baleares, País Vasco, Castilla la Mancha, La Rioja, and 27 new cases in Madrid	Event 13: First death in Madrid	Event 14: International Womens Day, plus 60 thousand football fans in football stadiums. Vox political Congress	Event 15: Catalan regional goverment suspended massive events. Spain stock index fell 14%	Event 16: President Sanchez announced a declaration of State of Alarm	Event 17: National lockdown becomes effective

Figure 2. COVID-19 preproblem stage timeline.