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The ideology of media. Measuring the political leaning of Spanish news media through Twitter users' interactions

Abstract

The news media have a strong influence on people's perception of reality. But despite claims to objectivity, media organizations are, in general, politically biased (Patterson & Donsbach, 1996; Gaebler, 2017). The link between news media outlets and political organizations has been a critical question in political science and communication studies. To assess the closeness between the news media and particular political organizations, scholars have used different methods such as content analysis, undertaking surveys or adopting a political economy view. With the advent of social networks, new sources of data are now available to measure the relationship between media organizations and parties. Assuming that users coherently retweet political and news information (Wong, Tan, Sen & Chiang, 2016), and drawing on the retweet overlap network (RON) method (Guerrero-Solé, 2017), this research uses people's perceived ideology of Spanish political parties (CIS, 2020) to propose a measure of the ideology of news

media in Spain. Results show that scores align with the result of previous research on the ideology of the news media (Ceia, 2020). We also find that media outlets are, in general, politically polarized with two groups or clusters of news media being close to the left-wing parties UP and PSOE, and the other to the right-wing and far-right parties Cs, PP, and Vox. This research also underlines the media's ideological stability over time.

Keywords

Media ideology, Twitter, news media, politics, political parties, Spain.

1. Introduction

The news media plays a key role in contemporary societies. Citizens use the media to be informed about all kinds of issues and in particular about politics. However, it is indisputable that each particular news media constructs its own particular reality. Despite widespread understanding that the media is politically biased (Bessi *et al.*, 2015; Gaebler, 2017), readers may have a poor idea of the proximity between media organizations and parties (Falck *et al.*, 2020). Consequently, one of the recurrent questions to address in political science and communication studies is the extent to which media organizations' construction of reality is in tune with the views contained in political ideologies and proposed by organizations. Previous research has proposed different methods to measure media outlets' political leaning and ideology based on content analysis (Haselmayer, Wagner & Meyer, 2017; Zhitomirsky-

Geffet, David, Koppel & Uzan, 2016; Gentzkow, Petek, Shapiro & Sinkinson, 2015; D'Allesio & Allen, 2000), discourse analysis (van Dijk, 1995), political economy studies (Schena, Almirón & Pineda, 2018), surveys (Pew Research, 2018), or machine-learning sentiment analysis (Falck *et al.*, 2020), among others.

Since their popularization more than a decade ago, social networks have become valuable sources of social data for researchers in a myriad of disciplines. Users of social networks access the platforms to find information, express their opinions, to communicate, to share information, and to engage in activities such as purchasing objects and services, listening to music, or watching all kinds of media content. Large samples collected from users contain traces of human interactions that allow researchers to gain a better understanding of social behaviour (Markowetz, Błaszczewicz, Montag, Switala & Schlaepfer, 2014; Kosinski, Wang, Lakkaraju & Leskovec, 2016) and to infer individuals' personal traits, such as sexual orientation, religious views or use of addictive substances, among others (Kosinski, Stillwell & Graepel, 2013). In particular, digital traces including interactions and language data have been used to accurately predict personality traits (Park *et al.*, 2015; Obschonka, Lee, Rodríguez-Pose, Eichstaedt & Ebert, 2020; Tay, Woo, Hickman & Saef, 2020), giving rise to what Markowetz *et al.* (2014) called psycho-informatics. This research has proven the efficacy of several methods applied with the objective of uncovering unknown traits or latent attributes of individuals and groups, and support the thesis that judgements made by computer-based methods are more accurate than those made by individuals (Youyou, Kosinski & Stillwell, 2015).

Political leaning and ideology are among individual traits that have been analysed extensively using social media data. For example, Facebook data has been used to predict users' political leaning by analysing textual information contained on personal pages (David *et al.*, 2016). However, Twitter stands out among the social media platforms in relation to politics. Not only because it is considered to be the social network for political debate, in which politicians, media, journalists and citizens discuss all kinds of issues (Guerrero-Solé, 2018), but also because it has been the only platform that offers an opportunity for researchers to access large datasets through its APIs. Twitter has allowed researchers to collect hundreds of millions tweets and estimate the political preferences of millions of users (Barberá *et al.*, 2015). As a consequence, data collected from Twitter has been a rich and useful source for proposing different measures of users' political leaning. The political alignment of Twitter users has been studied (Conover, Gonçalves, Ratkiewicz, Flammini & Menczer, 2011; Golbeck & Hansen, 2014), by analysing content, sentiment (Gautam & Yadav, 2014) mention, reply and retweet behavior, or the structure of the networks of following-followers (Renoust, Cheung & Satoh, 2017). Most of these studies that have addressed the uncovering of individuals' political leaning have led to conclusions about the formation of echo chambers (Bruns & Highfield, 2013) or the increase in political polarisation (Kim & Park, 2012) that is said to intensify political bias (Conover *et al.*, 2011).

However, research on the political leaning of the news media is scarce. In this regard, Park *et al.* (2011) inferred the political orientation of news stories by analysing the sentiment of the comments posted by users. An, Cha, Gummadi, Crowcroft and Quercia (2012) proposed a method based on the similarities of users' following and interactions to visualize an ideological map of news media. Wong *et al.* (2016) inferred the ideological leaning of media based on users' retweeting behaviour, and in a recent work, Stefanov, Darwish, Atanasov and Nakov (2020) used Twitter data to predict the political leaning of online media and of influencers. Facebook has also been used as a source for predicting the ideological stance of online media based on the political leaning of its users (Ribeiro *et al.*, 2018).

Among all the digital traces observable in Twitter data, retweeting is considered to be the most reliable source of information when it comes to political communication. It has been shown that users tend to retweet consistently about political issues (Wong, Tan, Sen & Chiang,

2016; Guerrero-Solé & López-González, 2019; Stefanov, Darwish, Atanasov & Nakov, 2020) and that similar users tend to be retweeted by similar audiences (Wong, Tan, Sen & Chiang, 2016). The consistency of users' retweeting behaviour in political discussions on Twitter has encouraged the development of methods that make use of this trace to uncover individuals' political leaning (Guerrero-Solé, 2017) or to measure the distances between political parties in multiparty democracies (Guerrero-Solé & López-González, 2019).

While the uncovering of personal traits and, in particular, of individuals' political leaning has received significant attention among scholars, research on the ideological relation between media outlets and political parties is still noticeably absent. The aim of this research therefore is to introduce a new method for measuring the political ideology of Spanish news media organizations by means of the Twitter users' retweeting behaviour based on their perceptions of Spanish political parties' ideology.

2. The Spanish case

The question regarding the relationship between media outlets and political parties is particularly relevant for polarized, pluralist media systems (Hallin & Mancini, 2004), characterized by a political parallelism (complete information about the structure of the Spanish Media System can be found in the works of Baumgartner and Chaqués Bonafont (2015) and Llorens (2010). According to Hallin and Mancini (2004), Spain is such a case. In the Spanish media ecosystem, the link between media outlets and groups and political parties is considered to be intense. In this sense, research published by the Pew Research Centre (2018) showed that political (left or right) preferences had a strong influence on the media outlets cited by Spaniards as their main source of news. The link between political preferences and readership has been also confirmed by surveys, as reported by Baumgartner and Chaqués Bonafont (2015). The authors cite research undertaken by the Spanish Centre for Sociological Research (CIS) published in 2009 in which a great proportion of readers of *El País* identified themselves as left-wing voters, and also a great proportion of readers of *El Mundo* as right-wing voters.

Recently, several articles addressing the relationship between news media and political ideologies in Spain have been published. Among them, a critical discourse analysis performed by Labio and Pineda (2016). In their research, the authors reported that media outlets such as *Público*, *eldiario.es*, or *infoLibre* were to be considered leftish outlets, while news media, such as *ABC* or *La Razón* tended to support the PP government and attack left-wing parties (Labio & Pineda, 2016). The same politicization has been observed for private TV stations by Sampedro and Seoane Pérez (2008). More recently, Schena, Almiron and Pineda (2018) have proposed a more complex method to classify media outlets in four categories or values (individualism, communitarianism, egalitarianism and elitism) and link them to political ideologies.

Research undertaken by Baumgartner and Chaqués Bonafont (2015) also confirms the level of politicization of the Spanish news media outlets, with particular media outlets establishing strong ties with particular parties, as in the case of *El País* with the PSOE (socialist party), or *ABC* with the PP (right-wing party). According to Baumgartner and Chaqués Bonafont (2015) the link between media outlets and political parties is better explained by readership patterns more than by media ownership. In this sense, the authors assert that reading a newspaper in Spain is linked to political ideology, in tune with the results obtained by Pew Research (2018). Finally, Ceia (2020) reported links between news media and political parties by analysing parties' retweeting behaviour. Again, the results of her research were also in tune with previous findings.

Despite these recent publications on the close relationship between media and political parties, and the evidence that confirms the Spanish media system as a polarized pluralist one, there is still a lack of research on measuring the extent to which certain media outlets and, in

particular, certain news media are in close proximity with political parties. Thus, considering that news media outlets and political parties in Spain have a strong presence on Twitter (Guerrero-Solé, 2018), and that users' digital traces can be used to obtain information about the links between them, the first research question takes the following form:

RQ1. What are the political leanings of the main news media outlets in Spain?

Most of the previous work inferring the political leaning of users, in general, and of media outlets, in particular, does not consider the evolution of their measures of political leaning over time. Thus, we also analyse the distribution and the dynamics of our measures to prove the reliability and consistency of the method for measuring political ideology across the media. Consequently, we add a secondary research question as follows:

RQ1.1. Are these political leanings stable or do they change over time?

3. Sample and method

To answer to the research questions above we first selected a random sample of Twitter users that participated in political debate during the election campaign in Spain in November 2019 using the neutral hashtag #10N in at least one of the messages they published. Conversations around neutral hashtags in election campaigns are considered to allow researchers to gather messages from all the political parties and from all the main media outlets, as well as to avoid strong correlations with political ideologies (Cohen & Ruths, 2013; Guerrero-Solé, 2018). While a total number of 230,555 users participated in the #10N debate, we randomly selected 8,463 of them. Afterwards, we collected the weekly activity of these 8,463 randomly selected users for 14 weeks, from March, 14 to June, 21 2020 using the Twitter API. This process resulted in a final sample of 8,028,673 total posts, of which 5,545,341 were retweets, and 2,483,332 tweets and replies.

The next step was to classify the 1,000 most retweeted users for each of the 14 weeks analysed using previous information we held about them, as well as the information they published on their Twitter profiles. 3,538 users were among the 1,000 top retweeted users at least in one of the fourteen-week periods. We classified them as (1) politicians or political party accounts, (2) media outlets, (3) journalists, and (4) other users. Table 1 shows the number of users in each category. Once the users were classified, we labelled the retweets by the type of the user retweeted. As a result, 2,005,443 retweets to classified users were labelled while 3,539,898 were retweets to none classified users.

Table 1. Top retweeted users in the sample by type.

Type	Number of top retweeted users
Parties	
UP	124
PSOE	161
Cs	140
PP	139
Vox	93
Media	180
Journalist	254
Other users	2,447
Total	3,538

Source: Own elaboration.

Among the media outlets identified, we selected the most retweeted Spanish news media during the 14 weeks as well as the accounts of the five Spanish national parties with a large representation in the Spanish Congress, i.e., the left-wing United We Can (UP, 35 deputies), the Spanish Socialist Workers' Party (PSOE, 120 deputies), the centre-right Citizens (Cs, 10 deputies), the right-wing People's Party (PP, 89 deputies), and the far-right party Vox (52 deputies). Among the news media outlets identified (see Table A1 in the appendix), we found the 10 most popular online news media in Spain (*El Español*, 19 October 2020), i.e., *elmundo.es*, *lavanguardia.com*, *20minutos.es*, *elespanol.com*, *abc.es*, *elconfidencial.com*, *elpais.com*, *okdiario.com*, *huffingtonpost.es*, *eldiario.es*). In particular, *El Mundo*, *La Vanguardia*, *ABC* and *El País*, were already among the most read newspapers in Spain from mid-1990s, along with *La Razón* or *El Periódico* (Baumgartner & Chaqués Bonafont, 2015), also included in the list of the most retweeted news media outlets of the sample.

4. Measures of similarity

Having classified the users and the retweets we calculated the similarity matrix for the communities of retweeters of the selected news media and the communities of retweeters of the five Spanish parties. To do so, we first created the communities of retweeters of the parties by calculating the union of all the users that retweeted any account of a particular party. Thus, the community of retweeters A_j of a given party j , which has n members, is as follows:

$$A_j = C_{1j} \cup C_{2j} \cup \dots \cup C_{nj}$$

where C_{ij} refers to the community of retweeters of the i user that belongs to the party j .

Following Flack *et al.* (2020), we used the four different aforementioned similarity coefficients to calculate the overlaps between the communities of retweeters of news media and the communities of retweeters of parties. These coefficients are defined as follows:

4.1. Jaccard index

$$S_{ij} = \sigma(C_i, A_j) = |C_i \cap A_j| / |C_i \cup A_j|$$

where C_i refers to the community of retweeters of the i news media account.

4.2. Ochiai coefficient

$$S_{ij} = \sigma(C_i, A_j) = |C_i \cap A_j| / \sqrt{|C_i| * |A_j|}$$

4.3. Sørensen-Dice

$$S_{ij} = \sigma(C_i, A_j) = 2 * |C_i \cap A_j| / (|C_i| + |A_j|)$$

4.4. Szymkiewicz-Simpson coefficient

$$S_{ij} = \sigma(C_i, A_j) = |C_i \cap A_j| / \min(|C_i|, |A_j|)$$

We calculated the overlaps between the communities of retweeters of news media outlets and the communities of retweeters of the five political parties for the fourteen weeks in the sample. Afterwards, we normalized the scores obtained for each news media outlet, dividing them by the maximum score among those of the five political parties.

To obtain the measure of the news media ideology we then calculated the scores using people's perception of political leaning (CIS, 2019) as a parameter. According to CIS (2019), the perceived ideology, ranging from 1 (extreme left) to 10 (extreme right) was 2.4 for UP, 4.1 for PSOE, 7.1 for Cs, 7.8 for PP, and 9.4 for Vox.

Consequently, for a news media i , weekly political meaning WP_i was calculated as follows:

$$WP_i = (\sum_{j=1}^n L_j * S_{ij}) / \sum_{j=1}^n S_{ij}$$

where S_{ij} are the normalized similarity coefficients, n is the number of political parties, and L_j is the perceived political leaning of the party j .

Finally, the mean score of the news media's political leaning P_i was calculated as follows:

$$P_i = (\sum_{k=1}^n WP_k) / n$$

where n is the number of weeks.

5. Results

We applied the method described above and calculated the four indexes for each of the news media outlets. The mean scores of the news media's political leaning for the Jaccard index and the Sørensen-Dice coefficient are shown in table 2, while the mean scores for Ochiai and the Szymkiewicz-Simpson coefficients are shown in table 3. As can be seen in Table 2, the scores for Jaccard and for Sørensen-Dice are practically the same, and the news media outlets are in the same order when sorted by those two scores.

Table 2. The ideology of Spanish news media, from left (2,4) to right (9,4), using the Jaccard and the Sørensen-Dice coefficients.

	Mean Jaccard	SD	Mean Sørensen-Dice	SD
publico_es	3.608	0.181	3.665	0.193
eldiarios	3.810	0.221	3.904	0.242
_infolibre	3.953	0.368	3.951	0.367
elhuffpost	4.108	0.347	4.141	0.350
la_ser	4.430	0.456	4.474	0.455
sextanoticias	4.478	0.602	4.485	0.601
actualidadrt	4.601	0.443	4.621	0.442
el_pais	4.764	0.372	4.836	0.359
elperiodico	5.194	0.370	5.203	0.369
lavanguardia	5.388	0.485	5.396	0.481
efenoticias	5.824	0.378	5.831	0.371
24h_tve	5.950	0.471	5.954	0.462
20m	6.073	0.413	6.074	0.403
lavozdegalicia	6.187	0.563	6.187	0.561
marca	6.494	0.392	6.406	0.634
europapress	6.501	0.241	6.491	0.234
a3noticias	6.582	0.328	6.575	0.321
elconfidencial	6.905	0.413	6.889	0.404
elespanolcom	7.458	0.205	7.445	0.203
elmundoes	7.573	0.193	7.520	0.201
larazon_es	7.623	0.171	7.621	0.173
voz_populi	7.746	0.145	7.721	0.128

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abc_es	7.765	0.125	7.729	0.149
cope	7.924	0.096	7.914	0.100
libertaddigital	8.026	0.084	8.011	0.087
okdiario	8.071	0.055	8.020	0.062

Source: Own elaboration.

The same happens for the Ochiai and the Szymkiewicz-Simpson coefficients. When compared to Table 2, we observe slight changes both in the value of the scores and in the order of the news media outlets.

Table 3. The ideology of Spanish news media, from left (2,4) to right (9,4), using the Ochiai and the Szymkiewicz-Simpson coefficients.

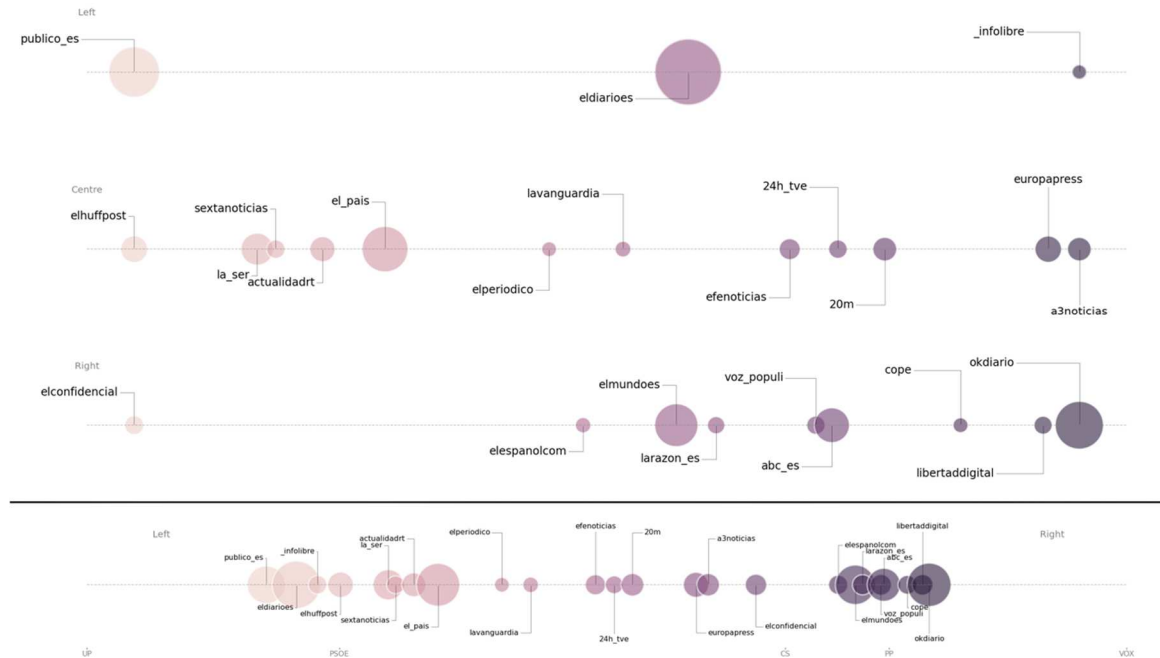
	Mean Ochiai	SD	Mean Szymkiewicz-Simpson	SD
publico_es	3.587	0.182	3.459	0.160
_infolibre	3.844	0.349	3.714	0.323
eldiarios	3.854	0.241	3.717	0.234
elhuffpost	4.050	0.350	3.925	0.352
sextanoticias	4.344	0.602	4.215	0.589
la_ser	4.389	0.452	4.254	0.462
actualidadrt	4.460	0.424	4.276	0.419
el_pais	4.775	0.349	4.624	0.373
elperiodico	5.066	0.372	4.916	0.392
lavanguardia	5.245	0.477	5.101	0.521
efenoticias	5.706	0.364	5.571	0.354
24h_tve	5.829	0.479	5.685	0.515
20m	5.936	0.424	5.788	0.460
lavozdeg Galicia	6.048	0.571	5.916	0.589
marca	6.252	0.667	6.109	0.722
europapress	6.395	0.237	6.269	0.244
a3noticias	6.473	0.340	6.343	0.366
elconfidencial	6.806	0.417	6.719	0.411
elespanolcom	7.395	0.208	7.333	0.222
elmundoes	7.492	0.203	7.431	0.214
larazon_es	7.576	0.198	7.517	0.239
voz_populi	7.692	0.162	7.645	0.180
abc_es	7.693	0.135	7.645	0.150
cope	7.887	0.111	7.858	0.125
libertaddigital	7.990	0.082	7.964	0.081
okdiario	8.003	0.062	7.970	0.068

Source: Own elaboration.

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To gain a better understanding of the distribution of the news media in terms of ideology, we plotted the results of the ideology score for the Jaccard index (Figure 1).

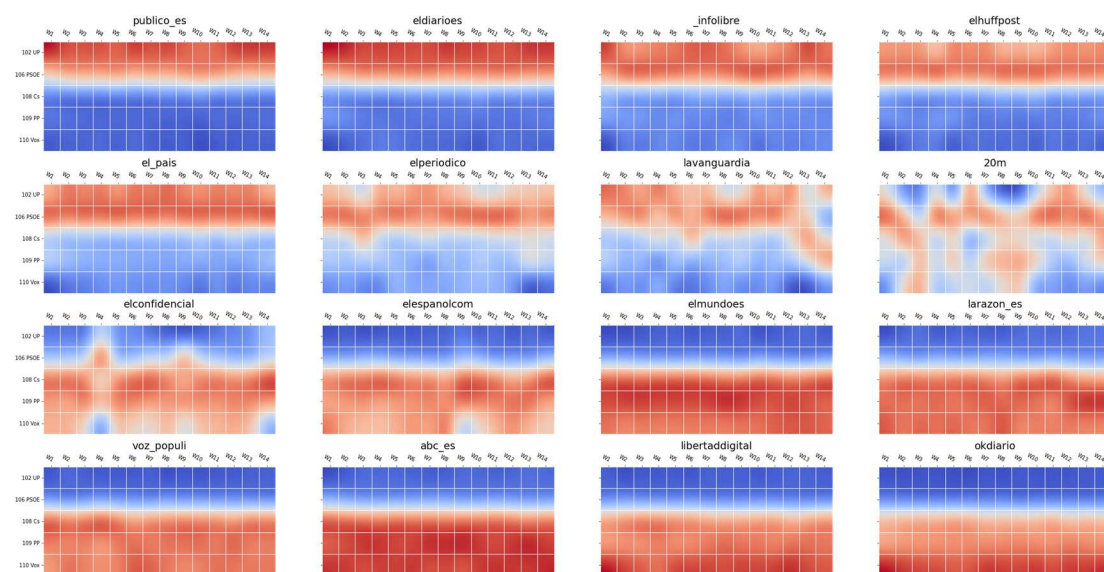
Figure 1. Ideological position of the most retweeted Spanish newspapers on Twitter.



Source: Own elaboration.

To answer to the question R1.1., we also plotted the evolution in time of the similarities between each newspaper and the five main political parties, again using the Jaccard coefficient.

Figure 2. Ideological leaning of the most retweeted Spanish newspapers in Twitter over time.



Source: Own elaboration.

Figure 2 shows the intensity of the similarity (proximity) between the news media and the 5 political parties during the 14 weeks analysed. The red colour indicates proximity between news media and the party; conversely, the blue colour indicates distance between the news media and the party. As it is shown in Figure 2, the most polarized newspapers (those at the top and those at the bottom of the image) follow a constant pattern, while the most centred ones (*elperiodico*, *lavanguardia*, and *2om*, in particular) show some changes across the fourteen weeks analysed.

6. Conclusions

The news media is said to shape individuals' perceptions of reality and impacts on their political attitudes and beliefs. In spite of the constant claims to objectivity, impartiality and independence, the news media and journalists are, in general, politically biased (Patterson & Donsbach, 1996). These biases are particularly acute in countries with polarized pluralist media systems (Hallin & Mancini, 2004), as is true in the Spanish context. However, the proximity between the news media and parties is considered to be subjective and difficult to measure (Falck *et al.*, 2020). Scholars have often found difficulties in asserting the proximity of media outlets, and in particular the news media, to political parties. Researchers have proposed different methods to measure the political ideologies of the news media such as by analyzing content, links between politicians and media owners or surveys (Haselmayer, Wagner & Meyer, 2017; Schena, Almiron & Pineda, 2018; Pew Research, 2018). Social media and the datafication of the interaction between media, politicians and citizens has eased the process of the identification of users' latent attributes and political leaning.

This research adds a new method to measure the political ideology of the news media in Spain by means of an indirect relationship between news media and political parties. By drawing on users' consistent retweeting behaviour when it comes to political issues (Wong, Tan, Sen & Chiang, 2016; Guerrero-Solé & López-González, 2019), we propose a way to identify the political leaning of the news media based on the overlaps between the communities of retweeters of the news outlets and those of the five Spanish national parties. These overlaps are finally weighted with people's perceived ideology (from left, 0, to right, 10) of the five Spanish parties (CIS, 2019) to finally obtain a score of the ideology of the news media.

In doing so, we followed the work undertaken by Falck *et al.* (2020), and calculated the overlaps by using four different similarity indexes, i.e., Jaccard, Ochiai, Sørensen-Dice, and Szymkiewicz-Simpson. Our results show that the final score for ideology doesn't depend on the similarity coefficient chosen, and that when sorted by this ideology score, the order of the news media analysed is almost the same for all the four coefficients.

Past research has already observed that the news media in Spain is politically biased (Labio & Pineda, 2016), and that certain politicians in social networks tend to retweet or link to certain news media outlets (Ceia, 2020). Our results overlap with previous research and are consistent with the answers provided by people when asked about their perceptions of the ideology of Spanish news media (see Pew Research, 2018), or with the results reported in content analysis researches (Labio & Pineda, 2016). As a result, we have found that *publico.es*, *eldiario.es* and *infolibre* are the news media that, according to our method, are closer to the left-wing parties UP and PSOE, while *elespanol.com*, *elmundo.es*, *larazon.es*, *vozpopuli*, *abc.es*, *libertaddigital* and *okdiario* are the news media closer to the right-wing parties Cs, PP and Vox. These results are also in line with those reported by Ceia (2020) who found that *public.es* and *eldiario* were the most retweeted news media outlets by Podemos, *el_pais* the most retweeted by PSOE, *elespanol.com* the most retweeted by Cs, *libertaddigital* the most retweeted by PP and, finally, *OKDiario* was the most retweeted news media retweeted by Vox.

However, unlike the aforementioned works, our research provides a concrete score for the ideology of the Spanish news media that allows us to place outlets on a left-right axis. In

this sense, we found that only a few outlets were in what we can consider the centre of the axis, with a sensitive overlap of their respective communities of retweeters with the communities of retweeters of the five political parties. In particular, only three newspapers, *elperiodico*, *lavanguardia* and *20m*, can be considered as 'centre' media outlets, along with two press agencies (*efenoticias* and *europapress*), and the Spanish public news channel *24h_tve*. In addition, the rest of the news media analysed are distributed in two clearly defined clusters, as can be seen in Figure 1. This distribution is in line with previous results confirming that voters of right-wing parties tend to read, listen or watch (in this case, retweet) certain news media, while voters of left-wing parties tend to read other news media. As a consequence, the results support the thesis of those who consider the Spanish media system as a pluralist polarized one (Hallin & Mancini, 2004) in which ties between media outlets and political parties are strong. Consequently, these results should raise awareness on the hypothetical increase in political polarization (Kim & Park, 2012) caused by the systematic exposure of citizens to media contents that are in tune with their previous attitudes and beliefs, and on the intensification of political biases (Conover *et al.*, 2011).

Since our results are in agreement with previous studies on the ideological positioning of the Spanish news media, we can conclude that the method used, based on the consistent behaviour of retweeters (Wong, Tan, Sen & Chiang, 2016), and on the similarities between communities of retweeters (Guerrero-Solé, 2017) may be used to measure the ideology of any media outlet and its proximity to political parties. Even more if we found that the overlaps between the communities of retweeters of news media and of political parties tend to be constant over time (Figure 2).

Finally, it is worth stressing again that unlike previous studies (Ceia, 2020) our results are not based on direct interactions between politicians and news media outlets, but on indirect measures that depend on Twitter users' behaviour. In this sense, the link between media and parties, and the ideology scores are based on readership patterns. These readership patterns, more than media ownership, were according to Baumgartner and Chaqués Bonafont (2015) good predictors of the link between media outlets and political parties.

7. Limitations and future research

This research is not without its limitations. In particular, we should recognise the bias introduced by the sample of users selected. In spite of the fact that conversations such as #10N may be considered as neutral, and that we assume that all relevant political actors and media outlets participate in these debates, there is a strong trend on the part of political parties to avoid these neutral debates and to label their tweets with their own hashtags, usually party hashtags (Mas Manchón & Guerrero-Solé, 2019). As a consequence, some of the parties could be underrepresented in the sample. This underrepresentation could have an impact on the results. Accordingly, more research based on diverse samples is needed to validate the method and the reliability of the measures of ideology. Furthermore, we should also analyse other samples from other particular political processes and countries to validate the method.

Despite the aforementioned conclusions, this research is also limited by one of the main assumptions of the method used to measure what we have called the ideology of the media outlets, which can be considered as a fuzzy or even misleading concept. Although previous research has shown that in political discussions people tend to forward or retweet those messages that are in tune with their own ideology (Wong, Tan, Sen & Chiang, 2016; Stefanov, Darwish, Atanasov & Nakov, 2020), we must be conscious that the assumption can hardly be generalized. In particular, when dealing with news media stories, that can be read and spread by active audiences that do not necessarily align with the assumed or presumed ideology of the media. Nevertheless, the method has proved to be in the identification of clusters of media outlets according to the political retweeting behaviour of their own retweeters.

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Appendix

Table A1. List of the most retweeted media outlets in the sample.

Handle	Name	website	Followers
_infolibre	infoLibre	infolibre.es	319,2K
20m	20minutos	20minutos.es	1,4M
24h_tve			
324cat	324.cat	324.cat	642,6K
a3noticias	Antena 3 Noticias	antena3.com/noticias	1,9M
abc_es	Diario ABC	abc.es	2M
actualidadrt	RT en Español	actualidad.rt.com	3,5M
catalunyaradio	Catalunya Ràdio	catradio.cat	254,9K
cope	COPE	cope.es	453,3K
debatalrojovivo	Al Rojo Vivo	lasexta.com/programas/al-rojo-vivo/	548,4K
diariara	Diari Ara	ara.cat	527.6K
efenoticias	Agencia EFE	efe.com	1,8M
el_pais	El País	elpais.com	7,8M
elchiringuitotv	El Chiringuito TV	https://mega.atresmedia.com/programas/el-chiringuito-de-jugones/	1,7M
elconfidencial	El Confidencial	elconfidencial.com	898,2K
eldiarioes	elDiario.es	eldiario.es	1,2M
elespanolcom	El Español	elespanol.com	419K
elhuffpost	El HuffPost	huffingtonpost.es	497K
eljueves	El Jueves	eljueves.es	1,2M
elmundoes	El Mundo	elmundo.es	3,8M
elnacionalcat	ElNacional.cat	elnacional.cat	164,3K
elperiodico	El Periódico	elperiodico.com	688,9K
elpuntavui	El Punt Avui	elpuntavui.cat	258K
eltorotv	El Toro TV	eltorotv.com	149.5K
espejopublico	Espejo Público	antena3.com/espejopublico	298.5K
europapress	Europa Press	europapress.es	1,3M
la_ser	Cadena SER	cadenaser.com	1,2M
larazon_es	La Razón	larazon.es	521K
lavanguardia	La Vanguardia	lavanguardia.com	1,2 M
lavozdeg Galicia	La Voz de Galicia	lavozdeg Galicia.es	379.2K
libertaddigital	Libertad Digital	libertaddigital.com	226K
marca	Marca	marca.com	5,3M
maticatradio	El matí de Catalunya Ràdio	catradio.cat/mati	179K
nacioidigital	NacióDigital	nacioidigital.cat	208,7K
okdiario	okdiario.com	okdiario.com	327,6K

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publico_es	Público	publico.es	1M
rac1	RAC1	rac1.cat	307,9K
rtvenoticias	RTVE Noticias	rtve.es/noticias	1,4M
sextanoticias	laSexta Noticias	lasexta.com/noticias/	1,1M
vilaweb	VilaWeb	vilaweb.cat	317,5K
voz_populi	Vozpópuli	vozipopuli.com	129K

Source: Own elaboration.