Social media and agenda setting: narrowing or expanding the consensus on the public agenda?

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Abstract

This paper fills in a gap in the academic literature by paying attention to the fragmentation effects of social media. Preserving a common public agenda is important for social integration, for minimizing social cleavages and reducing polarization. Although observers have warned of the risks of social media for audience fragmentation, research has not devoted much attention to the role of these platforms of news distribution in preserving the common agenda. We contribute to this literature by measuring the effects of social media over the public agenda at the level of public cognitions. A second contribution of this study is that we use unobtrusive data, i.e. observed online behaviour, to measure consumption of news. We relate the effects of social media as referral to news, to individuals' personal agendas. We find that when Facebook is a relevant news referral, it reduces the amount of agreement about a common public agenda. Our results also suggest that different social media platforms might have varying effects on the public agenda.

Introduction

Social media are disrupting old models of agenda setting power by decentralizing the distribution of news, multiplying the number of sources of information and by opening a venue for citizen participation in news production, distribution, and consumption. Recent evidence points that through secondary gatekeeping (Singer, 2014) social media might be creating a social news agenda different from the traditional media (Bright, 2016).[1] However, in spite of its ongoing expansion, we still know very little concerning the impact of social media platforms on citizens' perceptions over the public agenda, defined as "the priority of issues that the public perceive as important" (Singhal & Quinlan, 2007:185).

Much research on digital media and agenda setting has focused on how different media (mainly, traditional and digital media) interact to shape the news agenda. Observers have warned that a more fragmented media environment will lead audiences to isolate themselves from the larger public discourse and, in the process, undermine the very notion of a common public agenda. The lack of a common agenda will, in turn, endanger social integration (Takeshita, 2006), increase political polarization (Chaffee and Metzger 2001, Hollander 2008, Tewksbury 2005) and maximize social cleavages (Shaw & Hamm 1997). It is not difficult to imagine a political scenario in which public agenda fragmentation translates into fragmented parliaments, seriously compromised governances and minor, anti-system parties getting a chance to destabilize democracies.

The amount of attention devoted to the agenda-setting effects of traditional and digital versions of legacy media sharply contrasts with the few works focusing on the effects of social media. This study aims at filling this gap by paying attention to the

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[1] Audiences are considered "secondary gatekeepers" when they become active once the mass media process stops, and when they tell journalists via web analytics what stories are popular, ultimately shaping editorial decisions (Shoemaker and Vos 2009: 7).

fragmentation effects of social networking sites and measuring them at the level of individuals' perceptions. More specifically, the study tests whether news consumption through social media affects citizens' cognitions over the political agenda and particularly whether it reduces social agreement over the large public discourse.

A second contribution of this study is using unobtrusive (i.e. observed) data from the web to measure social consumption of news – our main explanatory factor. Most studies looking for social media effects on opinion rely on survey data (Gil de Zúñiga, Weeks, & Ardèvol-Abreu, 2017; Vaccari et al., 2016; Valeriani & Vaccari, 2015). Here we combine survey and online browsing tracking data to study the impact of social consumption of news on the public's perception concerning the most important problems (MIPs) of the day. We aim at relating observed use of social media in news consumption and, in particular, use of social media platforms as news referrals, to individual agendas (Althaus & Tewksbury, 2002). We argue that this novel research design will overcome well-known recalling issues to measure news consumption (Prior, 2009).

The paper starts with a literature review on the agenda-setting effects of digital media, which evidences a lack of attention to social media. The research design follows, which highlights the value of our direct measures of exposure for digital media use, obtained through tracking online behaviour. The presentation of the estimation results for our dependent variable (common public agenda) and a discussion of its implications close the paper.

Social Networking Sites and Public Agenda: Related Work and Empirical Expectations

Agenda setting describes the ability of news media to influence the salience of topics in the public agenda, which in turn refers to the concerns of average citizens. Although in the old days the (mass) media were shown to have a central role in agenda setting because they had considerable and monopolistic leverage over the topics that people thought about (M. E. McCombs & Shaw, 1972; Williams & Carpini, 2004), this might have changed with the emergence of online media. Online media have allegedly undermined the traditional agenda-setting model (Takeshita, 2006). In the first place, by expanding the number of media outlets and information sources. Unbounded information has created opportunities for nonmainstream political actors to influence the political news agenda (Kutz, 1998, quoted in Williams & Delli Carpini, 2004). Besides, digital media have given citizens a more active role in the production, distribution and consumption of news (Buns, 2003; Goode, 2009; Singer, 2014; Trench & Quinn, 2016; Williams & Carpini, 2004), creating a two-step gatekeeping process involving news visibility and value (Singer, 2014).

These changes, in turn, have generated much discussion about the consequences of this more decentralized agenda-setting process, mainly about the risk of audience fragmentation. Fragmentation is a concern from a normative point of view because it can erode the "common ground" that facilitates social integration, social consensus and bridges social cleavages (Chafee & Metzger, 2001; Hollander, 2008; Tewksbury, 2005; Shaw & Hamm, 1997; Takeshita, 2006, (Sunstein, 2009). Although some scholars acknowledge that a more decentralized and fragmented media environment might also have some positive consequences –e.g., diversifying and expanding the public agenda (Chafee & Metzger, 2001: 375), the prevailing view is that fragmentation "will make

agreement among respondents over the 'most important problems' extremely unlikely" (p. 374), undermining the social glue that holds democratic societies together (Sunstein, 2009). Moreover, fragmentation is likely to create audiences that are under-informed about the nation's central issues, and therefore to foster their alienation (Fonseca 2015)[2]

However, most literature examining the role of online media in news consumption and audience fragmentation has ignored the role of social media. And this despite the fact that a vast amount of news consumption is now taking place through social networking sites and that both algorithms and the more active role of citizens in information selection in these platforms might be fostering a parallel (social) media agenda, creating (social) "news gaps" (Bright, 2016).

Most studies on social media and social fragmentation have focused on segregation, either concerning the ties (i.e., peers and friends) that people choose to have online –i.e., homophily (Colleoni, Rozza, & Arvidsson, 2014; Conover et al., 2011), topic conversation (Barberá, Jost, Nagler, Tucker, & Bonneau, 2015), or types of media diets (Bakshy, Messing, & Adamic, 2015; Flaxman, Goel, & Rao, 2016) through these platforms. Furthermore, most research inquiring about the agenda-setting power of social media have used an inter-mediate perspective (Meraz, 2009): they have focused on who influences who in the construction of the public agenda by looking at the reciprocal influences between traditional and social media (Chu & Fletcher, 2014; Cornfield, Carson, Kalis, & Simon, 2005; Farrell & Drezner, 2008; Groshek & Tandoc, 2017; He, Zha, & Li, 2013; Meraz, 2009; Reese, Rutigliano, Hyun, & Jeong, 2007; Sayre, Bode, Shah, Wilcox, & Shah, 2010).

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[2] From a more optimistic perspective, a fragmented audience, with little common agenda grounds or little correspondence with media agenda might imply a less manipulated citizenship, therefore freer (Brubaker 2008) .

Finally, more directly connected to our work, some studies look at the agenda (or topic) diversity in social media (Park, Ko, Lee, Song, & others 2013), analyse first and second-level agenda setting in Twitter (Ceron, Curini, & Iacus, 2016), or examine aggregate patterns of news sharing in social networking sites and how they shape the news (social) agenda analyse first (Bright 2016). None of these works, however, tests the agenda–setting power of social media focusing on citizens' cognitions over the public agenda. This, despite the growing importance of social media as platforms of news consumption and distribution. [3]

There are reasons to expect these new and growing patterns of news consumption might affect individuals' personal agendas and hence, the extent to which people share common ground for public discussion. First, the dissemination of news is not social media's primary function (Flaxman et al., 2016). In a study using direct measures of news consumption through social media, Flaxman et al. (2016) find that only 1 in 300 clicks of links posted on Facebook lead to substantive news articles; the vast majority of these clicks, they find, go to video – and photo-sharing sites. Hence, even if more people have some exposure to news through social media, entertainment, sport and other forms of soft news continue to dominate information exchanges in these platforms, something that might not help awareness concerning the public agenda.

Second, social media might erode the public agenda by reducing people's capacity to retain the MIPs if it prompts more passive ways of consuming news. Recent research finds that social media use is positively associated with an attitude of not actively looking for news but expecting news "to find" the user, the so-called "news-find-me" type, which in turn has been found to be positively associated with less

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[3] 63% of Americans declare getting news from social media according to the Pew Research Center (Gottfried & Shearer, 2016).

political knowledge (Gil de Zúñiga et al., 2017). Additionally, exposure to online news through these platforms might have a direct impact on the public agenda, through learning. Studies found that consuming news online as opposed to consuming them in printed media had an impact on individual agendas by reducing people's capacity to remember certain issues (Althaus & Tewksbury, 2002).

Last, but not least, an alternative way by which news consumption through social networking sites might affect the public agenda is through algorithms and citizen journalism. Although much of the news content shared in these platforms comes from mainstream media (Newman, 2011; Bright, 2016), both algorithms and users play an active role in information selection in these platforms. Algorithms select the news that users get to see in their news feeds (Bakshy et al., 2015). We do not know how algorithm news curation fully operates. We do know that this selection is partially based on users' past choices and tastes. Moreover, recently, changes in Facebook algorithms have resulted in prioritizing friends and family communication over professional news content (Nick Newman, Fletcher, Kalogeropoulos, Levy, & Nielsen, 2017). This in combination to the rising preference for paths to news that includes algorithmic curation, is making editorial news selection less relevant. And, in turn, it increases the likelihood that personal agendas different from those set by news media might be more prevalent. Moreover, users decide which stories and news they will share with others, making editorial decisions concerning news value and determine news visibility (Singer, 2014). And by having an impact on news visibility, users decisions might also help to create a parallel news agenda if people systematically select types of news that are different from the mainstream media news agenda (Bright, 2016).

In fact, recent research shows that the kind of issues that gain prominence in social media platforms systematically differ from those emphasized by the traditional

news agenda. Bright (2016) shows that some of the issues that are less shared in social media (i.e., law, crime, and family issues; accidents and disasters) tend to be preferred reading topics in the traditional media. This, he argues, creates a "social news gap" between news reading and news sharing preferences that "will make news consumed through social media qualitatively different from news consumed directly through online platforms" (p. 344). He also finds, for example, that issues related to politics tend to be less visible in social media than in their traditional counterparts.

In sum, several factors might account for a negative impact of social media on the public agenda. First, most of the content that people encounter (and consume) in social media platforms concerns soft not hard news (that is, they advise or entertain the reader forgetting about a factual approach); second, social media might foster a less active behaviour with regards to news-searching, reducing (political) learning; finally, recent research on news sharing patterns in social media finds that people tend to select and share news that differ from the mainstream media, creating an alternative social news agenda. Based on this discussion, we expect social media to shape a slightly different news agenda and exposure to news through social media to have a negative effect on the common agenda. This leads to our first hypothesis:

H1: News consumption through social media will have a negative effect on the common agenda

Yet we would expect to find differences across social media platforms. Not all social platforms are alike. Twitter , which is the third most used social network for news consumption (10%) after Facebook (47%) and Youtube (22%) in most of the 36 countries studied by the Digital News Report (Nick Newman et al., 2017), has been

seen to have special characteristics. In particular, to be more "newsy" than other social media platforms or to better resemble an information-sharing network than a social network (Ceron, 2015; Colleoni et al., 2014; Groshek & Tandoc, 2017; Kwak, Lee, Park, & Moon, 2010). The fact that Twitter is a non-reciprocal social network –one in which users can follow others without having to be followed back– and that message extension is restricted to 140 characters resembling news headlines, seem to shape its characteristics as an information dissemination medium rather than a social networking service (Kwak et al., 2010).

This distinctive character of Twitter reflects also in the high speed of sharing after publication (Bright, 2016) and in the centrality of mainstream media in information exchanges. A recent study showed that during the French presidential elections in 2017, 88% of the news-related tweets about the campaign originated with or included explicit reference to traditional media (Majó-Vázquez, Zhao, & Nielsen, 2017). Hence, if mainstream news is "the lifeblood of topical social media conversations" (Newman, 2011), this is even more the case for Twitter. Furthermore, Kwak et al. (2010) find that 85% of the topics discussed in Twitter are headline news or persistent news in nature. Park et al. (2012) show that topic discussion in Twitter is highly concentrated on a few topics, and more importantly, consistent with Kwak et al. (2010), they find that there is a high degree of convergence between social media's trending topics and top headlines and news in the traditional media. In a study of the Italian Twittesphere, Ceron et al. (2016) show that legacy media still keep their first-level agenda-setting power, although they also show that mainstream media have lost much of their power in framing topics (or second-level agenda-setting). Other studies, using different methodologies such as network analysis, find that audiences are challenging traditional gatekeepers as influencers in processes of news dissemination

and discussion in Twitter (Groshek & Tandoc, 2016). In spite of these results, when looking at topic frequency, much research agrees that mainstream media still retains its capacity to impose the topics that concentrate most attention in Twitter discussion (Ceron et al., 2016; Kwak et al., 2010). Based on these results, we would expect the social news agenda in Twitter to be more closely aligned to the traditional news agenda. Hence, we would expect exposure to news through Twitter to have a positive effect on the common agenda:

> *H2: News consumption through Twitter will have a positive effect on the common agenda*

Data and Measures

To investigate how social media affect the public agenda this study uses two interdependent sources of data. We use survey data to measure individuals' perceptions of the MIPs and their tracked news consumption activity, what allows us also to identify referrals to news i.e., distinguishing between direct or referred audience through social media. The survey was conducted in Spain, where 58% of people use social media as a source of news (Newman et al., 2017). Although social media use for news has recently dipped in this country and slows down in favour of messaging applications, it rivals printed newspapers since 2015 (Newman et al., 2017).

Participants in our study are part of an opt-in panel of a Spanish market research firm, which worked with us on all aspects of the sample and the implementation of the survey. Recruitment was done using online contacts and offering incentives for completing structured questionnaires on their personal electronic devices (home computers, tablets, or cell phones). We targeted a sample of 1000 people and the final

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response rate was 75%, which is a satisfactory figure and in line with the tendencies reported in the academic literature (Cook, Heath, & Thompson, 2000; Krosnick, 1999) . We retained 40,8% of the subjects for our tracked sample. A total of 408 individuals explicitly agree to share their anonymized browsing history for our study. The figure accords with previous research analyzing individual observed digital news consumption (Guess, 2016; Guess, 2015). All our participants answered a first questionnaire from January to February 2015 taping different socio-demographics. A second survey was administered from February to April 2015 where people in our panel were invited to answer questions about the most important problem.

As for the sociodemographic characteristics of our sample, their age ranges between 18 and 74 (M=36, SD=13.73). In total, 49% are female. Education levels vary between primary studies and college. The largest group completed a college degree (57%), closely followed by those with secondary studies (45%). These figures match the characteristics of the Spanish online population (Robles, Molina, & De Marco, 2012). Despite these similarities, we must refrain from making overgeneralizations from our final sample to the Spanish online population. Foremost, people who voluntarily accept being tracked are generally less concerned about privacy. Yet we can see this attitude as an advantage and assume that they will not modify their news consumption routines as a result of our study. Notably, our subjects agreed to being tracked long before we started the study, which may have also helped to mitigate any initial change in their regular behavior.

Despite acknowledging the challenge of establishing representativeness of this sample, we follow previous studies (Flaxman et al., 2016) to establish a measure of representativeness with regard individual's online behavior when it comes to navigate news information. Hence, we compare the list of the top 20 most visited news sites by

our tracked sample with the one provided by Alexa (Alexa Internet, 2014) , a global online audience meter, for the Spanish online population. We obtained a strong correlation score, which equals .81. This figure speaks for the representativeness of the news consumption behavior of our pool of participants as the patterns of news consumption of our sample closely resemble that of the Spanish population which consumes news information online.

Our sample targets all individuals of the Spanish online population, except for those living in Catalonia. At the time we launched our study, one issue clearly marked the public agenda in Catalonia, in stark contrast to other Spanish regions: the prospects of becoming an independent state.[4] Avoiding this region helps us to assess the impact of the digital media on the public agenda in everyday life instead of during major political events, which tend to more easily draw people together around short-lived problems (McCombs & Zhu, 1995).

To measure the public agenda we borrowed the standard open-ended questions for the nation's MIPs, largely used in this research field (M. McCombs & Zhu, 1995). We asked our respondents "What do you think is the most important political or social problem in Spain?" [5]. Then we repeated the same question for the second and third MIPs. Finally, they were asked: "Could you tell us whether there are any other important political or social problems in Spain?". In total, subjects could provide up to 13 MIPs, although our sample reported 5.9 (full sample) and 6 (tracked sample) on average. The open-ended answers were coded by two researchers following the Policy

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[4] In a very short period of time, people in support of independence in Catalonia almost tripled, moving from 14% in 2006 (Muñoz & Tormos, 2015) to around 41% in 2015 whereas the Spanish population did not perceived this issue as important. Due to this exceptional situation, we did not include this region in our sample.

[5] Respondents could skip this and the following questions if they wanted to. In total, 9,789 answers were coded. The percentage of agreement between coders for each answer ranged from 94.82% to 77.02% with an overall intercoder reliability coefficient of 85% agreement.

Agenda Project codebook[6]. Then, we identified the top 3 MIPs mentioned in our sample, which were corruption, unemployment and politicians.[7] Next, we calculated for each individual how many of these 3 problems he or she had mentioned.[8] Finally, we created a dichotomous indicator of common public agenda which takes the value 1 if the individual mentions among all the recalled problems the three "main problems" identified by the sample. This identifies 19.6% of individuals in our sample as fully reproducing the common public agenda.

Then, we use online tracking data to identify referrals to news, and particularly whether people access news media through social media. We have online tracking data for 408 individuals over a period of three months (27/01/2015 to 27/04/2015). From these data, we can trace the sequence of navigation of each individual during the whole period of study, and identify the sites they visited before visiting a news media. We

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[6] The codebook was developed following the methodology of the Comparative Agendas Project (www.comparativeagendas.net), which is an international network of scholars form 11 countries including the United States, Canada and the United Kingdom that analyses political, public and media agenda across time. We decided to use this codebook to allow future cross-national comparative studies. For more details on the codebook and the project, visit http://www.ub.edu/spanishpolicyagendas/datasetinstruments/

[7] The Spanish representative survey conducted by the Centro de Investigaciones Sociológicas (CIS) at the same time than our fieldwork indicates that our ranking closely reproduces the concerns of the average Spaniard. The "most important problem" during the spring of 2015 was unemployment, followed by corruption and the economy. In our survey, the most often mentioned issue when asked by the first and most pressing problem in Spain is corruption, followed by unemployment and claims against politicians and the government related to a deficient performance. The fourth problem mentioned by our sample (macroeconomics) is the third problem in the CIS ranking. The third problem mentioned by our sample (general claims against politicians) is the fourth problem in the CIS ranking. These similarities speak in favor of the representativeness of our sample, although participants in our study are in general less concerned about micro and macroeconomics and more about political issues than the average Spaniard. Appendix III displays a systematic comparison between the CIS ranking (March 2015) and our sample.

[8] Literature offers little basis for operationalizing this construct at the individual level. Yet, in assessing its validity, one has to consider that, on average, people can offer no more than 4 to 5 issues (Zhu, 1992) and there has not been an increase in people's carrying capacity across time (M. McCombs & Zhu, 1995). Furthermore, most of the studies that measure the public agenda have only asked about the most important problem in an open-ended question (Chaffee & Wilson, 1977; Neuman, 1990). Hence, we assume that our threshold, set at the top 3 most important problems, offers a valid conservative measure.

restrict visits to news media to a list of 42 outlets corresponding to the top most visited news outlets reported by Alexa.[9]

The next step was to identify when paths to news consumption originated at a social media platform (Twitter or Facebook). For this, we first identified when a visit to a social media simply preceded a visit to the 42 news media outlet tracked in our study. Note that a necessary condition for a site to be considered referral to news sources is time overlapping. In other words, there must be some time overlapping between site A and B, for the former to be referral to the latter. Hence, we labeled a site as a referral if the difference between the start time of navigation at the site of destiny (at t_{i+1}) and the start time of navigation at the site of origin (at t_i) is smaller than the duration (D) of navigation in the site of origin (t_i) (we add an extra second to account for the time of changing from one page to the next) or:

$$(SNt_{i+1}) - (SNt_i) < (DNt_i) + 1,$$

where SNt_{i+1} stands for the time of arrival to the site of destiny at $t+1$, SNt_i, for the time of arrival to the site of origin at t_i, and DNt_i, for the duration of the visit to the site of origin. If this condition holds, we can be reasonably sure that there is overlapping between the site of origin and destiny, which again, is a necessary condition for a site to refer the user to the next site.[10] We obtain then the proportion of news

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[9] Visits to these outlets represent approximately 85% of all observed visits to news outlets in our sample but only 4% of total observed visits, confirming that news consumption and political information is way down in people priorities when it comes to their activities online. This list does not include entertainment or specialized news outlets, such as sport or economic sources. More detail on the distribution and nature of the websites visited during our fieldwork can be found in Appendix II.

[10] Note however that session overlapping is only a necessary condition for referral, not a sufficient one: for referral to happen there must be session overlapping but session overlapping does not necessarily imply referral –i.e., the user might have the previous session open without this implying that the opened site has taken him/her to the next one. Thus, even though session overlapping is the best measure at hand for referral, it is an imperfect one because we cannot be certain that an opened session has actually worked as a referral for the next site.

media visits accessed via the two different social media under study i.e. Facebook and Twitter.[11] Note that for these proportion to take all their meaning should be read along with the total number of visits to news media outlets. Thus, we control also for this in our study.

The dichotomous nature of our dependent variable determines the estimation method, which is a logistic regression. As for the controls included in our model (see the Appendix I for the descriptive), we consider age, political interest, frequency of newspapers consumption, frequency of news consumption using the TV and the total amount of visits to digital news media. While there are not clear expected effects of age on common public agenda due to previous mixed results (Coleman & McCombs 2007), political interest is a well-known predictor of media use. Those who show a tendency to be highly interested in politics are more likely to develop richer information repertoires (Wolfsfeld, Yarchi, & Samuel-Azran, 2015). They are also more likely to learn about politics (Carpini & Keeter, 1997) and to remember or to acquire political information (Bode, 2016) and, hence, to develop an expansive public agenda. Political interest is assessed by asking, "How much you would say you are interested in politics. Very much, quite interested, hardly interested, or not at all?".

We have also controlled for the effects of the frequency of news consumption using TV or newspapers.[12] Past studies show that people's reliance on different media types might have different effects on people's perceptions of salient issues (Althaus & Tewksbury, 2002). Finally, we have also included an indicator of the total amount of

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[11] Although our data allow us to track visits from another social network, YouTube, we omit this referral in the present study due to the low number of observations: visits via YouTube represent only 2% of the referred visits to news media, while Facebook achieves a 15%.

[12] We have recoded all the controls to range from 0 to 1. Hence the regression coefficients indicate the effect of the maximum variation of each independent variable, with the exception of the proportion of news media visits accessed via Facebook or Twitter, which keep the proportion metric (0-100).

visits to news sites (from the ALEXA's list) that each individual visited during the fieldwork. This variable, measured through the observed number of visits to digital media outlets, would help us to control for the effect of social media as information referrals by individuals' general levels of information, sophistication and, indirectly, need for cognition[13]. Individuals visiting more often news websites are exposed to more and more diverse information, which might revert into a more fragmented personal public agenda, maybe deviant from mainstream perceptions of the countries' MIPs.

The next section presents the distribution of the visits to news media outlets by social media referral. We follow with an analysis of effects of social media as referrals for news information on the chances to coinciding with public's common agenda (i.e. to have mentioned at some point the three problems that the sample has mentioned the most). This analysis is complemented with additional descriptive evidence: a visual representation of the first MIP mentioned across different levels of Facebook usage -the most widespread social network in Spain for news and in our sample which again speaks for its representativeness; and a comparison of the ten most mentioned problems for those using Facebook and Twitter for news.

Analysis and results

Figure 1 provides preliminary evidence about news consumption patterns of our sample. More specifically, it displays which is the main referral i.e. Twitter or Facebook for each of the 15 most visited news outlets.

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[13] The need for cognition is the motivational disposition to enjoy and engage in effortful thinking (see Petty, Briñol, Loersch, & McCaslin, 2009). Previous research has found that this variable is predictive of online information consumption, as individuals with a high need for cognition prefer two-sided stories and more complex stories (Winter and Krämer 2012), therefore they are also probably more likely to visit more news media outlets.

Figure 1. Distribution of visits (%) to the 15 most visited sites referred by type of social media platform.
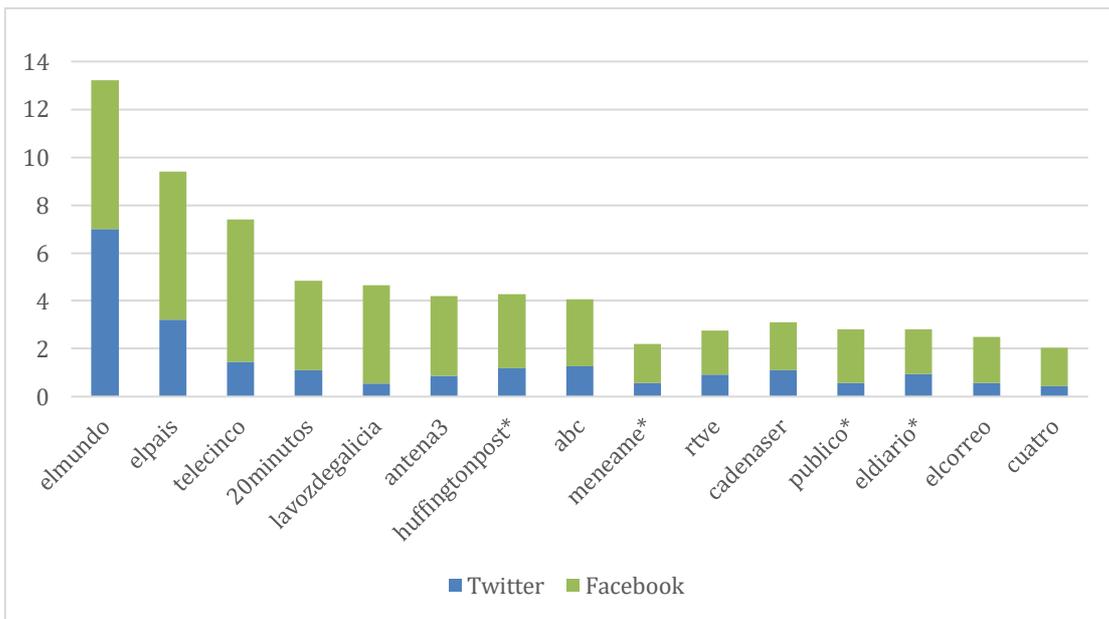
Note: N=3372 visits. The asterisk indicates digital-born media which in contrast to legacy media have shown a higher ability to make their content more shareable within social platforms (Riordan, 2014)

Two pieces of information stand out from Figure 1. First, Twitter is overrepresented as a referral for the two main mainstream media, especially for *El Mundo*. Twitter acts as a referral, on average, for 26,6% of the total visits to news outlets coming from social media platforms. This figure sharply increases for *El Mundo* as 48% of the visits of this news outlet originated in social platforms start on Twitter. For El Pais, Twitter refers 31% of the visits coming from social media platforms. The second important outcome from Figure 1 is that Facebook is more frequently the main referral for visits to outlets such as *Telecinco* and *Antena 3* that are also used for entertainment purposes. On average 63% of visits from social platforms to news media originated on Facebook

whereas 73% of the visits to Telecinco and Antena 3 originated in Facebook. These results suggest that social media platforms matter for visiting various kinds of news outlets: at one extreme, social networking sites such a Twitter tend to serve as referrals for mainstream outlets -online versions of traditional, mainstream newspapers-, while Facebook users seem to refer mainly to TV channels' websites, also rich in entertainment content. This would support our initial expectations concerning the varying effects of different social media platforms in the public agenda and should account for some of the differences we find across social networking sites (even if some are not statistically significant).

Table 1 shows the results of a logistic estimation of the probabilities of sharing the common public agenda of our sample.

Table 1: logistic estimations of the common public agenda

|	(1) **Individual variables**	(2) **Individual variables + media outlets referred by Social Platforms**
Individual controls		
Interest in politics	-.85+	-.81
	(.51)	(.53)
Age	1.02+	1.16*
	(.53)	(.56)
Freq. newspapers	-.25	-.27
	(.39)	(.40)
Freq. news on TV.	-.01	-.09
	(.42)	(.43)
News media outlets origin		
Prop. Facebook		-.04*
		(.02)
Prop. Twitter		.02
		(.02)
Total visits news media outlets		-.00
		(.00)
cons	-1.17**	-0.96*
	(.41)	(.44)
Pseudo R-Squared	.015	.033
N	408	388

Standard errors in parentheses

The results indicate a negative effect of interest in politics (which disappears when considering the navigation patterns regarding news media outlets). Hence, the more interested in politics, the less likely an individual is to mention the same set of national problems than the average citizen. The positive significant coefficient for age reads that older individuals tend to perceive the same main national problems than the average individual in our sample, which is 36 years. The frequency of news media consumption using the two most widespread offline traditional media (newspapers and television) has no significant effect, and neither does the total amount of visits to news media outlets.[14] As for the variables of our concern, and given that the effects of social media are controlled by the total number of visits for each individual in our survey, the coefficients for Facebook and Twitter should read as the effect of getting news information following links from these social media versus the effect of other indirect (e.g. Google) or direct (legacy and digital-born news media websites) sources. Therefore, all else kept equal, getting information through Facebook significantly reduces the common public agenda. The coefficient for Twitter has the expected positive sign but does not reach statistical significant, probably due to the low number of observations.[15]

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[14] The significant results for the negative effect of Facebook hold with other model specifications, such as other combination of individual variables (sex, education) or media consumption patterns (for instance, including Google and direct paths to news websites). For the sake of parsimony, the model keeps the number of independent variables at a minimum.

[15] We have alternatively considered jackknife estimations to test for the potential influence of outliers. Jackknifing consists of running the estimation n times (where n equals the individuals in the sample) taking one person out of the sample each time and recalculating the statistics. The results were virtually identical to the ones presented here, not affecting the significance or size of the effect for the two examined social media.

Figure 2 represents the predicted probabilities of sharing the common public agenda of our sample as a function of the percentage of news sites accessed through Facebook. Those who do not use Facebook at all to get information have a 23% probabilities to mention the exact main three problems identified by our sample. Those accessing about 20% of their news sites by following Facebook links have 13% probabilities to share this common public agenda. This figure drops to 4.7% if the individual access 50% of the total information websites visited during the time of our study though Facebook.

Figure 2. marginal predictions of the probabilities of sharing the common public agenda and access through Facebook
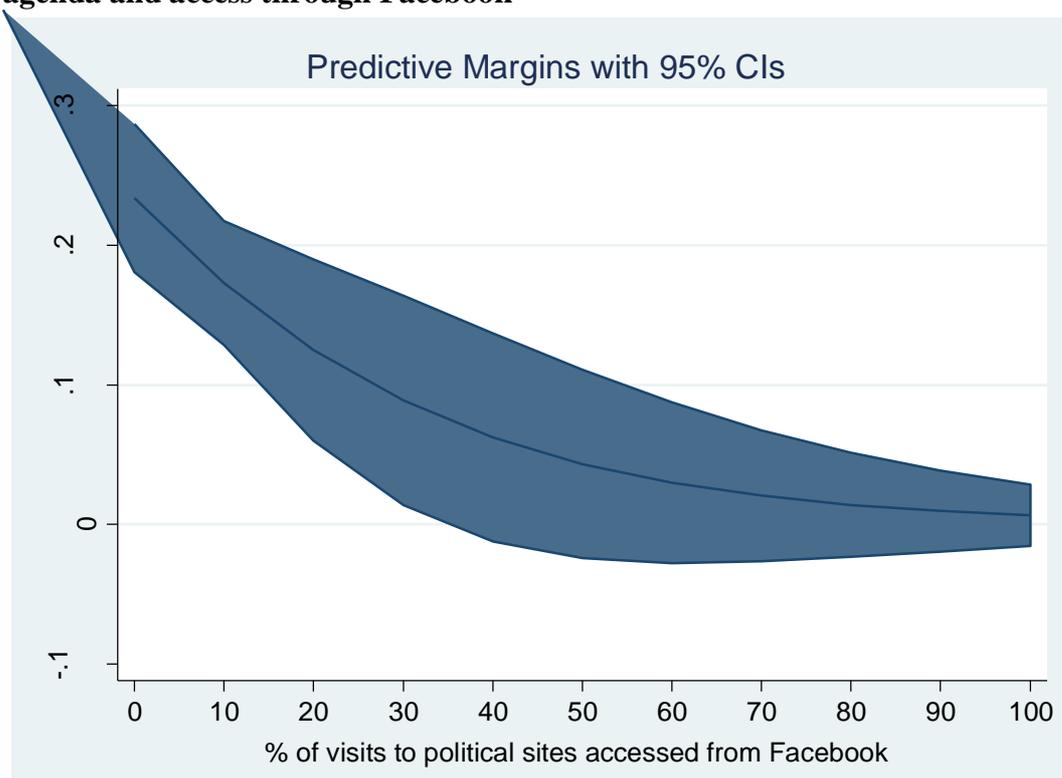
With regards to the other social networking site, Twitter, we find an effect that go in the expected direction (a positive coefficient for Twitter) although it does not reach statistical significance. Unfortunately, the low number of observed visits to news

referred from this social media platform (5% compared to 13% from Facebook) might help explain this lack of results.

Finally, we address citizens' concerns from a more qualitative point of view. Figure 3 displays two word clouds obtained with the open answers to the question on the MIP. The first panel displays the more frequent words (with a frequency higher than 4) for the subsample that used Facebook more frequently to obtain information. This is, for those whose percent of visits to news outlets via Facebook is higher than 2.8%, a figure that corresponds with the median of this variable. The second panel displays the other subsample, consisting of those that obtained information less often via this social networking site than the sample's median.

Figure 3. Word clouds for the first MIP by Facebook usage for news

Note: Left word cloud shows words mentioned in the first MIP by those who use Facebook for news more frequently and the right word cloud represents the same for those who barely use this platform for news. Stopwords and words mentioned less than 4 times are not included. Powered by https://wordart.com/ 215 individuals were referred more than 2.8% of the times to a news outlet by Facebook; 193 were referred less than 2.8% of the times.

Although it is difficult to interpret this kind of evidence, looking at the rankings those using less frequently Facebook –right hand side word cloud- to obtain information

tend to insist more in the economy, as they use more frequently words such as "crisis" or "budget cuts" (recortes). Also, they mention more frequently the party in government (PP) and the word "corruption". Finally, those using Facebook more frequently to get information –left hand side word cloud- refer to a wider array of problems including poverty, the health system and trust. In order to refine the evidence on citizens' concerns, we have coded the answers for the 408 individuals referring to the 10 most mentioned issues when asked about the three MIPs in Spain, following the labels suggested by the Spanish Policy Agenda project. The results are displayed in Table 2.

Table 2. Top 10 MIPs by frequency of use of social media platform

Most important problem	Full sample	Those using more FB as a referral	Those using less FB as a referral	Those using more TW as a referral	Those using less TW as a referral
1. **Government procurement, contracts and corruption**	0.78	0.78	0.79	**0.72**	**0.81**
2. **Unemployment**	0.73	**0.67**	**0.79**	0.69	0.75
3. **Claims against the government related to performance and leaders**	0.36	0.36	0.36	0.35	0.36
4. **General: combination of education problems**	0.35	0.35	0.35	0.36	0.34
5. **General: combination of health policy related problems**	0.29	0.30	0.29	**0.23**	**0.33**
6. **General: combination of economic, monetary and debt**	0.25	0.23	0.27	0.27	0.24
7. **Poverty and assistance for low-income families**	0.21	0.20	0.23	0.21	0.21
8. **Lack of values, incivility**	0.19	**0.23**	**0.15**	0.21	0.18
9. **General: related to the ministry of the presidency and the President/ Vice President**	0.17	0.17	0.17	0.16	0.18
10. **Immigration**	0.15	0.12	0.17	0.12	0.16

By far, the most worrisome issues according to our sample are corruption and unemployment. 78% and 73% of our sample respectively mention such issues when asked about the first, second and third most important problem in the country. 36%

complain about a poor government performance, 35% about education, 29% about healthcare and 25% about macroeconomic issues. Personal wealth and poverty follows with 21% of the sample mentioning it, followed by 19% worried about the lack of social values. The list closes with 17% mentioning the president or presidency as a major problem, and 15% concerned about immigration issues.

Bold figures indicate significant differences between those using more and less social media as referrals for news information. Four interesting patterns emerge. First, those using less Facebook are significantly more concerned about unemployment than those using this social media platform more frequently to get news. Also, those using more Facebook for news are significantly more concerned about their countrymen's lack of values. As for Twitter, those accessing news from this social platform are significantly less concerned about corruption and by healthcare than those using less this social media. At first sight, one would conclude that those accessing news more frequently through social media platforms are a privileged subsample, less concerned by unemployment or health care. Yet they are also significantly less worried about corruption -in general terms- and more about incivility. [16]A replication of the models presented in Table 1 with these 10 problems as dependent variables reveals no significant effects for the use of Facebook or Twitter as news sources. We can conclude, therefore, that the differences observed in Table 2 are probably due to systematic differences between individuals (namely, their age or interest in politics) that also explain partly their navigation habits and patterns.

Discussion

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[16] Note that this makes those using more Twitter and less Facebook for information purposes more similar to CIS representative samples, as they tend to be less worried about corruption and more about the economy and the unemployment.

Digital technologies have expanded to unprecedented levels the number of news outlets available for news consumption and opened venues for citizen participation in the process of news construction, and by so doing, are disrupting traditional models of agenda-setting and undermining the central role of mainstream media in old agenda-setting models. Many have claimed that these changes will reduce the amount of shared experiences among citizens, isolate audiences from the larger public discourse, and eventually, undermine the common public agenda. In turn, the lack of a common agenda might endanger social integration, increase political polarization and maximize social cleavages.

Although important fractions of the news that people consume today come from social media, the literature on online news consumption and audience fragmentation has vastly ignored social media effects over the public agenda. Furthermore, the scarce literature on agenda-setting and social media has tended to focus on intermediate agenda-setting or on how different media interact to affect the news agenda, without measuring social media effects on the public agenda through people's cognitions. Here we fill this gap. We contribute to the literature on agenda setting and audience fragmentation by (1) focusing on social media effects on the public agenda, (2) addressing these effects from the perspective of people's cognitions and (3) combining both survey and online (navigation) tracking data, which allows us to measure observed exposure to news outlets through social media –our independent variable– an overcome recalling issues for news consumption.

We expected social media platforms to have different effects on the public agenda. We expected social media generally to have a negative effect on the public agenda, whereas we expected Twitter –due to its special newsy character– would have a positive effect. Our results are quite in line with these expectations. We find that

Facebook clearly has a negative effect on the public agenda (an effect that is statistically significant and robust to different model specification). As for Twitter, we find that effects go in the expected direction (positive), but they do not reach statistical significance. We attribute the non-significance of this effect partly to the low number of observations for visits to news media from this platform. In fact, we provide additional evidence supporting our expectations of different social media platforms having varying effects on the public agenda. By plotting how visits to the 15 most visited outlets from social networking sites are distributed per platform, we show that different social media tend to serve as referrals for very different types of news media outlets. At one extreme, Twitter tends to send users to legacy mainstream media (mostly online versions of top ranked newspapers in term of audience), at the other, Facebook, tends to distribute users quite equally between mainstream media, infortainment news sites and digital-born media.

Logistic estimations of citizens' public agenda suggest that social media platforms (Twitter being probably the exception, although this should be tested with more and more nuanced data) reduce the amount of common ground shared by people, at least when measured through the MIPs, implying also that they tend to fragment the public agenda. More precisely, those who do not use Facebook at all to get information have a 23% probability to mention the exact main three problems identified by our sample, while those using Facebook to access 50% of the total information websites visited during the time of our study have less than 5% probabilities to share this common public agenda. A closer look to the issues that citizens worry about reveals that those using less Twitter as a news referral are significantly more concerned about corruption and healthcare than those using this social media platform more often to get news. Also, those using Facebook less frequently for information purposes are

significantly more likely to be concerned about unemployment. Although we cannot discard that these differences are due, in the first place, to systematic differences in the profiles of users and non-users of these social networks, the findings confirm that the use of Facebook indeed reduces public agenda's common ground.

Here we have suggested several explanations for this negative effect. Social media platforms could be fostering more passive attitudes concerning news seeking and reducing political knowledge, which would be associated with some of the negative consequences of audience fragmentation –making it more difficult to reach a critical mass for successful collective active. Other explanations include citizens operating as second-level gatekeepers and adopting a more active role in the process of news creation. In contrast to the previous one, this account would be associated with some of the positive implications of audience fragmentation –contributing to diversify and expand the public agenda. Further studies should inquire into which of these mechanisms is more likely to affect the impact of the social media platforms on the social consumption of news and the public agenda. .

This study has several limitations. First, our study is not representative of Spanish public opinion and includes only online news media (heavy) users. Second, our data stops at the domain level of the visit not at the page level, which does not allow us to identify the type of content (news, sports, entertainment) people get exposed to in media outlets. Finally, we had few observations of news visits from the smaller social media platforms (Twitter) to test for the hypothesized different effects of social media on the public agenda. Overall though this paper makes an important contribution to the extant literature on the impact of news consumption within social media platforms on the public agenda. We have brought evidence that when Facebook is the main referral

for news, the public agenda is eroded or in other words people do not share the

necessary common ground for the discussion of public affairs.

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Appendix I. Descriptive of the main variables

	mean	sd	min	max
Common agenda	.198	.399	0	1
Political interest	.413	.254	0	1
Age	36.1	13.72	18	74
Frequency newspapers	.57	.35	0	1
Frequency tv	.22	.31	0	1
Total visits news outlets	99.3	145.6	0	1031
% Facebook	6.35	10.0	0	100
% Twitter	1.54	4.68	0	50
% Youtube	.88	5.34	0	100
% Direct	58.1	17.8	0	100
N	388			

Appendix II. Origin of the websites' visits during the fieldwork

	N
Total of websites' visits	1,024,026
News media outlets	40,503
Direct	23,810
Referral	16,693
From facebook	2,148
From twitter	896
From youtube	328

Appendix III. Comparison between CIS and our sample MIPs' mentions
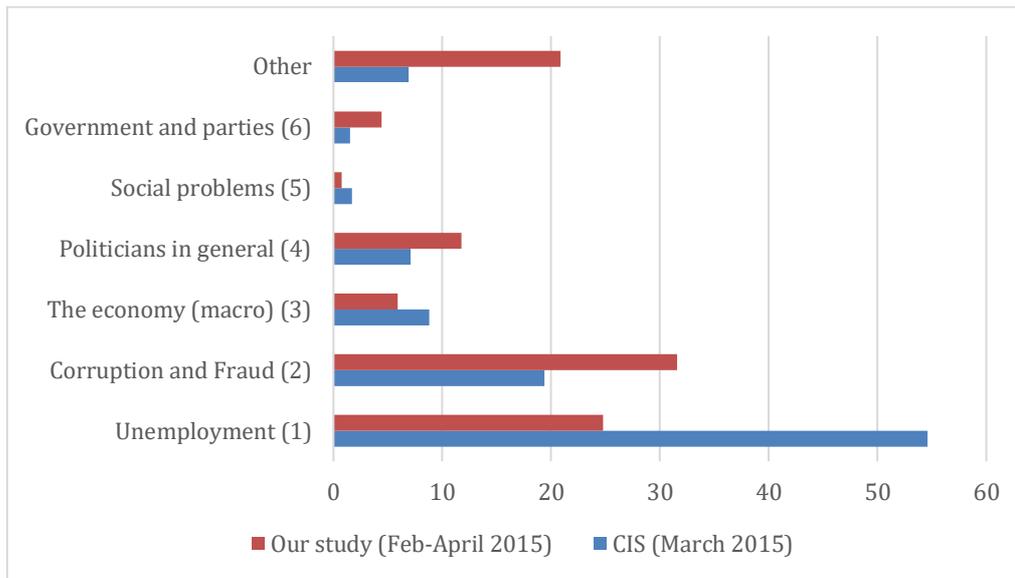
Note: The figures shows only the first problem mentioned. Numbers in brackets indicate the ranking in the CIS survey