

Informing the Public

How Party Communication Builds Opportunity Structures

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Informing the Public: How Party Communication Builds Opportunity Structures

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Informing the Public: How Party Communication Builds Opportunity Structures

ABSTRACT

We argue that the attention parties devote to a topic contributes to expanding the opportunity structure to acquire information that party supporters have. We evaluate this proposition in a comparative manner by focusing on an elite-driven new topic, namely the *Spitzenkandidaten* system in European Parliament elections. We link candidate recognition survey data from 28 countries with over 175 party electoral programs, press releases, and Twitter communication before the 2014 European Parliament elections. Our results show that especially what parties emphasize or decide to talk about on Twitter contributes to what their supporters will know. As proposed, this is an indirect effect through a general contribution to the information environment in election campaigns. However, party communication portfolios should not discount traditional tools given that these can also contribute to the opportunity structures available to party supporters.

KEYWORDS: Political knowledge, Party communication, Spitzenkandidaten, European Parliament elections

Are today's political parties successful in disseminating relevant information to their supporters? Answering this question is important for three main reasons. First, possessing knowledge about the political system and actors contributes to better political decisions and a higher quality of democratic representation. Second, a shared information base between parties and the public reduces disconnect and ensures that political competition at elite and voter level converge, overall cementing the role of parties in democratic societies. Third, provision of politically relevant information is regarded as one of the core functions of political parties, as they should help citizens in evaluating the complex and remote world of politics.

Theoretically, the opportunity structure from the ability-motivation-opportunity triad (Delli Carpini & Keeter, 1996; Luskin, 1990) links supply side efforts with individual level knowledge. Political parties can contribute to the opportunity element defined as the "information to which one is exposed" (Luskin, 1990), potentially facilitating the acquisition of political knowledge for their supporters and, ultimately, for the general public (Zaller, 1992). We argue that parties can use various communication tools that serve as input for the opportunity structure and this expands the information (environment) available to their supporters, which then affects the amount of political information at the individual level. This argument builds on research regarding the capacity of parties to set the media agenda and subsequently influence public opinion (e.g. Hayes, 2008; Hopmann, Elmelund-Præstekær, Albæk, Vliegenthart, & Vreese, 2012) and work on how the public's perception is linked to what parties say in their official communication (e.g. Adams, Ezrow, & Somer-Topcu, 2011; P. Fernandez-Vazquez, 2014).

A major difficulty in these analyses is isolating the effect of elite communication during campaigns from the role of pre-existing views already held by citizens (Druckman & Lupia, 2016). Furthermore, parties can adjust their focus on issues expected to be important for the public, amplifying confounding of effects. To overcome these limitations, we investigate how

information about a new topic presented in the official party communication relates to citizens' awareness of the topic. Our test case is an important institutional development, namely the *Spitzenkandidaten* or lead candidate system. This is a topic which has not been emphasized before the 2014 elections to the European Parliament (EP) where political elites had a clear role in introducing and promoting it; moreover, the potential theoretical and practical implications of this development are far-reaching.

We contribute to the debate regarding the role of “traditional” communication tools of political parties, like electoral manifestos (Adams, Ezrow, & Somer-Topcu, 2014; Fernandez-Vazquez, 2014) and press releases (Harris et al., 2008; Hopman et al., 2012), in shaping the public agenda in an era when multiple communication tools are available to parties. Importantly, we extend these debates by exploring how social media communication, as a new tool, can facilitate information acquisition among party supporters. From a variety of social media platforms we analyze candidate Twitter communication because of its widespread, repeated and permanent use in political campaigns (e.g. Grant, Moon, & Grant, 2010; Gulati & Williams, 2010; Larsson, 2015), and because of its potential to bypass traditional media or serve as input for it (e.g. Broersma & Graham, 2013; Chadwick, 2013).

Our results based on communication from over 175 European political parties across three platforms (manifestos, press releases, and Twitter) indicate that what parties emphasize matters for knowledge acquisition of their supporters, with candidate Twitter communication playing a dominant role. Since parties employ all these different communication tools simultaneously, our approach **indirectly** contributes to evaluating which communication platforms are effective. Overall, while social media has often been regarded as having negative direct learning consequences, our findings are more optimistic in this regard. Finally, from a substantive point of view, although supply-side salience of the *Spitzenkandidaten* system was

limited, low-cost communication efforts did contribute to knowledge about the system among supporters of parties that emphasized the topic more extensively.

Party communication and the acquisition of political knowledge

The opportunity structure

We investigate the extent to which parties can inform the public by focusing on a specific type of information, i.e. factual political knowledge defined as “factual knowledge about institutions and process of the government, current economic issues and social conditions, the major issues of the day, and stands of political leaders on those issues” (Delli Carpini & Keeter, 1996, p. 1). As with any type of learning, understanding how individuals acquire this type of information is guided by the ability-motivation-opportunity triad (Delli Carpini & Keeter, 1996; Luskin, 1990). *Ability* underlines the importance of cognitive skills in determining the ease with which individuals acquire new information. *Motivation* refers to the desire to learn and determines to what degree individuals seek information and how much attention they pay to it. While the ability of citizens is independent of party communication, we need to note that as a result of selective exposure and motivated reasoning (Brenes Peralta, Wojcieszak, Lelkes, & de Vreese, 2017; Gaines, Kuklinski, Quirk, Peyton, & Verkuilen, 2007; Levendusky, 2013; Taber & Lodge, 2006) citizens are more motivated to seek and pay attention to information coming from their own party.

Previous research explaining levels of political knowledge has overwhelmingly focused on the two elements described above. However, the third, *opportunity*, is the most important avenue for connecting party communication and individual-level political knowledge, and hence the most suitable mechanism for theorizing party information effects. *Opportunity* to acquire information refers to more contextual factors that lie largely outside the individual’s control (Luskin, 1990) and linkages between the public and elite communication are

established through the changing opportunity structure for knowledge acquisition. Previous research has shown that by supplying more information during electoral campaigns the media expands the information environment available to citizens, hence increasing the *opportunities* to become informed and ultimately increasing the levels of political knowledge (Ferrín, Fraile, & García-Albacete, 2019). Similarly, parties can also expand the information environment available to the public in relation to a given topic through their routine communication processes. By highlighting certain topics/issues in their official communication, parties increase the salience of that given topic/issue (Budge & Farlie, 1983). These topics are then most likely to be picked up by the media and thus communicated to the public at large, and/or reach citizens via accidental and/or unintended exposure, increasing the likelihood that the public will encounter the information highlighted by parties (Bode, 2016; Shehata & Strömbäck, 2018). The chances of a topic reaching the public are naturally higher for topics that are highly salient for the parties; that is, the chances of reaching the public are contingent on the emphasis which parties place on a topic. Nevertheless, given selective exposure and motivated reasoning, we would expect an increase in topic knowledge especially among the supporters of parties that pay substantial attention to the subject.

How can parties provide information to the public?

The potentially important role of parties in educating the public was most visible in the first two decades after World War II, “the ‘golden age’ of parties” (Janda & Colman, 1998, p. 612). However, this role has been weakened due to the rise of TV broadcasting, with journalists actively seeking “ways to stamp their marks on political stories” (Blumler & Kavanagh, 1999, p. 215). By the 1990s, the news time devoted to what politicians actually say decreased dramatically (Harrison, 1997; Blumler & Kavanagh, 1999), with a trend towards shorter “text/sound-bites” of politicians in election coverage (Esser, 2008; Patterson, 1993).

These developments represent a challenge for parties in their attempts to reach and inform their own supporters or the general public. Contributing to the opportunity structure available to supporters and the general public, party communication strategists can adopt various tools.

Press releases represent one traditional communication tool that parties or candidates can use to influence and inform their supporters. They are published frequently (sometimes on a daily basis) and are specifically geared towards the media and the general public (e.g. Grimmer, 2013; Maier, Bacherle, Adam, & Leidecker-Sandmann, 2019). Due to limited resources and time pressure, journalists rely on easily accessible sources of information such as press releases. In sum, “political parties are quite successful in shaping the media agenda” (Hopmann et al., 2012). Therefore, press releases seem to be a good indicator for issues that are transmitted to the public and for the salience associated with these issues by the communicator.

Recent research has also looked at the impact on public opinion of official party communication through party manifestos (see Adams et al., 2014; Pablo Fernandez-Vazquez, 2014), or direct individual legislator communication (Broockman & Butler, 2017) among others. In comparative party politics, the underlying idea of studies focusing on official party communication is that electoral manifestos generally reflect how salient political issues are for parties (Budge, Klingemann, Volkens, & Bara, 2001). The content prioritized by parties in their electoral manifestos indicates how salient a topic is for them and this is reflected in what parties communicate via other avenues (Adams et al., 2011). One problem concerning party manifestos is that only a minor fraction of citizens read manifestos, although citizens are expected to pay attention to media coverage of these manifestos (Topf, 1994).

Aside from more traditional tools such as manifestos and press releases, parties also make use of other tools to communicate their message towards the mass media (Adam et al., 2017). Recent years have seen a move away from websites and blogs to various social media

platforms, Twitter being one of the leading ones in political campaigns. Ease of use, potential to bypass mainstream media, and the limitless opportunities for personalized communication, have led to politicians strategically using social media to communicate their messages at a growing rate (Grant et al., 2010; Gulati & Williams, 2010; Larsson, 2015).

Furthermore, candidate communication on social media not only bypasses traditional media in communicating with the public (Chadwick, 2013; Goldberg, 2010), but also serves as input for traditional media (Broersma & Graham, 2013; Conway, Kenski, & Wang, 2015). This is one of the main reasons for choosing Twitter over other social media platforms. As our goal is to investigate how the opportunity structure changes, we have selected the social media platform documented as having a greater influence on how political journalists work (that is, what sources they rely on) than for example Facebook (see Parmelee, 2014). Second, as we will be working with a newly established topic, Twitter has been shown to further feature as a source to detect emerging topics and supply background information for their coverage (see Jungherr, 2016). The less biased way in which Twitter displayed (at the time of the data collection) content is a further advantage on relying on Twitter rather than Facebook, which uses an algorithm that takes into account the preference of users for displaying content. Thus, while in the case of Twitter we are sure that a user following a politician is exposed to most of his or her communication, in the case of Facebook this is not the case. In this sense what political actors communicate over social media has become an important “news” source that not only has the capacity to influence the public agenda setting but also represents an important and legitimate source of information (Franco, Grimmer, & Lee, 2016; Harder, Sevenans, & Van Aelst, 2017; Van Dalen, Fazekas, Klemmensen, & Hansen, 2015).

However, identifying the causal direction of links between party communication and public opinion or agenda is difficult. While some researchers have found little or no evidence of impact on public opinion of manifesto-based communication (Adams et al., 2014), others

have shown that official party communication shapes the attitudes of party supporters (Fernandez-Vazquez, 2014). Furthermore, some evidence suggests that parties might adjust their official communication (i.e., electoral manifestos) in response to the attitudes of the public (Adams, Clark, Ezrow, & Glasgow, 2004; Ezrow, de Vries, Steenbergen, & Edwards, 2011; Popa & Dumitrescu, 2015). Other studies focus on the question of the extent to which voters are knowledgeable, and how party behavior and communication-related features of the political system can account for these differences in knowledge (Fortunato, Stevenson, & Vonnahme, 2016; Popa, 2015; Vegetti, Fazekas, & Méder, 2016).

Theoretical argument

Our general expectation is that the attention political parties dedicate to a topic should signal to the public how important the issue is for the parties, which is in line with the salience theory of party competition (Budge & Farlie, 1983). This leads us to expect that especially the supporters of parties that mention more often a particular topic have a greater chance of acquiring knowledge about that subject. This expectation is reinforced by the fact that citizens motivated by the need to seek out like minded information (Bennett & Iyengar, 2008; Sunstein, 2001) are far more likely to pay attention to the message of their own party while dismissing information coming from the “others”. In this regard, previous studies show that the way in which individuals search for and incorporate new information is clearly influenced by selective exposure and motivated reasoning (Brenes Peralta et al., 2017; Gaines et al., 2007; Levendusky, 2013; Taber & Lodge, 2006).

Furthermore, social media allows for a large-scale transfer of information. If a given topic is covered more frequently on social media by politicians who have relatively many followers who pick up and spread their messages, the chances of accidental exposure to the topic increases exponentially (Bode, 2016; Shehata & Strömbäck, 2018), reinforced also by

potential attention given to the topic by media accounts. The chances of stumbling upon specific information posted by politicians is especially high among party supporters as they have been shown to be more likely to follow members of their own party (Barberá, 2015). Yet again, the possible impact of Twitter is not only given by its direct outreach as the tweets of politicians enjoy even greater outreach through indirect communication as they are re-circulated by their followers to a secondary audience (Choi, 2015; Vaccari & Valeriani, 2015). In addition, we can expect that those who avidly follow politicians on social media also have the potential to spread the messages they encounter online in their off-line social networks. This mechanism resembles the two-step flow of communication that was so important before the rise of mass media in facilitating the spread of information (Ernst, Engesser, Büchel, Blassnig, & Esser, 2017, p. 1350; Katz & Lazarsfeld, 1955), and is still capable nowadays of increasing the reach and strength of political messages (Aarøe & Petersen, 2018).

The core of our argument is summarized as follows: parties' selective focus on political issues and topics is reflected in materials produced using various traditional (election manifestos and press releases) and new (Twitter) political communication tools. Selective focus translates into salience, operationalized through the amount of attention dedicated to topics. Higher salience increases citizens' chances of exposure (also incidental exposure) to the topic, which means the *opportunity* structure is more favorable for information acquisition. However, given the source (parties), selective exposure, and differences in motivation, this "party-influenced learning" should benefit those who identify with the communicating party compared to those who do not. Thus, our general hypothesis is:

Opportunity hypothesis: individuals who support parties that devote more attention to a particular topic in their party communication are more likely to have factual knowledge about the topic compared to other individuals.¹

Test case of our study: the *Spitzenkandidaten* system

To test this hypothesis, we make usage of the introduction of the *Spitzenkandidaten* (or lead candidates) for the 2014 EP elections, an EU-wide institutional development. This institutional innovation allows the different political groups in the EP the opportunity to nominate different *Spitzenkandidaten*, making parties the expected promoters of the *Spitzenkandidaten* system (Braun & Popa, 2018). This was (theoretically) supposed to increase the prominence of European elections (Hobolt, 2014). This test case has several desirable properties for testing party communication influence on the opportunity structure.

First, this is not an instance of policy-specific knowledge mainly concerned with policy/issue stances (Barabas, Jerit, Pollock, & Rainey, 2014), thus limiting potential biases by partisan predispositions (e.g. Prior, Sood, & Khanna, 2015). *Second*, given the novelty of the system, it is unlikely that individuals chose the party they support based on their preferences for the lead candidates, limiting endogeneity issues from previous research on how parties influence public opinion. In addition, the low salience of the topic under consideration before the campaign ensures that pre-existing knowledge of it is low and the influence of parties on the public is clearer, without much prior contamination (Druckman & Lupia, 2016).

Third, focusing on an electoral campaign period further ensures that politicians are especially active in communicating with the public and that citizens are also likelier to seek more information about what parties communicate (Beach, Hansen, & Larsen, 2017; Larsson,

¹ By other individuals we mean supporters of parties that mention the topic less frequently, non-partisans and the partisans of those parties that did not mention the topic in their official communication.

2015). *Fourth*, this is a case where the opportunity structure in the knowledge acquisition triad should be quite influential as citizens tend to lack motivation to learn about European affairs. This lack of motivation was also reflected by the relatively low proportion of citizens who were aware of the system (Gattermann, de Vreese, & Van der Brug, 2016; Popa, Rohrschneider, & Schmitt, 2016). However, awareness of the fact that candidates were nominated varied strongly among countries, being particularly high in the home countries of the *Spitzenkandidaten* (Hobolt, 2014; Schmitt, Hobolt, & Popa, 2015).

To sum up, the EP election focus and the *Spitzenkandidaten* system as a knowledge component contributes to better identification of party information effects in a setting where informing citizens is a difficult task. First, parties' incentives to supply factual knowledge are lower than their incentives to provide policy-specific information, which is clearly illustrated in the case of the *Spitzenkandidaten* system by the low emphasis the parties accorded the topic in their manifestos (Braun & Popa, 2018) as well as in their Facebook communication (Braun & Schwarzbözl, 2018). Second, the mass media showed low interest in this novel topic (Maier et al., 2017) which can limit one of the main platforms for creating the opportunity structure to get informed, while also highlighting the importance of the opportunity structure created by political parties.

Data and measures

Spitzenkandidaten knowledge

In order to capture factual knowledge regarding the *Spitzenkandidaten* system, we use a *name-party recognition* battery from the post-election wave of the 2014 European Election Study conducted simultaneously in 28 European countries (Schmitt et al., 2015). Respondents had to identify which EP party group or which national party supported the nomination of the three most important candidates: Jean-Claude Juncker (European People's Party), Martin Schulz

(Socialists & Democrats) and Guy Verhofstadt (Liberals and Allies Group). They were offered four response options including a fourth and incorrect option: “Socialists & Democrat” (e.g. mentioning SPD in Germany), “European People’s Party” (e.g. CDU/CSU), “Liberals and Allies Group” (e.g. FDP) and finally “The Greens” (e.g. Die Grünen)² with a “Don’t know” option available. Our outcome variable is the proportion of correctly paired lead candidates out of the three correct answers (more information in Supplementary Information [SI] 1).

The recognition battery directly taps into political knowledge defined as “factual knowledge about institutions and process of the government, current economic issues and social conditions, the major issues of the day, and stands of political leaders on those issues” (Delli Carpini & Keeter, 1996, p. 1). As this is a measure of “Surveillance Facts“ (i.e. political knowledge about recent developments), it is ideal for capturing the effect of the *opportunity* structure on political knowledge (Barabas et al., 2014, p. 843). We should further note that the battery does not only reflect knowledge about the three specific candidates. The strong correlation between the three items forming our index (i.e. the average tetrachoric correlation between the items is 0.7) indicates that those who correctly respond to these items are also expected to know that Alexis Tsipras, Ska Keller and José Bové also took part in the race and so these respondents also have broader knowledge about the *Spitzenkandidaten* system (Popa et al., 2016).

It is worth noting that there is sizeable cross-country variation: 83% of the respondents in Luxembourg correctly linked Juncker to his party; however, this number is lowest in Estonia, with 4.3% of the respondents. For Schulz, the highest recognition is in Germany (69%) and the lowest in the United Kingdom (3.63%). Finally, Verhofstadt’s recognition numbers were highest in Belgium (70%) and lowest, again, in the United Kingdom (1.98%). Luxembourg and

² In countries where two or more parties were expected to join an EP group, the largest party was mentioned. In countries where there was no party supporting one of the four EP groups, only the name of the EP group was provided.

Belgium registered the highest proportions for recognizing correctly all three candidates (around 21%), with the lowest proportions in the United Kingdom and Ireland (0.57% and 0.84%). The proportion of people recognizing none of the candidates is highest in the Czech Republic (89%), Lithuania (87%), and Poland (86%), and lowest in Luxembourg (12%), Germany (23%) and Belgium (23%).

Core predictors

As the first platform within the traditional communication avenues, we use the EES 2014 Euromanifesto Study, which uses expert human coding and covers **manifestos** of the relevant parties competing in the 2014 EP elections (Schmitt, Braun, Popa, Mikhaylov, & Dwinger, 2016). In order to reflect the conceptualization of the outcome variable, we rely on the coding scheme of the Euromanifesto Study which acknowledges that references or mentions to the *Spitzenkandidaten* system can take two forms. They can include mentions as a general issue, such as the *Spitzenkandidaten* system as a means to enhance legitimacy in the EU and/or mentions of all candidate names, including the three candidates who are not part of the battery measuring the outcome (Schmitt et al., 2016). We measure the emphasis a party places on the *Spitzenkandidaten* system as the proportion of the party manifesto pertaining to that topic. Out of 181 parties with Euromanifesto coding available, only 35 mention the candidates or the system and the highest share is 2.35% for the Czech Social Democratic Party. Hence, we dichotomize this measure as being 1 if any mention can be found in a party manifesto.

The second traditional communication platform concerns the use of **press releases**: 2658 press releases by 46 national parties and party coalitions from Austria, France, Germany, Greece, The Netherlands, Portugal, and the United Kingdom were collected as part of a larger research project³ and cover the campaign twelve weeks prior to the 2014 EP elections (see

³ “Political parties as politicizers of EU integration” by Silke Adam and Michaela Maier.

more details in Adam et al., 2017). We build a thesaurus including the name of the lead candidates and varied forms of references to the positions in question (such as “President of the Commission” or “Lead candidate”) based on detailed reading of the Euromanifestos (see Table 1). We then carry out text searches for all these terms of interest and code a press release mentioning the *Spitzenkandidaten* system if any of the terms are found. Our final predictor will be the proportion of press releases that contain *Spitzenkandidaten* mentions out of the total number of press releases sent out by a party.

Table 1: *Spitzenkandidaten* thesaurus

	List of terms
<i>Schulz</i>	Martin Schulz; Schulz
<i>Verhofstadt</i>	Guy Verhofstadt; Verhofstadt
<i>Tsipras</i>	Alexis Tsipras; Tsipras
<i>Keller</i>	Ska Keller; Keller
<i>Bové</i>	José Bové; Bové
<i>Juncker</i>	Jean-Claude Juncker; Juncker
<i>Position</i>	Head of EC; Head of European Commission; President of EC; President of European Commission; Candidate for EC; Candidate for European Commission; Top position in EC; Top candidate; Lead candidate; Joint candidate

Note: All terms have been translated into all languages following the official translations encountered in various communications from the three EU institutions.

In order to map candidate communication via **social media**, we use Twitter data collected as part of the European Election Study 2014 (for a more detailed discussion see Nulty et al., 2016; Theocharis et al., 2016). Our analysis covers 85% of the total MEP candidates who had a Twitter account and we analyze all candidate communication (original tweets, re-tweets, and replies) from the pre-election period (3 weeks) to capture campaign communication. We use the same thesaurus as before with translations in all languages of the European Union.

As previously, we want to identify whether *any* term from the thesaurus is present in a tweet. We are looking at Twitter with a 160-character limit where the text can be written on various devices, with abbreviations or potential spelling errors, especially in the case of names as they are not part of usual autocorrect dictionaries. Thus, rather than exact matches, we allow for some minor spelling errors (a 5% margin) regarding the terms employed (formalized through a Jaro-Winkler distance, described and validated in SI 2).

When calculating the party level measure, we choose to focus directly on the opportunity structure created, i.e. the party mentions weighted by their potential reach. This decision dovetails with our theoretical argument and it is possible because Twitter communication (and the platform) offers various statistics associated with the tweets. More precisely, while it would have been desirable, we do not have such measures for manifestos and press releases, so in this case we are measuring the difference in the attention of parties dedicate to the topic under consideration. This also means that any comparison between platforms should not be interpreted at face value, but we will return with more salience-related alternative measures of Twitter communication in the sections below, which might be better suited for comparison though they are more distant proxies of the opportunity structure.

For each tweet, we have information on the number of followers the candidate had at the moment of tweeting, which we sum across all candidates in one party. This stipulates the total reach throughout the campaign. We do the same for tweets mentioning the *Spitzenkandidaten*. Given the distribution of follower counts in both cases, we take the log of these and then create a measure that reflects the proportion of potential reach of the content of interest out of total reach throughout the campaign.

This approach is more complex than the ones for traditional platforms. It is needed because the opportunity structure created depends on the popularity of the account holder. Thus, our measure tackles the problem that a lead candidate mention from a candidate with 10 followers is not identical to a mention from an account with 300,000 followers. Furthermore, since we scale with total reach we do not regard these numbers in absolute terms because there is a large set of overlapping followers between tweets at different points in time as well as between different candidates (1), audiences and candidate numbers vary across countries (2), and we still want to keep features of the measure comparable to those used for traditional communication platforms (3). Detailed examples, validation and comparison between

alternative measures are provided in SI 3. Furthermore, we will discuss alternative operationalizations later in the analysis section.

Combining data sources and method

For our analysis, we combine the individual-level data with the party-specific measures using respondents' party identification: we keep those respondents who named a party to which they feel close and those who said they did not feel close to any party, while all other do not know/do not want to tell answers were treated as missing. For EP election-specific parties, such as June List (Sweden) or People's Movement against the EU (Denmark), we used party vote in EP elections rather than party identification as a link.

At the party level, we were able to match 181 parties from the Euromanifestos, 178 from Twitter, and 46 from press releases, where data collection covered only a subset of seven European countries, with some sample size reduction because of parties not being in all three data sources. In this process, Malta was excluded overall, as no party had both manifesto and Twitter information. In all cases where individuals did not explicitly identify with any party, the party communication variables will take the theoretical minimum (0). We offer a detailed description of the parties included and descriptive statistics in SI 1.

Our outcome is the proportion of correctly matched candidates, and thus we fit a series of hierarchical binomial regression models where individuals are nested within parties with which they identified and non-identifiers are regarded as a separate group. This approach also allows us to control for between individual differences and link party-level predictors to recognition scores. Finally, the partial pooling nature of these hierarchical models ensures that between party differences in effects are not overemphasized (as would be the case for no-pooling models). We include controls for a number of factors that have been traditionally used to capture these aspects (i.e., education, knowledge about the EU, interest in politics, frequency

of political discussion, and general news consumption). We further control for the exposure to the campaign, support for EU integration, and the age and gender of respondents. These control variables are listed in SI 4 with the exact wording from the 2014 EES Voter Study. At the party level, we include a dichotomous control for whether the party was a member of the European party group that backed any of the three lead candidates. As previous research has shown that the nationality of candidates needs to be considered when analyzing the effects of the *Spitzenkandidaten* system (Braun & Popa, 2018; Schmitt, Hobolt, & Popa, 2015), our model also includes country fixed effects.

Party communication matters, especially on Twitter: main results

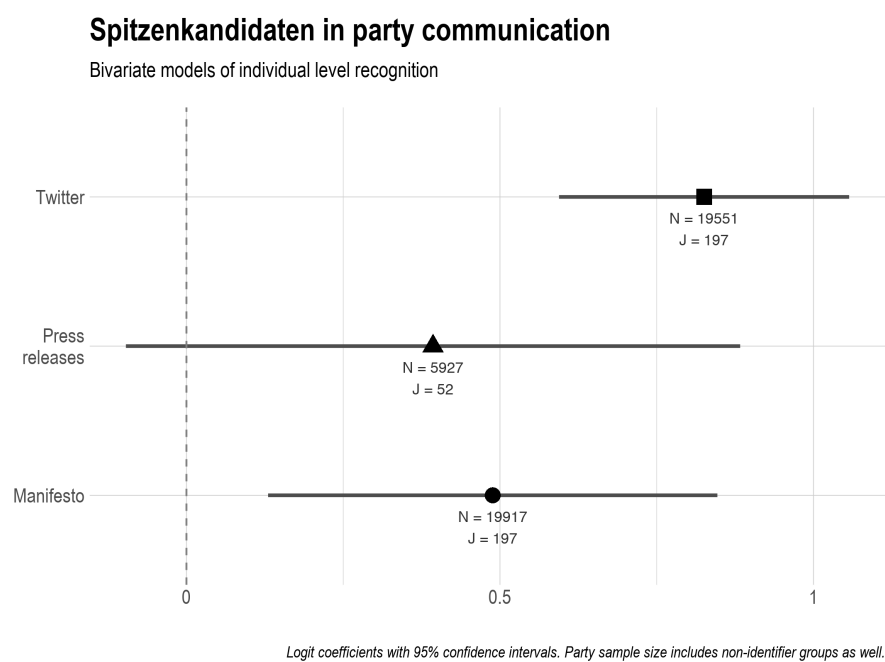
First, we establish that there is a meaningful bivariate relationship between recognition and the predictors relating to opportunity structure taken independently (Figure 1). While the effect sizes are comparable in a statistical sense,⁴ there are differences in the operationalization and data availability, so direct comparisons are difficult. Nevertheless, we can see across platforms that more attention or higher reach is positively associated with differences in individual-level recognition, with comparable magnitudes, and more uncertainty regarding press releases.⁵ However, parties can use all these different communication platforms simultaneously, and so we extend these models below to jointly test these effects. Furthermore, the opportunity structure is only one part of the knowledge acquisition triad, and accordingly we account for other individual-level predictors in the next steps.

⁴ After centering, continuous predictors are divided by two standard deviations as this allows a direct comparison of coefficients associated with continuous and dichotomous variables, and the size of the effect ranges from one standard deviation below the mean to one standard deviation above the mean (Gelman & Hill, 2007).

⁵ For some press releases digitalization relied on optical character recognition and thus we also ran a text search using the similarity-based approach employed for the Twitter platform. Allowing for potential mistakes, we have a slightly larger number of press releases with Spitzenkandidaten mentions. As reported in SI4, when using those values as predictors for the press release bivariate model the effect (0.53) is statistically significant ($p = 0.0275$).

We include relevant individual-level predictors of knowledge, a party-specific control, and country dummy variables. This specification serves as an important point of comparison for future models. Since the predictors included in these models are not central to analysis, we only highlight that they offer good face validity of our (mostly) individual level of recognition with results in line with previous research: more educated, interested and engaged individuals who also know in general about the EP have higher recognition scores (see Table 2).

Figure 1: Party communication on three platforms and *Spitzenkandidaten* recognition



We find consistent evidence that the opportunity structure created through Twitter communication is positively associated with recognition, and attention in manifestos also contributes to the opportunity structure in a way that it can foster better candidate recognition. However, when we account for joint use and assess them together, we find that social media reach is more important.

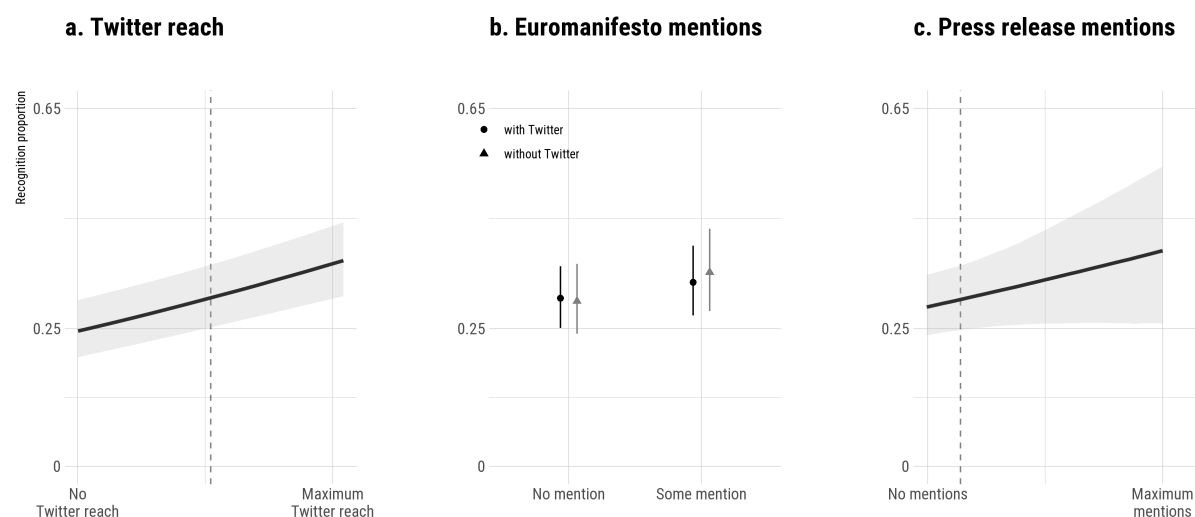
Table 2: Main results, party communication and Spitzenkandidaten recognition

	Baseline (all)	Twitter reach (all)	Manifesto mentions (all)	Both (all)	Baseline (sub)	Press release salience (sub)	All three (sub)
Intercept	-0.78 (0.16)	-0.78 (0.14)	-0.85 (0.15)	-0.82 (0.14)	-0.88 (0.14)	-0.84 (0.14)	-0.86 (0.11)
Sex (Female = 1)	-0.41 (0.03)	-0.41 (0.03)	-0.41 (0.03)	-0.41 (0.03)	-0.41 (0.04)	-0.41 (0.04)	-0.41 (0.04)
Age	0.33 (0.03)	0.33 (0.03)	0.33 (0.03)	0.33 (0.03)	0.38 (0.04)	0.38 (0.04)	0.38 (0.04)
Secondary education	0.24 (0.04)	0.24 (0.04)	0.24 (0.04)	0.24 (0.04)	0.22 (0.05)	0.22 (0.05)	0.22 (0.05)
Tertiary education	0.42 (0.04)	0.42 (0.04)	0.42 (0.04)	0.42 (0.04)	0.41 (0.06)	0.42 (0.06)	0.42 (0.06)
EU knowledge	0.35 (0.03)	0.35 (0.03)	0.35 (0.03)	0.35 (0.03)	0.37 (0.05)	0.37 (0.05)	0.38 (0.05)
Interest in politics	0.57 (0.03)	0.57 (0.03)	0.57 (0.03)	0.57 (0.03)	0.51 (0.05)	0.51 (0.05)	0.51 (0.05)
Campaign exposure	0.13 (0.03)	0.13 (0.03)	0.13 (0.03)	0.13 (0.03)	0.30 (0.05)	0.30 (0.05)	0.30 (0.05)
Political discussion	0.29 (0.03)	0.29 (0.03)	0.29 (0.03)	0.29 (0.03)	0.25 (0.05)	0.25 (0.05)	0.25 (0.05)
EU position	0.20 (0.03)	0.20 (0.03)	0.20 (0.03)	0.20 (0.03)	0.22 (0.04)	0.22 (0.04)	0.22 (0.04)
News consumption	0.42 (0.03)	0.42 (0.03)	0.42 (0.03)	0.42 (0.03)	0.40 (0.05)	0.40 (0.05)	0.40 (0.05)
Party of lead candidate	0.36 (0.06)	0.18 (0.06)	0.33 (0.06)	0.18 (0.06)	0.30 (0.10)	0.23 (0.11)	0.06 (0.09)
Twitter reach		0.42 (0.06)		0.40 (0.07)			0.21 (0.07)
Manifesto mentions			0.24 (0.09)	0.13 (0.09)			0.28 (0.09)
Press release mentions						0.16 (0.10)	0.10 (0.08)
AIC	31813.26	31776.67	31808.82	31776.26	10985.30	10985.00	10968.54
BIC	32119.41	32090.67	32122.82	32098.11	11110.69	11116.98	11113.72
N	18957	18957	18957	18957	5427	5427	5427
Parties	176	176	176	176	43	43	43
(Variance) Parties	0.12	0.08	0.11	0.08	0.07	0.06	0.02

Notes: (Restricted) Maximum Likelihood estimates of logit coefficients with standard errors in parentheses. Entries in bold are statistically significant at $p < 0.05$. Country dummy variables included but omitted from the output (Intercept = Austria). Likelihood ratio tests have been carried out: both Twitter reach and Manifesto salience models fit the data significantly better than the Baseline model (valid for subsample as well), and the full sample model with both included fits better than Baseline and Manifesto only, but not better than Twitter reach. Press release salience model does not fit better than the Baseline. The results for Press release salience are not sensitive to a dichotomous (as for Manifestos) measure of salience.

Whilst more attention to the *Spitzenkandidaten* system in press releases has a positive effect on recognition, this effect is not statistically significant.⁶ Our results in the last column of Table 2 suggest that manifesto and Twitter communications are systematically related to recognition, even within this smaller subset of parties and countries. One related (modelling) consideration is how much the communication content correlates across platforms. In this regard, our results are not influenced by multicollinearity in the statistical sense: Twitter and manifesto communication correlation is 0.26 (full sample) and 0.42 (press release subsample), and the press release correlations are 0.20 (with Twitter) and 0.28 (with manifestos). Beyond the statistical perspective, this indicates that attention and outreach for this topic is somewhat interrelated across platforms, but each platform has unique characteristics, likely because the different intended audiences and greater heterogeneity of candidate Twitter communication.

Figure 2: Generally low recognition, but higher with better opportunity structure



Note: Example predicted values calculated for average-aged Austrian man with lower than secondary education, no exposure to the campaign, with average discussion frequency, news consumption and EU position. He is not a supporter of a party being behind a lead candidate. For Twitter reach, party manifesto salience is fixed at 0. For manifesto salience with Twitter control (model: Both), Twitter reach fixed at sample mean. Party-specific random effects collapsed (discarded), as hypothetical example. Shaded area and line ranges for 95% confidence intervals.

⁶ As already mentioned and reported in SI4, when we use similarity-based search for press releases the effect in Press release salience model is statistically significant (0.22, $p = 0.033$). However, our findings from the final model are unchanged regarding press release salience (0.11, $p = 0.157$).

Figure 2 summarizes our results and shows that there is generally a low recognition proportion (also given the additional predictor values used in the example), but supporters of parties that designate attention to the topic are better at recognizing at least one out of the three candidates. Accordingly, our results indicate that citizens have scarce factual knowledge about a novel institutional feature, but party communication, especially through the opportunity structure created via social media, can ensure at least some knowledge about this institutional system. In the next section, we further investigate the robustness of our findings focusing on opportunity structure created through Twitter.

Sensitivity checks: detailed look at the opportunity structure

Not a simple partisanship effect

Using a varying intercept model with no predictors we generated the predicted average recognition proportions for all groups in our data. Because we fit the model to data containing both partisans and non-partisans where non-partisans in each country are treated as separate, we use these predicted values to assess whether we are looking at a *partisanship* effect or whether specific party communication indeed matters.

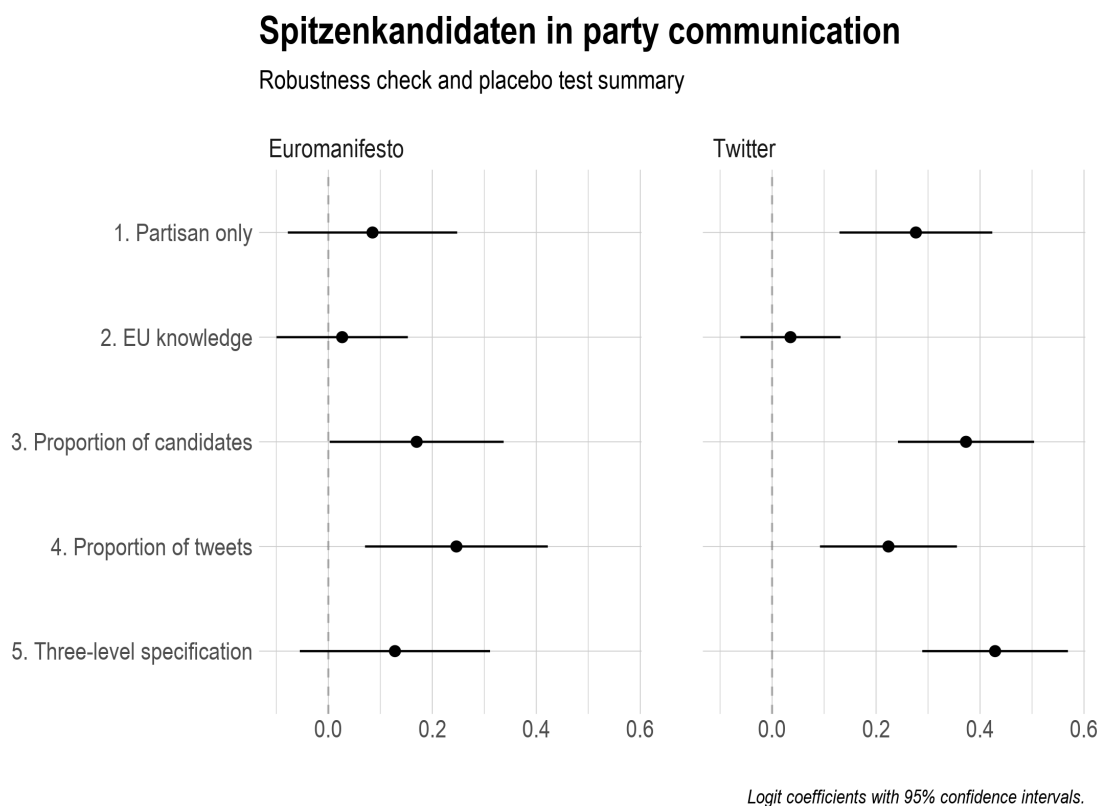
The average recognition across the 27 non-partisan groups is 0.122, indicating very low recognition among those who do not identify with a party. Those groups that are identifiers but where the parties they identify with had no Twitter reach relevant for lead candidate content (44 groups) have an average recognition of 0.126 (0.183 for no manifesto mentions, 118 parties). The comparison between non-partisans and partisans with no relevant party communication suggests that differences in recognition due to uninformative partisanship are very small. Conversely, the groups where there is at least some relevant Twitter reach (105), the average recognition is 0.222 (0.232 for Euromanifesto, 31 parties), indicating much larger differences. Similarly, we fit our model with all predictors on a subsample including partisans

only (Figure 3, first entry), and we see that the results are unchanged regarding our Twitter reach conclusions.

Not a general EU knowledge effect

Second, we tackle the question of whether we are looking at some overarching EU-related contribution. This can be considered as a placebo test and we fit the same model to the data where our outcome is general EU knowledge rather than recognition, and we find no statistically or substantively significant effect of the *Spitzenkandidaten*-relevant opportunity structure (second entry in Figure 3). The linkages and opportunity structures we measure are thus specific and this strengthens our confidence in our measurements and substantive findings.

Figure 3: Summary of robustness and placebo test results



Social media effects are not dependent measure choice or specification

We made a deliberate choice to focus on a measure of Twitter communication that is closer to the opportunity structure (follower count-based). However, this also limits possible comparisons between platforms, granting some potential advantage to the social media platform results. Figure 3 also displays results from our model including all predictors with two alternative measures of the Twitter communication: proportion of candidates out of total candidates on Twitter mentioning the system/candidates and proportion of tweets mentioning the system/candidates out of the total tweets from the campaign, for each party. These are closer in principle to the manifesto measure used as a comparison. There is minor variation in the effect size for the proportion of tweets measurement; however, substantively and in terms of statistical significance our results are robust.

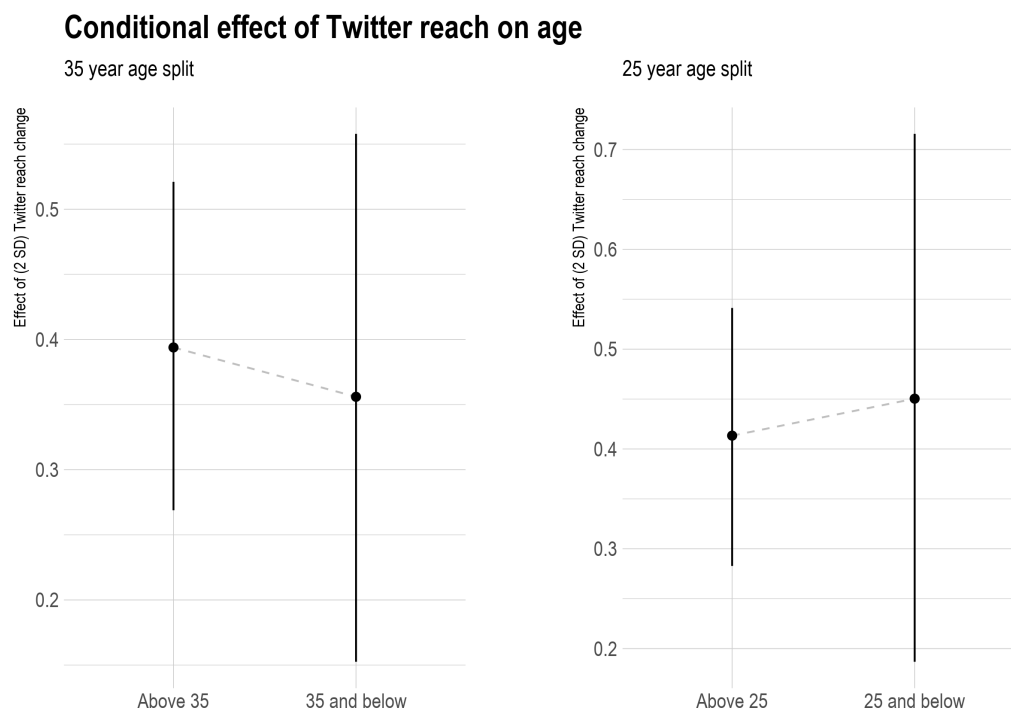
With the aim of keeping a similar specification for the models on the subsample where press release data was available, we decided to use country dummies. However, if our only focus is on the case where we cover 27 countries, we can alternatively fit a three-level hierarchical model (using our original Twitter reach measure), adding countries as the highest level of grouping. As in the previous cases, our checks indicate that the Twitter-related findings are robust with respect to this otherwise preferred specification choice.

Opportunity structure as indirect source of factual knowledge

We highlight here that Twitter-related party communication differences do not act through potentially direct exposure. Younger citizens are regarded as heavier social media users, hence if this effect would go through some sort of a potential for direct exposure, we would expect the party communication effect to be stronger for this group of people. Keeping the specification from our main model on the full sample size, we fit two models where the only change is related to using an age-group dichotomy: 35 and below in the first case and 25 and

below for the second case, compared to older citizens. This effect is let to vary across party group (including no identification) and the age-group slope is a function of the Twitter reach measure.

Figure 4: No differences conditional on age-group



We find no evidence for any difference in terms of Twitter reach effect size across age-groups (see Figure 4). While a rough proxy for potential exposure as younger citizens might use social media more often but not for politics, this result indicates that party communication, even on social media, has a more general contribution to the opportunity structure. All detailed results from this section are reported in SI 4, where we also report results from a jackknife approach excluding one country and re-fit the models and an alternative Twitter outreach measure that is scaled by party supporter size. These additional tests indicate that all our substantive results are robust to various specifications and operationalization choices.

Conclusions

We set out to answer whether today's political parties can inform their supporters by providing objective political knowledge and focused on the novel, low-salience institutional feature of *Spitzenkandidaten* in a comparative perspective. Generally, our answer is yes and in terms of opportunity structure building, novel communication platforms such as Twitter emerge as potentially important for the study of political knowledge acquisition. At the same time, we find that the role of manifestos in this regard is mixed, while (possibly due to the smaller sample) we do not detect a clear effect in the case of press releases.

These results are informative for the debate regarding the potential of official party communication (especially manifestos) to shape public opinion. In a cross-sectional, between-individual setting we find some evidence that party manifestos play a role in shaping what party supporters know about a topic. However, we see that a more direct measurement of an opportunity structure and thus informational context (rather than salience in communication by the supply side) is a more promising avenue for linking supply to demand in the study of political knowledge or electoral behavior. This echoes findings by Adams et al. (2014) where a broader measure of party position based on elite surveys fared better in explaining shifts in public opinion. This does not mean that we should dismiss traditional communication channels: their effects point to a positive impact, but this comes with more uncertainty. These differences are not surprising and are related to *what* these communication platforms can achieve: manifestos are a single-shot document early in the campaign that are intended to offer a comprehensive *policy* profile of the parties, whereas press releases are aimed directly at the media, and hence are potentially more dependent on media selection preferences.

We show that what parties emphasize or decide to talk about on social media matters for what their supporters and, by extension, the public end up knowing. We have also shown that both for Twitter and manifesto communication, we only find topic-specific, not general

knowledge-related differences and these go beyond a simple partisan versus non-partisan dichotomy. However, the results also indicate that while substantively important, the potential party communication influence is at best suitable for increasing the minimum levels of factual knowledge, rather than for creating expert party sympathizers. Furthermore, party communication contributes to a broader opportunity structure regarding the topic, and social media reach is unlikely, based on our measures, to act directly through potential exposure.

However, the cross-sectional nature of the data presented here makes causal claims – especially on the direction of influences – quite difficult and this is a key limitation. The public-to-elite direction implies that the salience of the *Spitzenkandidaten* system in a campaign is a result of following the (supposed) interest towards the topic among the public or the party’s own supporters. While our empirical strategy cannot directly dismiss this direction, we regard this mechanism as unlikely given the novelty of the topic, its low salience, and the fact that the *Spitzenkandidaten system* is an elite-driven project. Accordingly, citizens had at best little substantive knowledge about this topic before the campaign as they had neither the motivation nor the opportunity to learn about it.

Most importantly, we need to emphasize that we rely on the previously tested assumption that the link between parties and their supporters is driven by selective exposure and motivated reasoning (Brenes Peralta et al., 2017; Gaines et al., 2007; Levendusky, 2013; Taber & Lodge, 2006), but we do not test it explicitly in our cross-sectional analysis. Similarly, we do not test how information from the communication platforms reaches citizens, directly or indirectly. Based on existing research we can only assume that topics which are emphasized by parties are likely to reach citizen via accidental, unintended exposure, and through the media coverage (Bode, 2016; Shehata & Strömbäck, 2018). These limitations need to be considered as a next step in understanding how what parties and candidates say reaches their supporters or the general public (Geers, Bos, & de Vreese, 2017; Lecheler & de Vreese, 2017). Furthermore,

for our test case, negative information or negative campaigning was not at play, but social media communication might attract more interaction and negativity compared to the two other party sources (especially manifestos). This is important as it has been shown that negative information might cut through this protective shield of selective exposure more easily (Donsbach, 1991).

Finally, we focused only on Twitter, but platforms such as Facebook should be considered as well, especially because the popularity of these social media platforms might vary across countries, or even specific party supporters. With these limitations and potential future avenues in mind, our results consistently indicate that what parties talk about matters for what voters know and this opportunity structure for knowledge acquisition is likely influenced by newer communication tools such as Twitter that are playing an increasingly more important role in election campaigns.

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Online Supplementary Information for

“Informing the Public: How Party Communication Builds Opportunity Structures”

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Supplementary Information 1: Data description

Table SI1.1: Party level descriptive summary

	n	Party	Cand	Tw.	Cands mention	Spitzen reach	Manifesto salience	N press	N press mention
AT	87	The Greens	10	1817	5	185797	0.707	188	9
	161	Austrian Social Democratic Party	13	2319	7	250933	0	519	47
	104	Austrian Freedom Party	5	891	5	27330	0	222	21
	35	NEOS	9	846	4	10658	0	54	0
	121	Austrian People's Party	11	397	5	67197	0.656	305	33
BE	5	Alliance for the Future of Austria	7	9349	3	215873		120	4
	30	Ecologists	2	44	1	585	0.057		
	46	Green	1	141	1	48928	0		
	28	Centre Democrat Humaniste					0.086		
	103	Francophone Socialist Party	4	186	2	5218	0		
	13	Workers Party of Belgium	2	191	1	1493			
	51	Socialist Party Different	4	737	2	17283	0		
	45	Open Flemish Liberals and Democrats	2	52	2	1818	0		
	80	Reform Movement	4	211	0	0	0		
	78	Christian Democratic and Flemish Party	2	21	1	3621	0		
	25	Flemish Interest	1	198	1	38087	0		
BG	118	New Flemish Alliance	1	11	1	1763	0		
	128	Coalition for Bulgaria	2	18	0	0	0		
	165	CEDB	5	88	1	1335	0		
	23	Reformist Bloc	2	238	1	3046	0		
	21	BG coalition (2)					0		
HR	22	Attack	1	27	0	0	0		
	27	Movement for Rights and Freedom	1	203	0	0	0		
	7	Altertive for Bulgarian Revival	1	150	1	2968			
	80	Odraēivi razvoj Hrvatske					0		
	83	Social Democratic Party of Croatia	5	220	2	5008	0		
CYP	17	Croatian Labouristi - Labour Party	1	37	0	0			
	5	Croatian Social-Liberal Party	1	65	1	1678			
	157	Croatian Democratic Union	6	409	0	0	0		
	63	Progressive Party of the Working People	1	1	0	0	0		
	22	Social Democrats' Movement	1	43	0	0	0		
CZ	30	Democratic Party	3	187	0	0	0		
	87	Democratic Coalition	1	145	1	8158	0		
	25	Green Party	1	82	1	16492			
	98	Communist Party of Bohemia and Moravia	3	88	0	0	0		
	146	Czech Social Democratic Party	5	97	1	955	2.353		
	49	Civic Democratic Party	6	136	2	739	0		
	203	ANO 2011	3	107	2	812	0.227		
	39	C and Dem Union / Czechoslovak People's Party	5	239	2	414	0.549		
DK	56	TOP 09	5	58	1	300	0.428		
	14	Party of Free Citizens	2	535	1	1141	0.209		
	218	Social Democratic Party	7	887	1	1106	0		
	66	Socialist People's Party	6	405	1	187	0		
	55	Radical Party	7	2263	4	99194	0		
	182	Liberals	5	187	1	1667	0		
	17	Liberal Alliance	2	210	1	640			
	38	Conservative People's Party	5	405	1	511	0.847		
EE	164	Danish People's Party	4	295	2	10565	0		
	19	People's Movement against EU	6	198	0	0	0		
	17	Independent	5	171	1	299			
	96	Social Democratic Party	2	30	0	0	0.424		
	95	Estonian Center Party	1	16	0	0	0		
FI	82	Estonian Reform Party	3	154	0	0	0		
	48	Pro Patria and Res Publica Union	6	560	1	4093	0		
	59	Green Union	17	3917	11	231287	0		
	44	Left Wing Alliance	11	1144	4	16678	0		
	97	Finnish Social Democrats	17	1393	3	16103	0		
	30	Christian Democrats in Finland	13	751	1	152	0		
	157	tiol Coalition	15	2800	2	119508	0		
	144	Finnish Centre	16	1257	3	31841	0		
FR	53	True Finns	11	399	0	0	0		
	16	Swedish People's Party	8	446	3	2918	0		
	51	Europe Ecology - The Greens	36	6451	25	2609897	0.333	43	2
	42	Left Front	21	4264	16	1486122	0.238	108	8
	6	NPA						16	0
	177	Socialist Party	42	7188	33	2220223		48	4
DE	45	UDI + MoDem	39	6973	27	596626	1.364	8	2
	114	Union for a Popular Movement	44	4162	12	523493	0		
	3	Arise the Republic	7	965	2	6844			
	66	FN	28	2376	12	996377	0	111	2
	102	Alliance 90 / The Greens	15	2345	12	1834798	0.045	120	2
	292	Social Democratic Party	21	2238	17	391904	0.776	174	39
	105	The Left	3	22	0	0	0.05	143	0

	17	Free Democratic Party	21	1470	11	116989	0.109	50	11
	370	CDU/CSU	22	1023	21	316179	0	108	4
	27	Alternative for Germany	3	13	0	0	0	32	5
	14	Pirates	11	5922	7	157114	0		
GR	6	Ecologist Greens	8	451	3	1488	0	46	0
	53	Kommounistiko Komma Ellados					0.195	64	0
	213	Coalition of the Radical Left	15	1464	9	318484	0.554	334	35
	7	Democratic Left	9	490	1	2371		72	1
	30	Panhellenic Socialist Movement	16	1761	6	152383	0.912	65	11
	36	The River	8	512	4	7571	0		
	148	New Democracy	18	1415	4	11559	1.17	62	14
	19	Independent Greeks	7	410	0	0	0	182	0
	6	Laikos Orthodoxos Sygermos					0	33	2
	66	Laikos Syndesmos					0	67	1
HU	22	LMP					0		
	15	Egyutt					0		
	82	Hungarian Socialist Party	2	138	1	16805	1.099		
	29	DK					0		
	341	FIDESZ-KDNP Alliance	3	18	0	0	0		
	91	Jobbik					0		
IRE	15	Green Party	3	356	3	69998	0		
	3	Socialist Party	1	149	0	0	0		
	37	Labour Party	2	735	1	16729	0		
	102	Family of the Irish	6	1029	1	3903	0		
	107	Soldiers of Destiny	2	244	1	1777	0		
	65	Ourselves Alone	3	536	0	0	0		
ITA	10	Left Ecology Movement	20	3406	19	1099321	0		
	242	Democratic Party	34	7488	19	1021255	0		
	16	Union for Christian and Center Democrats	44	5041	13	116158			
	83	Go Italy	45	12968	13	83979			
	22	Brothers of Italy - tiol Centre-right	35	11877	11	443456			
	37	Northern League	22	11651	6	936284	0		
	110	Five Star Movement	29	3372	7	73991	0		
LAT	61	Green and Farmers' Union	6	425	0	0	0		
	84	Concord Centre	3	32	0	0	0		
	95	Unity	14	2399	7	84199	0		
	69	For Fatherland and Freedom	11	231	0	0	0		
	8	Latvijas Krievu Savienf'ba					0		
LIT	131	Lithuanian Social Democratic Party	2	10	0	0	0.169		
	83	Darbo Partija					0		
	55	Liberal Movement	7	318	0	0	0		
	24	Lithuanian Peasant and Greens Union	1	15	0	0	0		
	106	Homeland Union	4	67	0	0	0		
	70	Order and Justice	1	2	0	0	0		
	9	Aljanso Koalicija VTB					0		
LUX	46	The Greens	1	2	1	563	0		
	45	LSA					0		
	46	Democratic Party	3	5	1	425	0.231		
	99	Chreschtlich Sozial Vollekspartei					0.704		
	7	Alternative Democratic Reform Party	1	2	0	0			
PL	39	Congress of the New Right	2	258	0	0	0		
	16	United Poland	4	178	0	0			
	5	Europa Plus Social Movement	48	3764	6	9919			
	47	Democratic Left Alliance	6	309	2	38738	0		
	150	Civic Platform	30	3151	5	75302	0		
	147	Law and Justice	14	902	0	0	0		
	17	Polish Peasants' Party	14	1003	1	4230	0		
PT	4	Partido da Terra					0		
	25	Left Bloc	1	53	0	0	0	100	10
	62	Coliga√bao Democratica Unitaria					0	87	0
	190	Socialist Party	3	360	1	52414	0	176	7
	101	Partido Social Democrata - Partido Popular					0	77	11
RO	202	PSD-PC-UNPR	1	2	0	0	0.129		
	50	Democratic Liberal Party	2	223	2	3410	0.526		
	74	tiol Liberal Party	2	18	2	13021	0		
	14	People's Movement Party	2	34	1	5044	0.821		
	12	CDNPP	1	1	0	0			
	22	UDMR	3	77	0	0	0		
SK	248	Direction - Social Democracy	2	34	0	0	0.881		
	19	Freedom and Solidarity	4	89	1	93	0		
	66	Christian Democratic Movement	2	31	0	0	0		
	22	Democratic Party	2	32	0	0	0		
	17	NOVA +					0		
	31	OPIP	4	204	1	170	0		
	14	SNS					0		
	20	MKP					0		
	20	Bridge	1	112	0	0	0		
SI	9	Slovenian Peoples	2	363	1	20933	0		
	146	SDP	5	907	2	33674	0		
	104	SDP+Kacin	11	1204	6	64930	0		

	22	Positive Slovenia	1	6	0	0			
	84	Pensioners	1	1	0	0	0		
SPA	16	Union, Progress and Democracy	28	9479	4	9309	0		
	110	Podemos (We Can)	22	2995	2	1515	0		
	113	Spanish Socialist Workers' Party	39	10358	33	667313	0.578		
	5	Citizens - Party of the Citizenry	16	4828	5	10181	0		
	104	Popular Party	20	1142	10	505532	0.066		
	25	Left for the Right to Decide	20	4364	11	163027			
	3	European Spring	27	8251	20	422440	0		
	6	Vox	7	3742	2	8532			
SWE	12	Pirate Party	16	4827	1	17888	0		
	133	Green Ecology Party	27	3278	5	33331	0		
	87	Left Party	19	2311	3	3332	0		
	227	Social Democratic Labour Party	21	1598	3	65485	0		
	83	Liberal People's Party	29	2300	5	19746	0		
	29	Christian Democrats	25	3605	3	42982	0		
	167	Moderate Coalition Party	20	2790	2	27017	0		
	45	Sweden Democrats	8	2094	0	0	0		
	28	Centre Party	26	4711	3	402	0		
	41	Feminist Initiative	7	2194	0	0	0		
NL	62	Green Left	18	3262	12	297481	0.341	34	4
	102	Socialist Party	15	1618	7	92602	0	84	5
	99	Labour Party	34	3630	9	58020	0.109	90	3
	161	Democrats '66	25	4420	12	242780	0	75	5
	89	PVV	16	1989	8	39673	0	12	1
	89	Christian Democratic Appeal	25	3632	15	143854	0	5	3
	55	Christian Union	12	1469	6	22759	0	67	8
	38	Party of Freedom	5	608	4	652500	0	25	2
	19	Party for the Animals	10	1317	3	2258	0	45	11
UK	26	Green Party	42	8755	24	201019	0	47	4
	12	Sinn Fein	1	345	0	0	0		
	133	Labour Party	52	8746	9	32939	0	157	0
	21	Liberal Democrats	49	5075	11	235219	0	88	0
	131	Conservative Party	43	3759	5	194899	0	14	0
	11	SDLP	1	36	0	0	0		
	5	Party of Wales	4	627	0	0	0		
	10	Scottish National Party	6	740	1	19604	0		
	38	DUP	1	51	0	0	0		
	60	UKIP	39	10953	10	78599	0	52	0

Notes: Cand = number of candidates on Twitter. Tw = tweets. Cands. mention = number of candidates who mention the Spitzenkandidaten. Manifesto salience expressed in percentage.

Figure SI1.1: Distribution of Spitzenkandidaten recognition

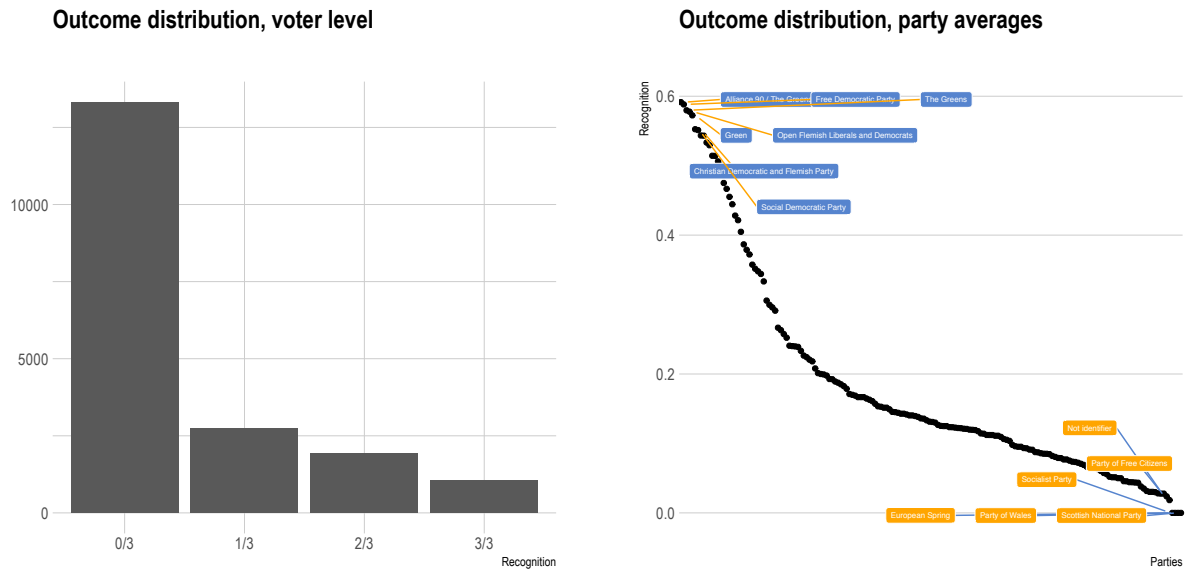


Table SI1.2: Recognition descriptive statistics, as % of respondents

	No correct	1 correct	2 correct	All correct
Austria	42.92	19.79	24.17	13.12
Belgium	23.07	40.75	15.34	20.84
Bulgaria	73.16	12.12	10.58	4.14
Croatia	81.41	9.23	6.54	2.82
Cyprus	73.25	16.11	6.99	3.65
Czech Republic	89.05	6.62	3.13	1.2
Denmark	74.7	16.71	6.42	2.18
Estonia	91.3	5.52	1.8	1.38
Finland	66.06	17.08	8.09	8.77
France	76.5	10.83	10.4	2.28
Germany	22.56	14.07	55.74	7.63
Greece	68.41	15.67	8.51	7.41
Hungary	79.95	12.85	4.63	2.57
Ireland	80.28	15.38	3.5	0.84
Italy	67.5	16.69	8.71	7.09
Latvia	80.77	14.66	2.35	2.21
Lithuania	86.67	8.3	2.72	2.31
Luxembourg	12.26	38.69	27.79	21.25
Poland	86.21	9.34	2.73	1.72
Portugal	78.23	13.71	4.52	3.55
Romania	80.67	12.79	4.65	1.89
Slovakia	84.5	11.63	2.45	1.42
Slovenia	74.04	8.23	5.96	11.77
Spain	83.09	6.94	6.94	3.03
Sweden	72.89	17.48	6.55	3.08
The Netherlands	63.31	17.29	6.04	13.36
United Kingdom	84.28	13.69	1.47	0.57

Table SI1.3: Correctly linked candidate to party, as % of respondents

	Juncker	Schulz	Verhofstadt
Austria	45	40.73	16.04
Belgium	30.95	25.81	70.09
Bulgaria	14.32	17.98	5.27
Croatia	13	11.7	4.23
Cyprus	17	11.82	6.4
Czech Republic	5.07	6.24	3.49
Denmark	17.71	11.11	3.35
Estonia	4.28	5.05	2.09
Finland	26	18.01	12.08
France	13.53	17.72	2.75
Germany	65.69	68.92	7.82
Greece	23.1	19.08	10.04
Hungary	9.78	10.65	6.3
Ireland	13.68	4.7	1.71
Italy	14.66	23.72	9.89
Latvia	15.24	4.44	2.96
Lithuania	5.97	8.03	4.56
Luxembourg	82.76	48.28	23.89
Poland	4.82	7.39	4.18
Portugal	13.05	10.12	5.46
Romania	5.72	12.5	3.81
Slovakia	6.78	7.12	4.97
Slovenia	19.88	18.26	11.18
Spain	10.78	10.33	3.52
Sweden	21.22	11.77	5.1
The Netherlands	24.14	16.45	24.83
United Kingdom	9.32	3.63	1.98

Supplementary Information 2: Search validation

We review here the strategy employed for selecting the distance threshold and results from an evaluation exercise viewed as part of a validation process. Before that, we reiterate from the main text how we handled the Twitter search, with an additional example. We are looking at Twitter with a 160-character limit where the text can be written on various devices, with abbreviations or potential spelling errors, especially in the case of names as they are not part of usual autocorrect dictionaries. We calculate distance (Jaro-Winkler) between each element of our thesaurus and terms of the same length (n-grams) from each Tweet. This generates a set of distance scores between each element of the Tweet and each term of the thesaurus. Across these values within one Tweet, we take the minimum distance and record that as the result of our search. Table SI2.1 displays this process with a hypothetical Tweet being “Schultz is best for the EU” and the subset of the thesaurus pertaining to Martin Schulz.

Table SI2.1: Generating distance

Tweet (split)	Vocabulary element	JW score	Minimums	Final score
the	Schulz	0.5		
schultz	Schulz	0.0476		
is	Schulz	0.4444		
for	Schulz	1	0.0476	
best	Schulz	0.5278		
EU	Schulz	1		0.0476
the EU	martin schulz	0.5042		
is best	martin schulz	0.5402		
for the	martin schulz	0.4569	0.4569	
schultz is	martin schulz	0.5141		
best for	martin schulz	0.4807		

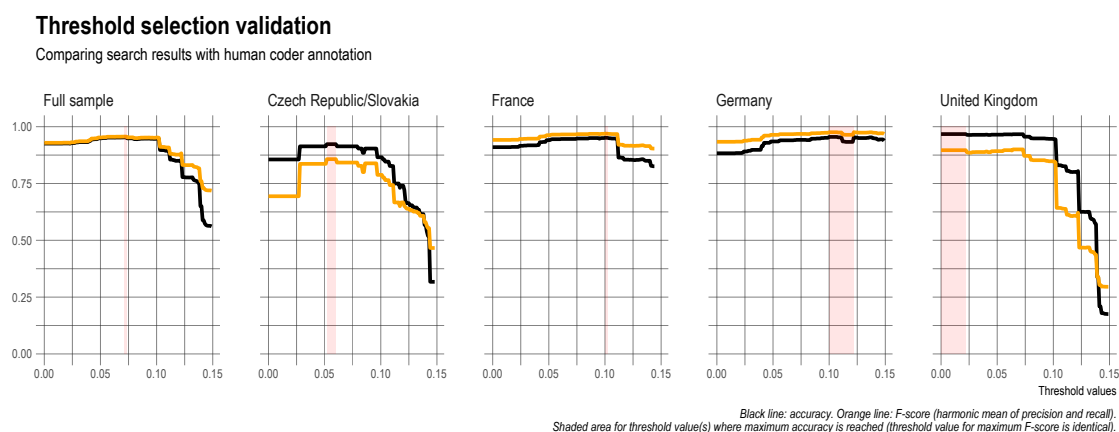
Cut point selection through human validation

As reported in the text, we tag a Tweet a mention of the candidate or position element of interest if the distance metric is below 0.05. We report here the general strategy and validation exercise covering the UK, Germany, Czech Republic, Slovakia, and France for the quantities of interest. In these countries, we selected Tweets that had an approximate distance score between 0 and 0.15 (reminder: 0 indicates at least one perfect match from at least one element of our thesaurus), for any of the thesaurus of interest. To be more precise, these are Tweets from candidates running in these countries, not necessarily Tweets in the given country’s language.

Given available resources we were able to assign all Tweets in question from the Czech Republic, Slovakia, and the UK to one coder, and a random subsample of 1000 Tweets from Germany and 1000 Tweets from France to another coder (with different language skills). The two coders were student assistants at the Mannheim Centre for European Social Research (MZES). Since this is a follow-up checking task with a thesaurus supplied and the resources were limited, each Tweet was coded only by one coder, hence no inter-coder reliability was calculated. The task followed exactly the automated search task: coders were asked to mark for each candidate appearance in the text (0 = no, 1 = yes), and the same for the institution related search terms, with the exact list of terms supplied prior to the coding. Thus, we evaluate here the automated text coding, rather than the relationship between the concept and the used terms (not a validation exercise of the thesaurus used). We discarded Tweets that were highlighted to be in a language in which coders were not able to code the content.

As our paper focuses on any mention, we have recoded the human annotation to be 1 if any relevant feature is found, 0 otherwise. Of course, there were multiple Tweets that mentioned more than one candidate, or candidates and institutional terms together. We use the results of the human coding as *gold standard*, and calculate accuracy, precision, and recall for different cutoff thresholds of our machine search.¹

Figure SI2.1: Contrasting human coding and search results for different distance thresholds



¹ Accuracy is the proportion of tweets correctly identified; precision is the proportion of tweets with predicted value of mention correctly classified; recall is the proportion of tweets with predicted value of no mention correctly classified.

Figure SI2.1 displays the relationship between the distance metric threshold and the result of the human coding, focusing on accuracy and F-score (harmonic mean of precision and recall). Overall, we see good performance compared to our human coding. If all countries considered, the *optimal* threshold would be 0.06, which is slightly higher (more tolerant) than what we employ. However, we also see that these optimal thresholds vary across countries. While only a subset of countries was included in the validation, it is important to note that our current threshold and approach definitely assures that 1) we do not have false positives, limiting potential issues in the UK, and 2) results in better depiction of social media communication search than identifying only exact matches, with partially reducing false negatives in Germany. Since there is a between platform comparison component in the main paper, we use the more conservative measure as we especially want to avoid false positives. With generally low salience of the Spitzenkandidaten, we do not want our social media results to be driven by potential overestimation of salience compared to the two other communication platforms analyzed.

Face validity: lead candidate debate and frequency of mentions

A second way to check for face validity is linking the frequency of mentions to an important campaign event. One such event was the televised lead candidate debate held on 15th of May 2014 in Brussels (EBU), with 5 of the lead candidates present. Figure SI2.2 displays the estimated mentions aggregated at the day level across all countries. We see that indeed, around the debate the mentions of lead candidate related terms peaks. Second, as displayed in Figure SI2.3 this peak holds also when we factor in the overall increase in the Tweets, lending further confidence in our content retrieval method and consequently the measurement of attention dedicated to lead candidates.

Figure SI2.2: Spitzenkandidaten relevant mention count throughout the campaign

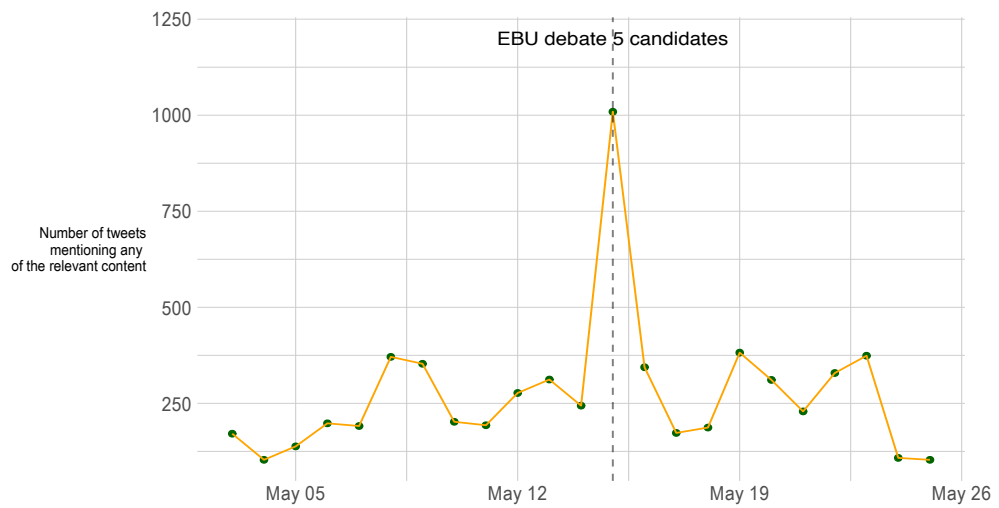
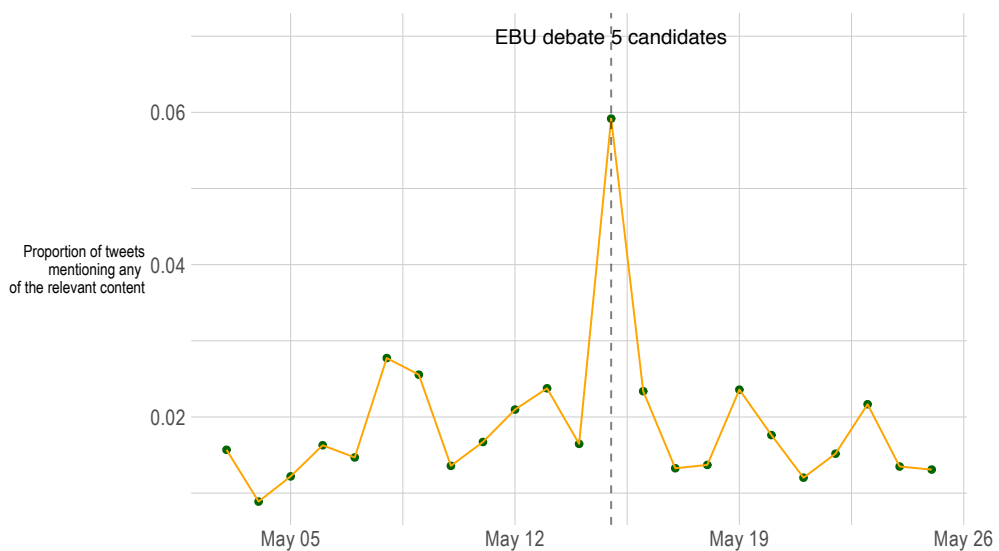


Figure SI2.3: Spitzenkandidaten relevant mention proportion (of total Tweets) throughout the campaign



Supplementary Information 3: Detailed description of Twitter outreach measure

Our main measure relies on follower information that each candidate had at the moment of each Tweet sent. Accordingly, we treat the number of followers as possible outreach, or audience. As described in the main text, for party, we sum the total number of followers reached (all candidates, all Tweets) and the log of this count will be our denominator. In an identical manner, we sum the total number of followers but only including Tweets that mentioned the Spitzenkandidaten. The log of this count (adjust with + 1 before log transformation) is our numerator. Overall, these steps assure that extremely high visibility and popularity candidates do not scale off the charts (through log) and that our outreach measure is still in line with the salience-based measures (through dividing by total outreach) on the other platforms.

Table SI3.1: Measure calculation example

Party 1			Party 2		
	Content	Followers		Content	Followers
Candidate 1			Candidate 1		
	Tweet 1 Spitzen	1000		Tweet 1 Not Spitzen	20000
	Tweet 2 Spitzen	1100		Tweet 2 Not Spitzen	22000
	Tweet 3 Not Spitzen	1110	Candidate 1		
Candidate 1				Tweet 1 Spitzen	30000
	Tweet 1 Spitzen	1000000		Tweet 2 Spitzen	30100
	Tweet 2 Not Spitzen	1001000			
Party 1			Party 2		
Numerator	Log (1000 + 1100 + 1000000 + 1)		Numerator	Log (30000 + 30100 + 1)	
Denominator	Log (1000 + 1100 + 1110 + 1000000 + 1001000)		Denominator	Log (20000 + 22000 + 30000 + 30100)	
Final score:	0.952		Final score:	0.954	

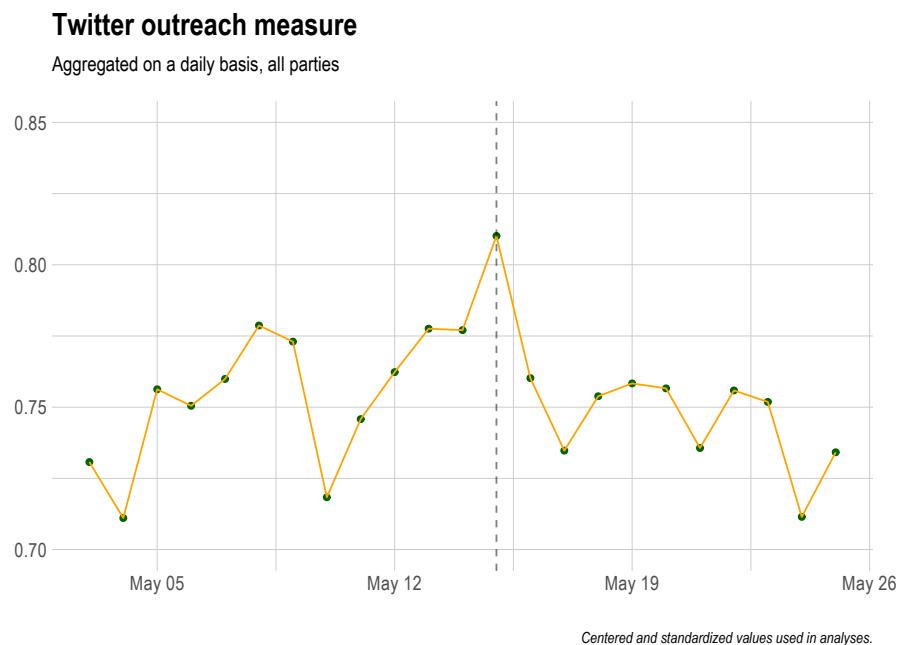
Note: per Tweet follower numbers can both increase and decrease. This reflects the changing number of people following each candidate depending of the time of Tweet. +1 is added to the numerator before taking the log.

First, in Table SI3.1 we present a hypothetical example of different candidates and Tweet content that exemplifies our measure calculation. Through this example we show that Tweets from overly popular candidates will not drive these numbers. While the measure pulls absolute numbers upwards, these should not be understood directly (1:1) salience or proportion outreach measures, given the transformations involved. We focus on between party comparisons and in our analysis, we mean center and rescale these predictors to better

gauge relative patterns. We do not aim to formulate conclusions such as X amount increase in number of Tweets should mean Y amount of increase in recognition, as we believe those conclusions are misleading. Rather, we focus on a comparably scaled opportunity structure and between party differences.

Second, as displayed in Figure SI3.1, when calculating our outreach measure on a daily basis, we see good face validity: outreach is at its maximum on the day of the main Spitzenkandidaten debate, also peaking around the 8 May debate that was televised with good rating in Germany and Austria.

Figure SI3.1: Spitzenkandidaten relevant mention proportion (of total Tweets) throughout the campaign



Finally, as referenced in the main text analysis section, we carry out several robustness tests, including those that alter the Twitter outreach measurement. The three alternatives presented are: (1) for each party, the proportion of candidates on Twitter mentioning at least once the Spitzenkandidaten, (2) the proportion of all Tweets sent by each party (total of candidates) mentioning the Spitzenkandidaten, and (3) the sum of all the potential followers reached by Spitzenkandidaten tweets (summed each Tweet following for each party) and divided by the number of votes the parties received in the 2014 EP elections. This last alternative is another way to account for party size differences on one hand, but also allows for better comparability or scaling between countries on the other hand. The first two

alternatives are provided for a closer relationship with how the salience measures were calculated on other platforms. Below, in Table SI3.2 we summarize how the three alternative measures relate to our main Twitter outreach measure through Spearman’s correlation coefficients. We prefer rank order correlations as these measures are on different scales. As seen, there is a very high correspondence between these.

Table SI3.2: Correspondence between different Twitter measures

	Proportion candidates	Proportion tweets	Reach/votes in election
Ratio of log follower count (original)	0.89	0.93	0.86

Supplementary Information 4: Variable description and detailed results from bivariate models and robustness tests

Variable description

Explanatory variables, individual component (level 1), Original questions available at the following link:

<http://europeanelectionstudies.net/wp-content/uploads/2014/05/Master-Questionnaire.pdf>.

Sex: original question D10, recoded to 1 ‘female’ and 0 ‘men’.

Age: original question VD11.

Secondary education: original question VD11, recoded 1 for those who ended their education between the age of 16 and 19 and 0 otherwise.

Tertiary education: original question VD8, recoded 1 for those who ended their education after the age of 20 and 0 otherwise.

EU Knowledge: measure of political knowledge that ranges from 0 to 2, reflecting the correct True/False answers given by each respondent to. “Don’t Know” answers were coded as incorrect answers as we consider that they reflect a degree of ignorance similar to the one reflected by incorrect answers.

QPP23.1. Switzerland is a member of the EU. True/False (correct answer: False)

QPP23.2 Each Member State elects the same number of representatives to the European Parliament. True/False (correct answer: False)

Interest in politics: original wording QP6.9 The original variable takes values between 1 = “Yes, definitely” and 4 = “No, not at all”. Scale was reversed so that low values reflect low interest in politics and high values reflect high interest in politics.

Campaign exposure: original wording QP8, responses was recoded to 0 reflecting ‘No, not don’t remember’ and 1 reflecting ‘yes, remember’.

Political discussion: a mean of three items (Cronbach alpha = 0.87). Scale was reversed so that low values reflect low frequencies of discussion and high values reflect high frequency of discussion. Original variables rescaled to [0, 1] range.

D71_1 discussion about national politics matters, 3-point scale 1 = “Frequently”, 2 = “Occasionally” and 3 = “Never”

Dd71_2 Discussion about European politics matters, 3-point scale 1 = “Frequently”, 2 = “Occasionally” and 3 = “Never”

D71_3 Discussion about local politics matters), 3-point scale 1 = “Frequently”, 2 = “Occasionally” and 3 = “Never”

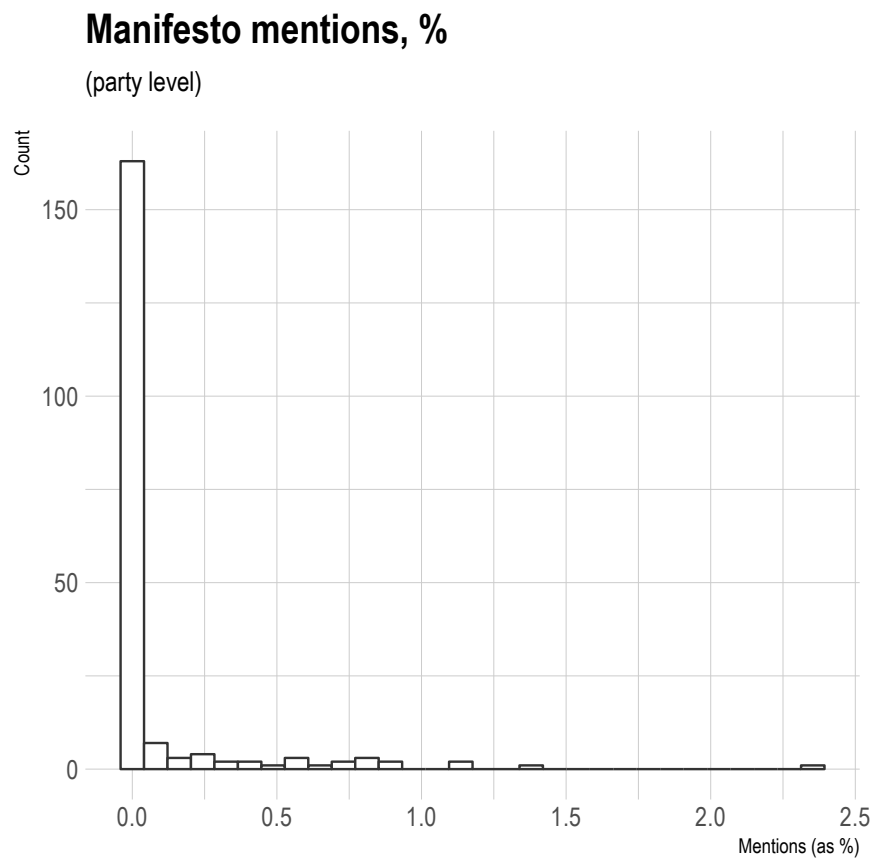
EU position: original question wording QPP18 order was reversed and rescaled in the analysis, the final original variable takes values for 0 reflecting that the respondent considers that “European unification has already gone too far” to 10 reflecting that the respondent considers ‘European unification should be pushed further.

News consumption: variable computed as the maximum of three items QP9.1 (TV news), QP9.2 (online news) and QP9.3 (newspaper news), each measured on scale ranging from 1 = “Every day/almost every day” to 6 = “Never”. Scale was reversed so that low values reflect low media consumption and high values reflect daily media consumptions.

Explanatory variables, party level (level-2):

Party of lead candidate: coded 1 for the national parties that supported any of the lead candidates in the runoff for the 2014 EP elections and 0 otherwise.

Figure SI4.1: Manifesto mention distribution



Bivariate models: Summary tables

Table SI4.1: Bivariate models (logit coefficients)

	Twitter model	Manifesto model	Press model
Intercept	-1.65 (0.06)	-1.85 (0.08)	-1.25 (0.12)
Twitter reach	0.83 (0.12)		
Manifesto mention (=1)		0.49 (0.18)	
Press release salience			0.39 (0.25)
AIC	36181.86	36849.20	13281.47
BIC	36205.50	36872.89	13301.53
N	19551	19917	5927
Parties	197	197	52
(Var) Parties	0.69	0.88	0.72

Table SI4.2: Bivariate models (logit coefficients) for Jaro-Winkler text search in press releases

	Twitter model	Manifesto model	Press model (JW)
Intercept	-1.65 (0.06)	-1.85 (0.08)	-1.24 (0.12)
Twitter reach	0.83 (0.12)		
Manifesto mention (=1)		0.49 (0.18)	
Press release salience			0.53 (0.24)
AIC	36181.86	36849.20	13279.25
BIC	36205.50	36872.89	13299.31
N	19551	19917	5927
Parties	197	197	52
(Var) Parties	0.69	0.88	0.69

Press release: Alternative search

Table SI4.3: Press release models (from Table 3 in main text) with Jaro-Winkler text search in press releases

	Press release salience, JW (subsample)	All three, JW (subsample)
Intercept	-0.84 (0.13)	-0.86 (0.11)
Sex (Female = 1)	-0.41 (0.04)	-0.41 (0.04)
Age	0.38 (0.04)	0.38 (0.04)
Secondary education	0.22 (0.05)	0.22 (0.05)
Tertiary education	0.42 (0.06)	0.42 (0.06)
EU knowledge	0.37 (0.05)	0.38 (0.05)
Interest in politics	0.51 (0.05)	0.51 (0.05)
Campaign exposure	0.30 (0.05)	0.30 (0.05)
Political discussion	0.25 (0.05)	0.25 (0.05)
EU position	0.22 (0.04)	0.22 (0.04)
News consumption	0.40 (0.05)	0.40 (0.05)
Party of lead candidate	0.21 (0.10)	0.06 (0.09)
Press release salience (JW)	0.22 (0.10)	0.11 (0.08)
Manifesto salience		0.26 (0.09)
Twitter reach		0.21 (0.07)
AIC	10983.16	10968.09
BIC	11115.15	11113.27
N	5427	5427
Parties	43	43
(Var) Parties	0.06	0.02

Country coefficients from main models

Table SI4.4: Country coefficients

	Baseline (all)	Twitter reach (all)	Manifesto mentions (all)	Both (all)	Baseline (subsample)	Press release salience (subsample)	All three (subsample)
Intercept (<i>Austria</i>)	-0.78 (0.16)	-0.78 (0.14)	-0.85 (0.15)	-0.82 (0.14)	-0.88 (0.14)	-0.84 (0.14)	-0.86 (0.11)
Belgium	0.32 (0.19)	0.36 (0.17)	0.38 (0.19)	0.39 (0.17)			
Bulgaria	-1.41 (0.22)	-1.14 (0.20)	-1.33 (0.22)	-1.11 (0.20)			
Croatia	-1.68 (0.26)	-1.39 (0.23)	-1.60 (0.26)	-1.36 (0.23)			
Cyprus	-1.66 (0.24)	-1.34 (0.22)	-1.57 (0.24)	-1.31 (0.22)			
Czech R.	-2.55 (0.22)	-2.43 (0.19)	-2.61 (0.21)	-2.47 (0.19)			
Denmark	-1.85 (0.21)	-1.73 (0.18)	-1.79 (0.20)	-1.70 (0.18)			
Estonia	-2.78 (0.24)	-2.40 (0.22)	-2.74 (0.24)	-2.40 (0.22)			
Finland	-1.11 (0.20)	-1.03 (0.17)	-1.04 (0.20)	-0.99 (0.17)			
France	-1.79 (0.22)	-1.82 (0.20)	-1.82 (0.22)	-1.83 (0.20)	-1.76 (0.20)	-1.79 (0.19)	-1.86 (0.15)
Germany	0.47 (0.20)	0.53 (0.17)	0.43 (0.20)	0.51 (0.17)	0.49 (0.16)	0.48 (0.16)	0.47 (0.11)
Greece	-1.03 (0.22)	-0.97 (0.19)	-1.08 (0.21)	-1.00 (0.19)	-0.99 (0.18)	-1.03 (0.18)	-1.08 (0.13)
Hungary	-1.94 (0.26)	-1.65 (0.23)	-1.92 (0.26)	-1.66 (0.23)			
Ireland	-2.14 (0.23)	-1.95 (0.20)	-2.06 (0.22)	-1.92 (0.20)			
Italy	-1.10 (0.23)	-1.12 (0.20)	-1.02 (0.23)	-1.08 (0.20)			
Latvia	-2.08 (0.24)	-1.77 (0.21)	-2.00 (0.23)	-1.74 (0.21)			
Lithuania	-2.39 (0.23)	-1.98 (0.21)	-2.36 (0.23)	-1.98 (0.21)			
Lux.	0.55 (0.26)	0.59 (0.23)	0.55 (0.26)	0.58 (0.23)			
Poland	-2.29 (0.23)	-2.08 (0.21)	-2.21 (0.23)	-2.05 (0.21)			
Portugal	-1.67 (0.28)	-1.46 (0.24)	-1.59 (0.27)	-1.43 (0.24)	-1.62 (0.22)	-1.60 (0.21)	-1.35 (0.16)
Romania	-2.01 (0.23)	-1.81 (0.21)	-2.04 (0.23)	-1.84 (0.20)			
Slovakia	-2.44 (0.23)	-2.06 (0.21)	-2.41 (0.23)	-2.06 (0.21)			
Slovenia	-1.18 (0.23)	-0.98 (0.20)	-1.08 (0.23)	-0.93 (0.20)			
Spain	-1.89 (0.23)	-1.81 (0.20)	-1.91 (0.22)	-1.82 (0.20)			
Sweden	-1.78 (0.19)	-1.65 (0.17)	-1.69 (0.19)	-1.61 (0.17)			
Netherlands	-0.90 (0.19)	-0.91 (0.17)	-0.87 (0.19)	-0.89 (0.17)	-0.89 (0.15)	-0.95 (0.15)	-0.88 (0.11)
UK	-2.44 (0.22)	-2.34 (0.20)	-2.36 (0.22)	-2.30 (0.19)	-2.25 (0.19)	-2.22 (0.19)	-2.13 (0.14)

Table SI4.5: Robustness and Placebo test models

	Partisans only	EU knowledge	Proportion candidates	Proportion Tweets	3-level model
Intercept	-0.68 (0.15)	1.85 (0.11)	-0.90 (0.14)	-0.84 (0.15)	-2.14 (0.17)
Sex (Female = 1)	-0.39 (0.03)	-0.21 (0.03)	-0.41 (0.03)	-0.41 (0.03)	-0.41 (0.03)
Age	0.28 (0.03)	0.26 (0.03)	0.33 (0.03)	0.33 (0.03)	0.33 (0.03)
Secondary education	0.24 (0.04)	0.06 (0.04)	0.24 (0.04)	0.24 (0.04)	0.24 (0.04)
Tertiary education	0.41 (0.04)	0.42 (0.04)	0.42 (0.04)	0.42 (0.04)	0.42 (0.04)
EU knowledge	0.32 (0.03)		0.35 (0.03)	0.35 (0.03)	0.35 (0.03)
Interest in politics	0.56 (0.04)	0.28 (0.03)	0.57 (0.03)	0.57 (0.03)	0.57 (0.03)
Campaign exposure	0.11 (0.04)	0.03 (0.03)	0.13 (0.03)	0.13 (0.03)	0.13 (0.03)
Political discussion	0.27 (0.03)	0.19 (0.03)	0.29 (0.03)	0.29 (0.03)	0.29 (0.03)
EU position	0.19 (0.03)	-0.14 (0.03)	0.20 (0.03)	0.20 (0.03)	0.20 (0.03)
News consumption	0.43 (0.03)	0.18 (0.03)	0.42 (0.03)	0.42 (0.03)	0.42 (0.03)
Party of lead candidate	0.07 (0.06)	-0.03 (0.05)	0.28 (0.06)	0.30 (0.06)	0.16 (0.07)
Manifesto salience	0.09 (0.08)	0.03 (0.06)	0.17 (0.09)	0.25 (0.09)	0.13 (0.09)
Twitter reach	0.28 (0.07)	0.04 (0.05)			0.43 (0.07)
Twitter: proportion of cands.			0.37 (0.07)		
Twitter: proportion of tweets				0.22 (0.07)	
AIC	22005.36	27996.14	31782.76	31800.16	31844.88
BIC	22307.89	28310.13	32104.61	32122.00	31970.48
N	11834	18957	18957	18957	18957
Parties	149	176	176	176	
(Var) Parties	0.06	0.02	0.08	0.10	
Parties					176
Countries					27
(Var) Parties in country					0.11
(Var) Country					0.67

Table SI4.6: Age split models

	Age group, 35-year split	Age group, 25-year split
Intercept	-0.68 (0.14)	-0.72 (0.14)
Age (<=35)	-0.33 (0.05)	
Sex (Female = 1)	-0.42 (0.03)	-0.42 (0.03)
Secondary education	0.19 (0.04)	0.18 (0.04)
Tertiary education	0.37 (0.04)	0.35 (0.04)
EU knowledge	0.35 (0.03)	0.36 (0.03)
Interest in politics	0.59 (0.03)	0.61 (0.03)
Campaign exposure	0.13 (0.03)	0.12 (0.03)
Political discussion	0.30 (0.03)	0.30 (0.03)
EU position	0.20 (0.03)	0.19 (0.03)
News consumption	0.39 (0.03)	0.39 (0.03)
Party of lead candidate	0.16 (0.06)	0.16 (0.06)
Manifesto salience	0.10 (0.08)	0.14 (0.09)
Twitter reach	0.39 (0.07)	0.41 (0.07)
Age (<=35): Twitter reach	-0.04 (0.09)	
Age (<=25)		-0.30 (0.08)
Age (<=25): Twitter reach		0.04 (0.13)
AIC	31788.27	31660.25
BIC	32133.64	32005.41
N	18948	18854
Parties	174	168
(Var) Parties (intercept)	0.07	0.08
(Var) Parties (Age <= 35)	0.12	
(Cov) Intercept (Age <= 35)	0.02	
(Var) Parties (Age <= 25)		0.26
(Cov) Intercept (Age <= 25)		-0.03

Additional robustness checks

In Figures SI4.2 and SI4.3 we report the coefficients of the party communication measures from the final models in the main text in a setup where we drop a country for each iteration. Excluding one country and re-fitting the model shows that our results are not driven by any specific country.

Figure SI4.2: Systematic sub-sample analysis (1)

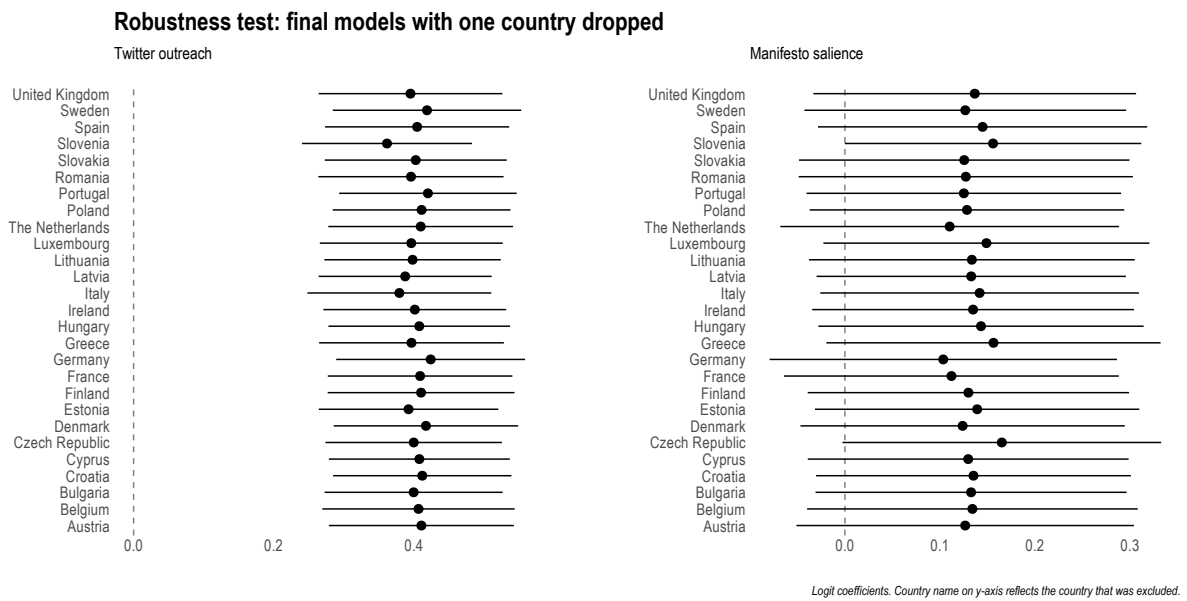
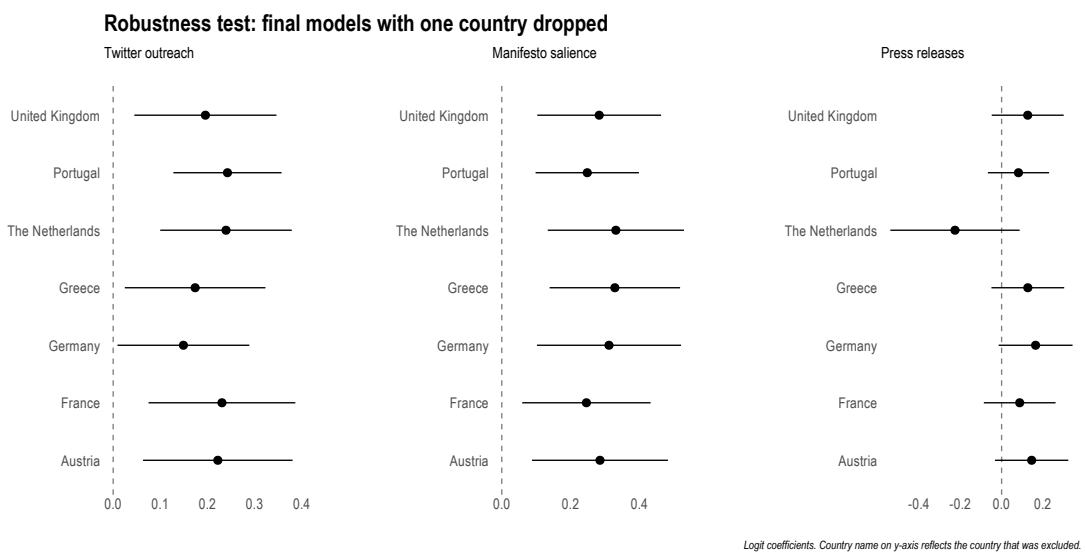


Figure SI4.3: Systematic sub-sample analysis (2)



As introduced in SI 3, a final alternative Twitter outreach measure (not included in previous robustness tests) is one where we simply sum all the potential followers reached by Spitzenkandidaten tweets (summed each Tweet following for each party) and divide it by the number of votes the parties received in the 2014 EP elections. After the same mean centering and two-standard deviation division rescaling, we report in the Table below results from the final models for both samples (full sample and where press-releases are available).

Table SI4.7: Twitter models

	Both (all)	All three (subsample)
Intercept	-0.83 (0.14)	-0.85 (0.11)
Sex (Female = 1)	-0.41 (0.03)	-0.41 (0.04)
Age	0.33 (0.03)	0.38 (0.04)
Secondary education	0.24 (0.04)	0.22 (0.05)
Tertiary education	0.42 (0.04)	0.42 (0.06)
EU knowledge	0.35 (0.03)	0.38 (0.05)
Interest in politics	0.57 (0.03)	0.51 (0.05)
Campaign exposure	0.13 (0.03)	0.30 (0.05)
Political discussion	0.29 (0.03)	0.25 (0.05)
EU position	0.20 (0.03)	0.22 (0.04)
News consumption	0.42 (0.03)	0.40 (0.05)
Party of lead candidate	0.18 (0.06)	0.08 (0.09)
Manifesto salience	0.14 (0.08)	0.26 (0.09)
Twitter reach/votes	0.43 (0.07)	0.21 (0.07)
Press release salience		0.09 (0.08)
AIC	31773.54	10967.57
BIC	32095.39	11112.75
N	18957	5427
Parties	176	43
(Var) Parties	0.08	0.02