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RESEARCH ARTICLE

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Tweeting through the glass ceiling? Twitter usage and candidates' biological sex in the 2019 European Parliament election campaign

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ABSTRACT

Scholarly research shows that the usage of social media in election campaigns produces similar gender imbalances compared to pre-digital times. A systematic comparative approach for a larger set of (European) countries, however, is still lacking. We contribute to filling this gap by studying how politicians all over Europe used Twitter in the 2019 election campaigns to the European Parliament (EP) and ask the following research questions: Do female and male candidates differ in their Twitter usage during campaigning, and if so, in which manner? And how can we explain such a deviating Twitter usage? Our study follows a predominantly quantitative approach, informed by qualitative interview data, and draws on Twitter data linked with individual-, party- and country-level contextual information. Our findings show that female candidates are less present on Twitter than their male counterparts, but both are equally active during the campaign. While biological sex does not significantly influence how frequently candidates post on Twitter, other campaign-related factors – such as incumbency and list placement – do. Our findings are insightful for both gender research as well as the impact of social media on political behaviour.

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Introduction

Gender equality[1] is among one of the main goals pursued by the European Union (EU): 'equality between women and men is a fundamental EU value, an EU objective and a driver for economic growth. The Union shall aim to promote equality between men and women in all its activities' (European Union 2016: 6). Nonetheless, a gap between men and women prevails in almost every domain of European politics: in Germany, women are underrepresented, in particular, at the *local level* of politics (Eder, Fortin-Rittberger, and Corinna 2016); in a number of European countries, women are less represented in *legislative debates* (Bäck and Debus 2019), and women's *political parties'*

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recruitment procedures still depend to a large degree on the inclusiveness of the selectorates in the early stage of candidate selection processes (Fortin-Rittberger and Rittberger 2015). It is thus not very surprising that gender inequalities not only shape political representation, but also crucial procedures in democratic political systems such as elections.

In this paper, we act on the assumption that stereotypes are a common feature in electoral campaigning. There is broad empirical evidence on this – in particular for the US context (Burrell 2014; Carlson 2001; Cassese and Holman 2018; Fridkin and Kenney 2009; Fox 1996; Herrnson and Lucas 2006; Kahn 1994; Kittilson and Fridkin 2008; Strach and Sapiro 2011), but also for European countries (Aaldering and van Der Pas 2020; Ennser-Jedenastik, Dolezal, and Müller 2017; Walter 2013). Female political actors are held to higher standards in candidate selection procedures (Verge and Astudillo 2019). Even in Finland, a country which is certainly known for gender equality, gender – and sex-related stereotypes still affect female candidate s' electoral success (Lefkofridi, Giger, and Holli 2019). In a research note, van der Pas (2021, 1) therefore questions whether 'the media advantages male politicians by giving them more attention than their female colleagues' and shows that female parliamentarians are indeed less visible in traditional news than men. Gender inequalities thus persist in traditional media outlets.

However, election campaigns have been altered tremendously during the last decade in line with the success of social media. Traditional communication tools of political actors, such as electoral manifestos (Braun 2023) and press releases (Hopmann et al. 2012), have been complemented by multiple communication tools (Popa et al. 2019). Social media tools restructure political communication by replacing the classic media logic of one-to-many with the principle of many-to-one. Accordingly, online campaigning via social media has become a crucial aspect during electoral contests enabling candidates to directly reach out to their voters (Gibson 2015; Jungherr 2016; Stier et al. 2018, 2026). Although social media has been considered the great equalizer for social inequalities such as gender inequality (Brandtzaeg 2017; Lutzky and Lawson 2019; Puente, Maceiras, and Romero 2019), the latter seem to be quite persistent in online campaigning via social media as well: Earlier studies show that male political actors tend to use social media more often than female political actors (Åström and Karlsson 2016; Carlson and Strandberg 2008; Karlsen and Enjolras 2016), whereas the latter use it in a more consequential way and generate more user engagement (Sandberg and Öhberg 2017). Moreover, gender differences remain in what concerns the communication style (Åström and Karlsson 2016; Yarchi and Samuel-Azran 2018) and content (Beltran et al. 2021). This pattern that the usage of social media in electoral campaigns produces similar gender inequalities compared to pre-digital times has been empirically proven also in more recent studies (Tsichla et al. 2023; Lühiste, Praet, and Popa 2025). What becomes additionally obvious when looking at the empirical studies at hand, however, is that a systematic comparative approach, aimed at understanding differences in the usage of social media in electoral campaigns, for a larger set of European countries is still lacking.

We seek to contribute to the gap in the literature by investigating the differences in how female and male candidates use Twitter in election campaigns. We study this question for the case of the campaigns in the run-up of the 2019 elections to the European Parliament (EP). Given that the EP is considered to be more equal in terms of the distribution between men and women than national parliaments, elections to the EP provide an opportunity to test the effectiveness of strategies to address gender inequalities in political campaigning.

More specifically, our reference to gender equality strategies pertains primarily to the comparatively high level of gender-balanced representation within the European Parliament – that is, a higher proportion of women among Members of the European Parliament (MEPs) than among Members of Parliament (MPs) in most national parliaments – rather than to specific legislative or procedural equality mechanisms. We therefore treat the EP as an upper-bound case in terms of representative gender balance and use this as the basis for our analytical strategy. Empirically, we investigate the Twitter usage of political candidates,[2] comparing (1) the number of active twitter accounts (Twitter presence) and (2) the number of tweets produced by female and male political actors (Twitter activity levels). Moreover, we seek to understand the reasons for the identified differences and similarities in terms of Twitter usage between men and women. Our research questions can be thus summarized as follows: *Do female and male candidates differ in their Twitter usage during campaigning, and if so, in which manner? Second, how can we explain deviating Twitter usage among European candidates?*

To address these research questions, we adopt a predominantly quantitative research design, informed by qualitative interview data, using the 'Twitter in the 2019 EP Election Campaigns' dataset (Stier, Popa, and Braun 2020) linked with individual-, party-, and country-level contextual information. In terms of statistical models in the quantitative part of the paper, we rely on multilevel modelling to account for a tiered structure of the argument we are testing. Our findings show that female candidates are less present on Twitter than male future Members of the European Parliament (MEPs), but if they are registered on the platform and use it, they show similar activity levels as their male counterparts. Interestingly, country – and party-level factors cannot explain why male candidates are more likely to have an active Twitter account. Instead, socio-psychological risks related to online harassment and resource-related aspects such as incumbency and list placement are most decisive. Regarding the activity levels of candidates, we find no systematic differences between women and men on how often they post on Twitter. Instead, individual level factors associated with the available resources to run an election campaign seem to matter (i.e. incumbency and list placement). This research contributes to a better understanding of how individual-level factors, particularly resource availability and perceived risks, shape gendered patterns of political engagement on social media during election campaigns.

Gender differences in the behaviour of political actors via social media

Empirical studies show that elections and election campaigns are by no means a gender-neutral phenomenon. From the offline context we know that patriarchal norms are prevalent with the result of gender stereotypes as a common feature in electoral campaigning. Although most research has been produced for the US context (Burrell 2014; Carlson 2001; Cassese and Holman 2018 Fox 1996; Fridkin and Kenney 2009; Herrnson and Lucas 2006; Kahn 1994; Kittilson and Fridkin 2008; Strach and Sapiro 2011), the same is true for the European context: Walter (2013) shows in her study on British, Dutch and German parliamentary election campaigns that the gendered usage of negative campaigning is also prevalent in Western democracies – but to a smaller degree than in US campaigns. Similarly, Ennser-Jedenastik, Dolezal, and Müller (2017) show for the case of Austria that women are less likely to attack men. Finally, Aaldering and van Der Pas

(2020) reveal in their study of Dutch newspaper articles that men are more often discussed in terms of the leadership traits than women. van der Pas (2021) also uncovers that the difference between men and women in terms of media presence is due to a bias in the political system which has a tendency to allocate better positions and therefore more power in politics to men. Gessler et al. (2025) show for two elections in Switzerland that the gender gap in media attention has decreased over time and that gender-stereotypical topics are relevant for both men and women in media coverage. Accordingly, gender differences in elections and election campaigns is more a rule than an exception.

What, then, of political behaviour on social media? As discussed above, platforms such as Twitter have become increasingly influential in the context of political campaigning. Even after Elon Musk's acquisition and the subsequent changes in content moderation policies and algorithmic dynamics – including amplification patterns (Nutakki et al. 2025) – Twitter (and its successor 'X') continues to serve as a relevant tool for political actors. Previous research has also shown that Twitter has been perceived as a useful platform for challenging patriarchal norms, particularly by drawing attention to social issues (Maas et al. 2018) and contributing to shifts in social practices (Gilmore 2012; Lutzky and Lawson 2019; Puente, Maceiras, and Romero 2019). Twitter was seen as a platform offering an opportunity to politicians 'who traditionally struggled for equal and equitable coverage in the traditional media' (Lühiste, Praet, and Popa 2025, 3). In contrast to that, other scholars argue that Twitter mostly reproduces societal structures (Armstrong and Gao 2011; Demirhan and Çakır-Demirhan 2015; Iveson 2017; Litchfield et al. 2018; Usher, Holcomb, and Littman 2018). Whereas a bulk of empirical studies have been provided to study these contradictory assumptions in the US (Bailey and Nawara 2018; Bos, van Doorn, and Nelson 2018; Cunha et al. 2014; Evans et al. 2017; Evans and Clark 2016; Evans, Cordova, and Sipole 2014; McGregor and Mourão 2016; McGregor, Lawrence, and Cardona 2017; Meeks 2016; Schneider 2014;), for the case of Europe, only a few empirical studies are available. Since the aim of our study is to shed more light on the European background, in the following, we will discuss in detail these findings which are to some degree contradictory.

On the one hand, Lappas, Triantafillidou, and Yannas (2019) are able to illustrate that Twitter and Facebook are the most frequently used platforms by the MEPs in the EU with male MEPs using social platforms more than female MEPs. Åström and Karlsson (2016) found that blogging is slightly more of a male than a female phenomenon in Swedish election campaigns (for similar findings in Finland and in Norway, see Carlson and Strandberg 2008; Karlsen and Enjolras 2016). On the other hand, Sandberg and Öhberg (2017) show that female candidates in Sweden use social media more often and consider social media more useful as a campaign tool. This reinforces the findings of an early study for the case of Finland illustrating that female candidates put up more often websites than male politicians. However, it needs to be added that this analysis also suggests that male and female candidates take advantage of the new communication technology in a similar way (Carlson and Strandberg 2008). Yarchi and Samuel-Azran (2018) show for the case of Israel that posts generated by female politicians were more consequential as they produced more user engagement in terms of the number of 'likes' and 'shares' in direct comparison to their male counterparts (but see also earlier findings for Sweden: Åström and Karlsson 2016). Moreover, different issues have been raised by male versus female politicians. Beltran et al. (2021) identify important differences in terms of the topics that have been emphasized: While male politicians use more words related to

politics, sports, ideology and infrastructure, female politicians tend to emphasize gender and social affairs. However, the use of authoritative voice or emotions did not reveal any gender differences (Yarchi and Samuel-Azran 2018). Similarly, Ross, Jansen, and van de Wijngaert (2019) show the gender disparities regarding the issues Labour and Conservative politicians tweeted about during the 2017 British general election campaign. For the 2019 Greek national elections, although Tsichla et al. (2023) are able to show that female and male candidates addressed a wider range of political issues on Facebook than those typically associated with their gender, some gender-related stereotypes continue to persist in terms of issue emphasis and campaign strategies. Finally, using a comparative design (studying Germany, Spain, UK, and the US), Lühiste, Praet, and Popa (2025) study the idea of the gender gap in the proportion of incivility on Twitter. Analyzing over 23 million tweets they find little consistent evidence of such a gender gap, but their findings show that prominence is a crucial factor for the US case, but not the European campaigns. A similar study by Schmidt, Stier, and Otto (2024) showed that women are generally more exposed to incivility on Facebook and Twitter than men, and uncivil content is particularly strong on Twitter, while Boukemia, Sältzer, and Boyer (2025) found evidence of women MPs receiving more insulting tweets than male MPs.

Based on the literature review above, our final assessment is that gender differences in online election campaigns are obviously an empirical fact. Nonetheless, the current state of the art is still inconclusive when it comes to gender-related differences in social media usage in the field of European politics. This is, of course, because European countries cannot be treated as single entities due to the multitude of different political and party systems involved. But also, the predominance of single-country analyses in European studies – despite a few notable exceptions (Lühiste, Praet, and Popa 2025; Stier et al. 2026) – is undoubtedly linked to the heterogeneity observed in the results (see also Fernández and Valiente 2021). And while recent research has followed a comparative approach (Stier et al. 2026), according to Magin et al. (2017) research on the structural factors shaping gender and politics in each of the countries is required to bring some light into this field of research. Accordingly, country-specific macro-level and structural factors (such as gender policies, quotas, public perception of gender-related issues, etc.) are hardly systematically explored in terms of their effects on women's social media usage during electoral campaigns, despite knowing that these factors also explain gender differences in political behaviour. Only a very recent study points to the relevance of structural factors:

> The fact that European female politicians do not experience proportionally more incivility online could point to other structural disparities. For example, female politicians in Europe could avoid building an extensive social media presence, especially because of their initial more negative experiences on the platform — as evidenced by our analysis (Lühiste, Praet, and Popa 2025, 23).

Theoretical framework and hypotheses

The research literature clearly shows that there is a gender gap in online (as well as in offline) electoral campaigning. However, due to the lack of large N-comparative studies, we do not yet know about the role of structural factors in European multi-party systems. Nevertheless, this is important because there is not one single European

party system but a variety of party systems in each of the countries (Sartori 1976) with different levels of fragmentation and polarization, which in consequence leads to different campaign strategies with respectively tailored election campaigns. In addition to that, European countries do not only differ in terms of the party system but also regarding gender-related regulations and policies. For example, looking into the Gender Equality Index[3], we can easily see that in some countries gender equality between women and men is much more developed (e.g. Denmark, Finland, Sweden) than in others (e.g. Greece, Hungary, Slovenia). Accordingly, we can act on the assumption that the sheer variety of different contextual backgrounds and institutional factors has divergent implications for the political actors' behaviour. To get better insight into the reasons for the gender gap in Twitter usage in Europe, we thus need to run a systematic European-wide empirical study with a particular eye on gender differences and develop a theoretical framework that considers the institutional variety potentially influencing women's behaviour during campaigning.

Before introducing the central explanatory factors, we will first outline the conceptualization of our main dependent variable, which underlies our main research question (*Do female and male candidates differ in their Twitter usage during campaigning, and if so, in which matter?*) We conceptualize **Twitter usage** in electoral campaigning in a two-fold way: (1) as '**Twitter presence'** and (2) as '**Twitter activity level.'** 'Twitter presence' captures whether candidates have a Twitter account that is used at least once during the period of investigation. 'Twitter activity level' assesses the number of Tweets posted by political candidates. This conceptual distinction is important as we know from the literature and many day-to-day scandals on online harassment directed at female politicians, that the costs and risks for exposing online are somewhat higher for female than for male politicians (Das NETTZ et al. 2024: 7). Thus, it is reasonable to explore in a first step, whether women decide at all to promote their candidacy on social media, and then in a second step, the question of how active they are on Twitter. To explain this two-fold dependent variable, we rely on a set of four explanatory factors – namely (1) socio-psychological risks, (2) resources, (3) partisan support and (4) societal support – derived from individual-level, party-level and country-level theoretical arguments. Since empirical research has produced mixed findings, we base our theoretical assumptions on comparative studies rather than single-country case studies.

Socio-psychological risks

Women often must put more effort into their careers to be successful and tend to overperform to reduce the risk of being blamed. Yet, the risks of being blamed and confronted with uncivil behaviour are very high in social media communication (Lühiste, Praet, and Popa 2025; Theocharis et al. 2016), especially for women because violence is here often manifested through online threats (Holm 2020; Krook 2017) and insulting language would work in a gendered fashion (Boukemia, Sältzer, and Boyer 2025, 13).[4] In recent research, Boukemia, Sältzer, and Boyer (2025) show that German female parliamentarians face a more hostile online environment, receiving insults more frequently than their male colleagues. This occurs despite their generally lower use of uncivil communication, and the likelihood of receiving insults increases substantially when they employ more confrontational language. These dynamics suggest that women encounter greater difficulties

in defending themselves against online hostility and face higher costs of remaining active on Twitter, as such interactions may negatively affect their psychological well-being (Boukemia, Sältzer, and Boyer 2025).

In response to this problem, the European Parliament and the European Council reached a new informal agreement to adopt any legislation that explicitly criminalizes cyber stalking, cyber harassment and cyber incitement to hatred or violence (EUP 06.02.2024). All this together reflects that 'online harassment' is a highly salient topic, certainly shaping female politicians' willingness to rely on social media channels in online campaigning. Another socio-psychological risk potentially reducing female candidates' use of social media is that political communication through these channels challenges the separation of private and political life. In doing so, online campaigning comes with the risk of cyber bullying of family members. A final socio-psychological hurdle lies in the fact that, while social media campaigning is effective in enhancing visibility, it is not ideally suited for conveying substantive content. This is particularly true for Twitter due to the word limit for single tweets. Increasing one's own visibility is maybe harder for women than for (some) men. For instance, studies on legislative behaviour of MEPs in the European Parliament illustrate that male MEPs tend to hold more 1-minute speeches than female MEPs. Moreover, female MEPs contribute over-proportionally to legislative proposals and thus, to more 'substantial legislative work' (Euchner and Frech 2020). Therefore, we expect differences in terms of '**Twitter presence'** during electoral campaigns, but not in terms of '**Twitter activity'**. The latter is related to two reasons: (1) if women have decided to 'go online,' they may post an equal number of Tweets as their male colleagues because the risk of online harassment does not linearly grow with the number of tweets, i.e. one tweet might cause a big scandal already. Accordingly, we expect:

Expectation 1a: Women are less present on Twitter during electoral campaigns as they fear higher socio-psychological risks related to online harassment.

Expectation 1b: If women have decided to campaign online, they are equally as active as men.

Resources

A second important explanatory factor relates to the human and financial resources at hand to develop a professional online campaign. While social media channels are accessible and 'easy' to use for everyone, the professional management of contents, which is particularly important during political campaigns, requires expertise and time. Yet, we know from previous research that women have less resources and a smaller network available than men and accordingly have less opportunities to shape their election campaign appropriately (van der Pas 2021). We assume that this plays out not only in the case of visibility in traditional media outlets, but also on social media. On average, women have less political experiences and worse list placements reducing (re-)election changes (see Fortin-Rittberger and Rittberger 2015) and thus, the ability to rely on a well-equipped social media team. Accordingly, we expect:

Expectation 2a: Female future MEPs are less prone to campaign online (i.e. be present on Twitter) if they are lacking resources.

Expectation 2b: Female future MEPs are less active on Twitter if they are lacking resources.

Partisan support

It is well known that leftist and green parties are more on the GAL (*green-alternative-left*) side of the political spectrum and therefore more open to gender equality policies (Campbell and Erzeel 2018). In view of this, recent research has also found that leftist parties tend to have a higher share of female MEPs, and it is also more likely for these parties to have a female leader (Sundström and Stockemer 2022). As political ideology is relevant in explaining women's representation, it is also important to consider the extent to which party's left-right position contributes to its female candidates tweeting more. Therefore, we expect female MEPs from these parties to be more active in their social media election campaigns than politicians from other party groups. Similarly, we act on the assumption that political parties with regulations for gender quotas also have a positive, encouraging effect on female MEPs to make themselves visible (Twitter presence). A similar finding has been published, showing that countries with gender quotas display stronger support for increased female participation in politics (Fernández and Valiente 2021). However, not only the openness of a party towards gender equality might have an important effect, but also the size of the party, as bigger parties might have more resources and party-organizational support to register an account and add the necessary professional materials like images (Stier et al. 2026). As described above, high professionalized campaigns offer more and better opportunities for female political actors. Therefore, we expect female MEPs from bigger parties to be more active in their social media election campaigns than politicians from smaller ones with a reduced degree of professionalization. It is worth noting, however, that offline party size does not necessarily translate linearly into online visibility and digital resources. A party's social media followership, investment in digital infrastructure, and the incentives it provides for candidates to maintain an active online presence may not grow proportionally with their electoral size. Some smaller parties – particularly those mobilizing niche or highly engaged audiences – may invest disproportionately in their online presence, while larger parties may vary in the extent to which they prioritize digital campaigning. As we are unable to account for parties' online resources retrospectively, we acknowledge that the relationship between offline party size and online organizational capacity is more nuanced than our measure captures. Parliamentary seat share should, therefore, be understood as a proxy for organizational resources rather than a direct measure of digital campaigning capacity.

Expectation 3a: Female future MEPs are less prone to campaign online because of the lack of partisan (ideological) backing.

Expectation 3b: Female future MEPs are less active online due to a lack of partisan (ideological) backing.

Societal support

In addition to these party-level factors, we know from the literature on gender and politics that female political representation in general and powerful positions in particular very much depends on favorable structural factors, such as gender quotas and specific

candidate selection procedures (Euchner and Frech 2020; Fortin-Rittberger and Rittberger 2015), compensating for negative stereotypes regarding female politicians, among other factors. In other words, a 'gender-balancing infrastructure' also contributes to more gender inequality in social media campaigning as it secures resources for female candidates to develop a professional social media campaign (Theocharis et al. 2016). In line with this argument, we assume that female MEPs from countries with a 'gender-balancing infrastructure', i.e. a high level of gender equality in a country, a decent number of female ministers in a country as well as public support for gender equality in a country, are more prone to campaign online and are more active in their social media election campaign than politicians from countries with a poor 'gender-balancing infrastructure'.

Expectation 4a: Female future MEPs are less prone to campaign online if they lack societal support in form of a 'gender-balancing infrastructure'.

Expectation 4b: Female future MEPs are less active in their social media election campaign, because of the lack of a 'gender-balancing infrastructure'.

Research design

Case selection

For three reasons, we opted to investigate the 2019 EP election campaigns to study our research questions. Firstly, the EP elections should provide a more fertile ground for gender equality, given that the EP is more equitable than national parliaments (Fortin-Rittberger and Rittberger 2015). Therefore, elections to the EP offer a conservative testing strategy of gender inequalities in political campaigning. Secondly, EP elections offer an ideal testing ground for gender effects in electoral campaigns in *Europe*, since these elections take place simultaneously in all EU member states and underlying similar constraints. The disadvantage is that EP elections are still second order elections, i.e., less visible and less important than national elections (see e.g. Schmitt et al. 2020), but also with different electoral rules. In 2019, national electoral regulations continued to vary in terms of the election date, compulsory voting, the age for passive and active voting rights, the list form, the application of statutory thresholds, and the calculation procedures (Braun and Tausendpfund 2019). These differing electoral rules and the findings of the study need to be critically discussed in relation to potential country differences. Thirdly, the 2019 elections provide the most insight into our research question because, prior to this, social media was not widely used for political communication (e.g. for the 2014 EP elections).[5] However, in the most recent elections, Twitter, the most widely used social media platform for political communication, had already been transformed into 'X' and undergone major structural changes. This and the fact that attacks and abuse were largely unpunished (see also Lühiste, Praet, and Popa 2025, 3) made the platform less attractive to be used for electoral campaigns by many politicians.

Data

To test our hypotheses, we employ a predominantly quantitative research design drawing on the Twitter in the 2019 EP election campaigns dataset (Stier, Popa, and Braun 2020).

The dataset includes the entire population of political elite actors' Twitter communication in the period between 23 April and 30 May 2019. It includes tweets from EP candidates from all EU 28 countries (excluding those from parties that ensured less than 2 per cent of the national votes), but also the so called *Spitzenkandidaten* (including those who did not run as a candidate on a European party list) and EU parties (not parliamentary groups). The tweets were purchased from Twitter after the election which ensures the completeness of the data. In short, there were 3489 candidates that had a Twitter account, but only 2807 of these were active on Twitter – this is, tweeted at least once – during the mentioned period. This means that from a population of 6495 candidates to the EP, 53.7 per cent had a Twitter account and roughly 43 per cent used it at least once during the electoral campaign. From these 2807 actors, 1632 are male (58.1 per cent) while 1175 were female candidates (41.9 per cent).[6] If we compare to the entire population of candidates to the EP, we see that 2648 were female (40.76 per cent) and 3847 (59.23 per cent) were male[7], so these data already suggest that the adoption of Twitter as a communication tool during the campaign reflects the gender distribution that we observe in the population.

Given that we want to study the differences between female and male candidates in their use of social media communication and the factors affecting it, we take a three-step strategy with two dependent variables. First, we assess whether there are significant differences between male and female candidates regarding the ownership of an active user account in Twitter (i.e. 'Twitter presence'). Thus, for this, our dependent variable is a dummy that identifies candidates with (1) and without (0) a Twitter account that posted at least one tweet during the electoral campaign for the EP. Second, we pay attention to gender differences in how much female and male candidates tweet; therefore, our dependent variable in this second step is the mean number of tweets each candidate posted during the campaign (i.e. 'Twitter activity levels'). Third, we compare our results from the quantitative analysis with the qualitative insights we draw from interviews with politicians.

Because our hypotheses address individual (socio-psychological risks and resources), party (partisan support) and country level (societal support) characteristics (see Table 1), we decided to run different models in which factors of the superior level are subsequently added.[8] This way, after the first model in which the only independent variable is the gender of the candidate to the EP, we include the following candidate-level characteristics: whether the candidate is an incumbent (coded '1') or not ('0'), the candidate's position on their party's list for the European Parliament (with lower numbers indicating a higher likelihood

Table 1. Theoretical framework.

Theoretical argument	Twitter presence	Twitter activity	Empirically testable indicators
Socio-psychological risks	-	0	• Gender
Resource argument	+	+	• Incumbency • Rank on party list
Partisan support	+	+	• Political ideology • Size of the party • Gender quota
Societal support	+	+	• Level of gender equality in a country • Number of female ministers in a country • Public support for gender equality in a country

Comments: + (positive effect), – (negative effect), 0 (no effect).

of being elected), and the number of Twitter followers. [9] We also collected contextual data at the party and country levels. Regarding the party level, we hypothesized that female candidates feel more confident to participate in social media when they have partisan backing. In this respect, we consider whether a candidate belongs to a leftist party and/or whether their party implements a gender quota to ensure equal representation. Thus, we included parties' positions on the left-right scale (Döring et al. 2023) running from '0' extreme-left to '1' extreme-right[10], as well as a dummy variable that identifies those parties with a gender quota (Euchner and Frech 2020). As an additional variable, we also consider the share of seats in the national parliament as literature indicates that candidates from bigger parties have more resources to allocate in their social media communication (Gibson and McAllister 2014; Stier et al. 2026).

Our final hypothesis focuses on country characteristics and theorizes that women are more likely to participate in the public discussion, also in social media, when public opinion is more willing to support gender equality because then women face less hostility when speaking their mind publicly. Considering this, we selected several other indicators that describe the situation regarding gender equality at the country level, in society, the workforce, and political life. Thus, we take as independent variables country's scores on the Gender Equality Index[11], the share of female ministers in the national government, and the percentage of people in the country based on Eurobarometer data who agree with the statement 'promoting gender equality is important for you personally'[12], as well as the share of those who said they disagree with the sentence 'women do not have the necessary qualities and skills to fill positions of responsibility in politics'.[13]

To test how individual, party and country level characteristics affect social media activity of female (in contrast to male) politicians, and given the hierarchical nature of our data, we run multilevel models with varying intercepts at the party and country levels. For models with the variable of Twitter account ownership ('Twitter presence') as dependent variable we use mixed-effects logistic regressions, while we run mixed-effect linear regression for the models with the mean number of tweets ('Twitter activity levels') during the campaign as the dependent variable.

We complement this analysis with qualitative insights from five semi-structured interviews with MEPs (and, in one case, an office leader). We incorporate these qualitative perspectives for the following reasons: while structural factors at the party and country levels can be effectively identified through large-N comparative analyses, determinants grounded in individual-level characteristics are more difficult to detect quantitatively and benefit from qualitative contextualization. The interviews therefore serve to support and refine our theoretical framework rather than constituting a separate methodological strand. The MEPs were selected based on their prior work or specific commitments indicating proximity to value-laden topics. Their distribution is comparatively representative in terms of demographic criteria and party affiliation (cf. Appendix Table A1). Nonetheless, contacting and securing access to high-level politicians proved challenging and required considerable persistence.

Results

Before addressing the question of what increases the likelihood of women campaigning in social media, it is important to describe the different online presence of male and

female candidates. We already mentioned that based on Stier et al.'s (2020) dataset *Twitter presence* reflects the gender structure of the EP electoral candidates. This means that about 58 per cent of male future candidates and 42 per cent of female future candidates have an active Twitter account. Yet, the picture looks more diverse when disaggregating the data by country (see Figure 1). In most of the EU countries, there are fewer Twitter accounts used by female political candidates. The most significant case is Cyprus, where less than 10 per cent of the candidates with an active Twitter account were female. On their side, Ireland, France and Finland are the only countries where the proportion of female candidates tweeting during the campaign was higher than that of male candidates.

There are also relevant differences concerning the percentage of female candidates per country (see Figure 2) and the percentage of candidates that were active on Twitter per country that are female.[14] As shown in Figure 3, United Kingdom, Ireland and Finland are the countries in which the percentage of female candidates using Twitter is higher despite the low share of female candidates. On the opposite side, in Romania, Lithuania and Slovakia female candidates are much less likely to use Twitter in their social media communication. Paradoxically, Slovakia and Lithuania are two of the ten countries in which Twitter adoption is higher among the female candidates than among male candidates (see Figure 4). The low presence on Twitter of female candidates from these countries would be associated with a lower use of this social media platform among politicians as even the percentage of male candidates using Twitter in Lithuania and Slovakia do not reach 10

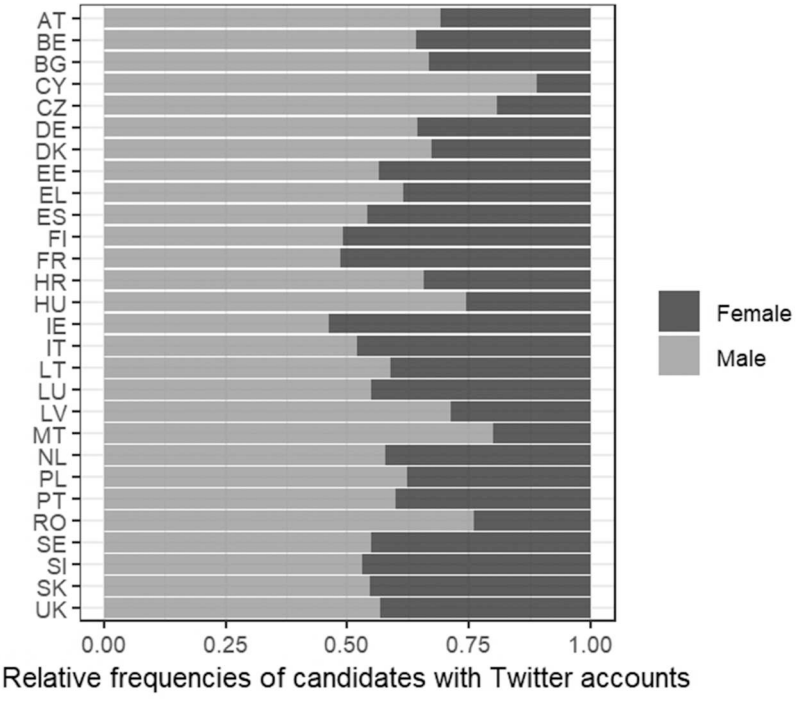

Figure 1. Gender differences in active Twitter account ownership across the EU countries. Data: Stier, Popa, and Braun (2020).

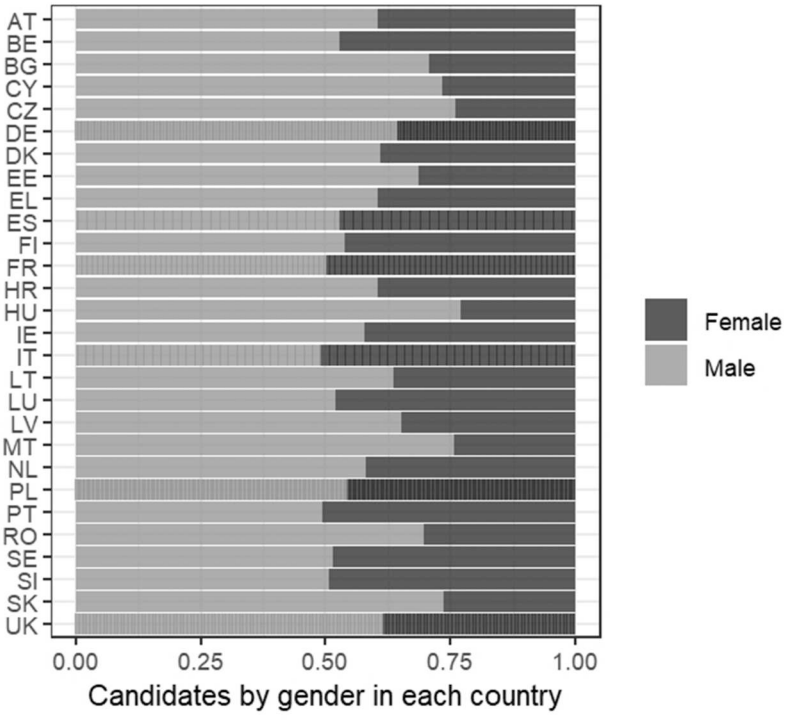

Figure 2. Percentages of female and male candidates to the European Parliament by country (with and without an active Twitter account). Data: Stier, Popa, and Braun (2020).

per cent. In Figure 4 we observe that in Cyprus, Belgium and Austria the percentage of male candidates with presence on Twitter is significantly higher compared to the percentage of female candidates with an active Twitter account, while women are more likely to have a Twitter account than male candidates in Ireland, Estonia and United Kingdom.

While we observe differences regarding 'Twitter presence', measured as ownership of Twitter accounts, women who were active in the EP campaign on Twitter could produce fewer or more tweets than their male counterparts (i.e. 'Twitter activity levels'). Nevertheless, as shown in Figure 5, in most of the countries, female candidates produced fewer tweets than their male counterparts. While male politicians posted 491,160 tweets (60%), only 197,400 tweets (40%) were published from accounts owned by a female candidate to the EP. On average, female politicians posted 168 tweets, while male politicians posted 180 tweets, suggesting men are not only more represented on Twitter but also tend to be more active (see Table A4. in the Appendix). Nevertheless, we observe a lot of variation between countries. Particularly in Cyprus, Austria and Czech Republic more than 80 per cent of the tweets of the campaign were posted by male candidates. On the opposite side, in Denmark and Ireland more than 50 per cent of the tweets belong to accounts owned by female candidates. This is especially relevant because in Denmark only 32,9 per cent of the candidates with an active Twitter account were female and yet they produced 55 per cent of all the tweets. Nevertheless, the most active female candidates where in the United Kingdom with a mean of 408 tweets per female candidate and a median of 235.

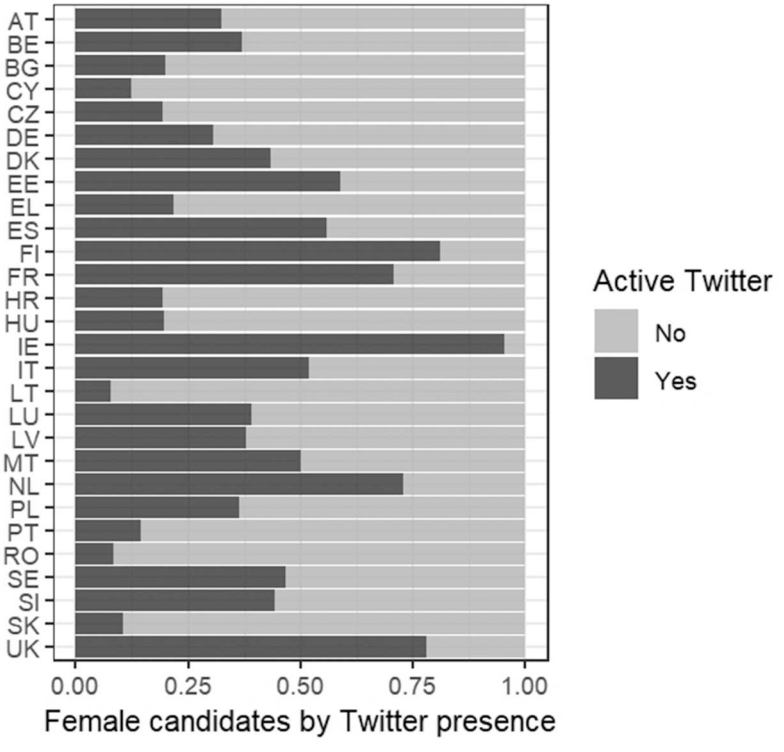

Figure 3. Female candidates by social media presence per country. Data: Stier, Popa, and Braun (2020).

To sum up, there is so much variance between countries that we are unable to identify patterns that could explain why women are less represented not only as candidates and owners of Twitter accounts, but also what makes them be active on Twitter during the campaign. We have also shown that in some countries, female candidates find less incentives to tweet and their activity on social media does not seem to reflect their actual presence in the lists to the EP. To analyse what contributes to women participating more in their social media campaign and to understand why male candidates seem to be overall more active than their female colleagues when tweeting, we ran several regression models with ownership of an active account ('Twitter presence') and the mean number of tweets during the campaign ('Twitter activity levels') as independent variables; subsequently, we added individual, party and country characteristics (see Table A6. and A8. in the Appendix). We use this strategy because by including new sets of independent variables we should expect that the explanatory power of our main independent variable might be affected when adding new controls.

Surprisingly, we find that for both dependent variables – these are, owning an active Twitter account and the mean number of Tweets during the campaign – party and country characteristics have very little or no effect at all. Individual level aspects such as gender and resources show a different picture. First, in respect to gender, we find distinct results for each of our dependent variables. As shown in Figure 6, in all the different models that we ran testing the relationship between gender and ownership of an active

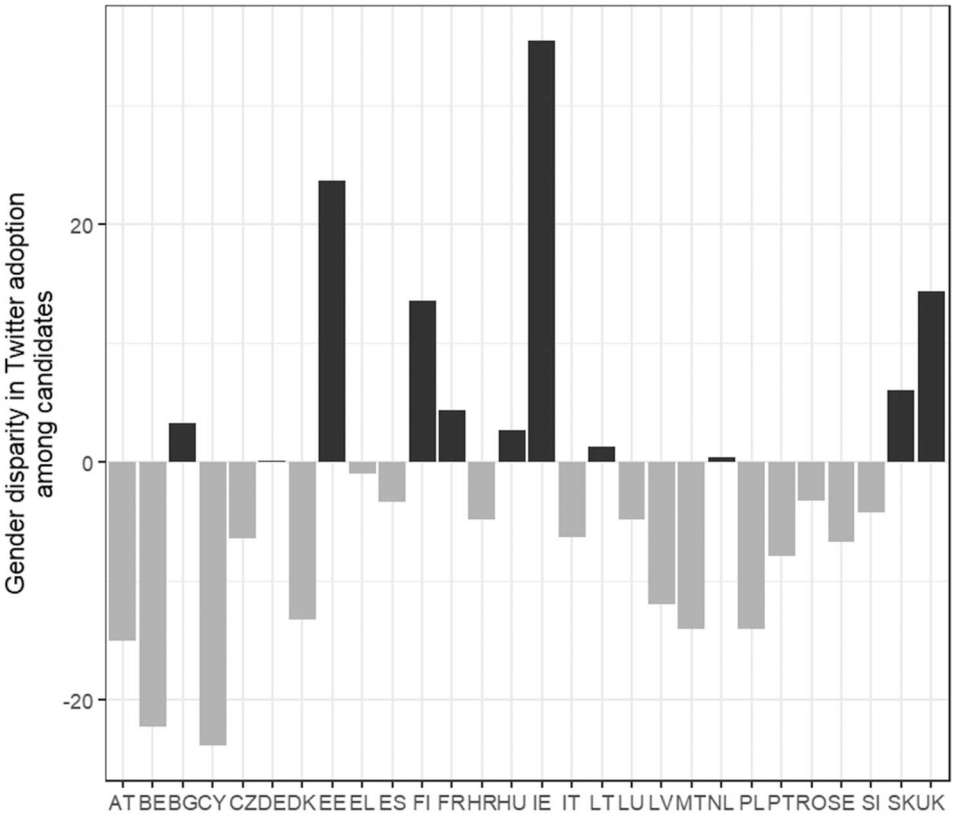

Figure 4. Differences by country between the share of female candidates present in Twitter and the share of male candidates present in Twitter. Data: Stier, Popa, and Braun (2020).

Note: Positive (negative) values indicate how much the percentage of female (male) candidates with presence on Twitter outnumbers the percentage of male (female) candidates with presence on Twitter.

Twitter account we find that gender is statistically significant and remains so even with the subsequent inclusion of contextual variables. Thus, gender affects presence on social media because, based on the evidence provided here, male candidates are significantly more likely to have an active Twitter account than female candidates, supporting our expectation 1a. Also, it is worth noting that even after including more control variables, differences between male and female candidates remain statistically significant with men having more presence on Twitter than women.

In respect to other variables, we see resources and partisan support seem to be particularly important as incumbency and seat share of the national party has the largest impact on candidates' presence on Twitter. If the candidate was already an MEP, the probability of having a Twitter account increases significantly, as does the larger the seat share of the party in the national parliament. The worse a candidate's position on the party list (i.e. higher numerical ranks indicate lower chances of election), the more likely they are to have a Twitter account with campaign-related activity. This suggests that, all else being equal, candidates in poorer list positions – who typically have lower visibility and presumably fewer campaign resources – have a stronger incentive to establish a presence on

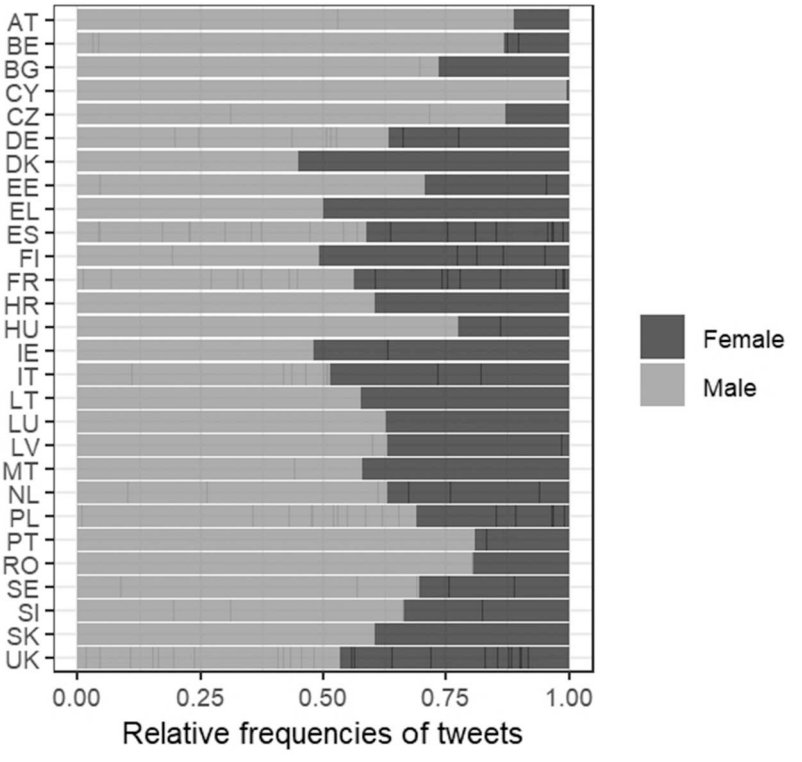

Figure 5. Tweets during the campaign by gender and country. Data: Stier, Popa, and Braun (2020).

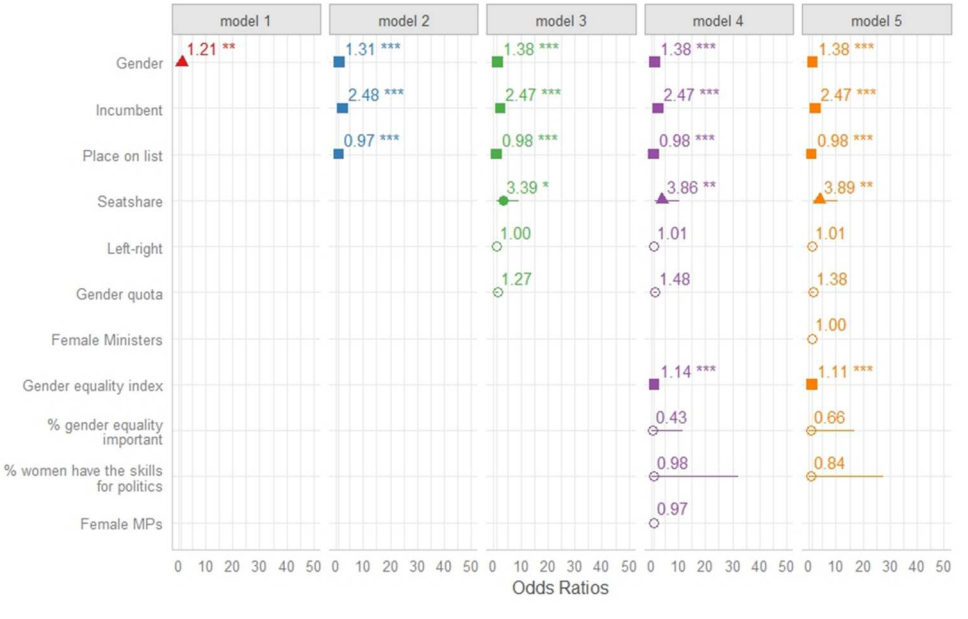

Figure 6. Multilevel logistic regression models for ownership of an active Twitter account.

Notes: 1: Dependent variable: ownership of an active Twitter account during the electoral campaign to the EP. 2: Gender variable coded as 0 = female, 1 = male. 3: Complete information about the models in Table A6. in the Appendix.

Twitter. This finding aligns with the literature arguing that social media can help equalize political campaigns by offering more disadvantaged candidates communication opportunities (Jungherr, Schroeder, and Stier 2019). Furthermore, a 'gender-balancing' infrastructure seems not to stimulate Twitter presence of future candidates very much. Additionally, the latter independent factors do not differ between candidates of different gender, signalling us so no support for expectations 2a, 3a and 4b (see interaction terms in Table A7 in the Appendix).

A very different story can be told when turning our attention to how often candidates tweet (i.e. Twitter activity levels'). As shown in Figure 7, once they have an active Twitter account, male and female candidates do not differ significantly in how much content they post, supporting our expectation 1b. Nevertheless, factors associated with the resources a candidate could have – again, their place on the party list and whether they are incumbents or not – have a significant impact on candidates' Twitter activity. Those seeking re-election are much more active than newcomers, and candidates placed further down their party's list tweet less frequently. This indicates that those better positioned to be elected – and presumably with greater campaign resources – tend to show higher levels of activity on Twitter during the campaign. Yet, this is a general pattern across future female *and* male candidates, not backing our expectations 2b, 3b and 4b.

Based on our findings, party and country characteristics do not appear to have a significant impact on the activity of female candidates on Twitter. Also, our results do not

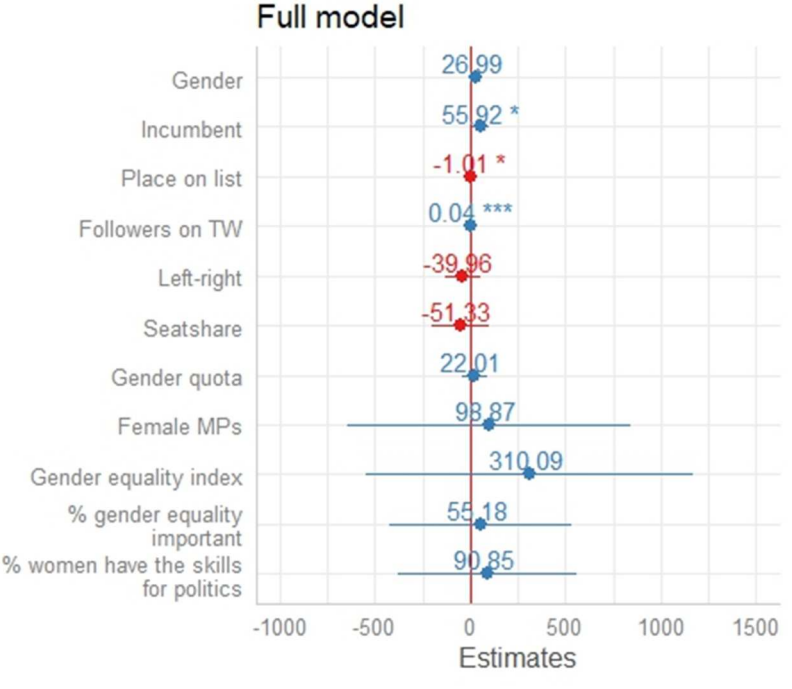

Figure 7. Multilevel linear regression including individual, party and country variables.

Note: Dependent variable: mean number of tweets during the electoral campaign to the EP; Coefficients shown are based in the Model 5 of Table A8. in the Appendix. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; ·$p < 0.1$.

support a distinctive use of Twitter based on gender. In all the different models tested (shown in the Tables A8 in the Appendix), the variable of gender does not reach the standard levels of statistical significance. Only when accepting a level of significance of 90 per cent, being a male candidate has a positive effect on the number of tweets posted. Moreover, in other tests we included interactions of gender of the candidate with other variables, but when interaction terms are included in the model gender becomes even more irrelevant to explain differences in Twitter activity (see Table A10 in the Appendix). Thus, our results do not allow us to state that male and female candidates to the EP showed distinct levels of activity in their Twitter accounts during the electoral campaign. On the contrary, the differences observed in the descriptive part are likely to be associated with other characteristics such as the incumbency, the number of followers on Twitter and the place on the list.

In short, the number of tweets a candidate publishes is associated with the resources s/he has to campaign. The most determinant factor of a candidate's campaign on Twitter is whether s/he is an incumbent or not (see Figure 8). This way, those that already are MEPs will tweet significantly more than aspirants to the EP. Similarly, those with a lower place on the electoral list, that is, those with higher chances to be elected, are also more prone to use Twitter during the campaign, as well as those who have a high number of followers.

In this regard, we thought that the number of followers on Twitter could also be associated with the gender of the candidate, and male candidates might have more engagement on social media. To avoid that having an already relevant presence on Twitter could be masking distinctions based on gender, we ran again the models without including the number of followers (see Table A9 in the Appendix). Once again, being a male candidate affects positively the number of tweets only if the level of significance is set to less than 95 per cent. Similarly, in tests including interactions, the impact of gender does not even reach the 90 per cent threshold of statistical significance.

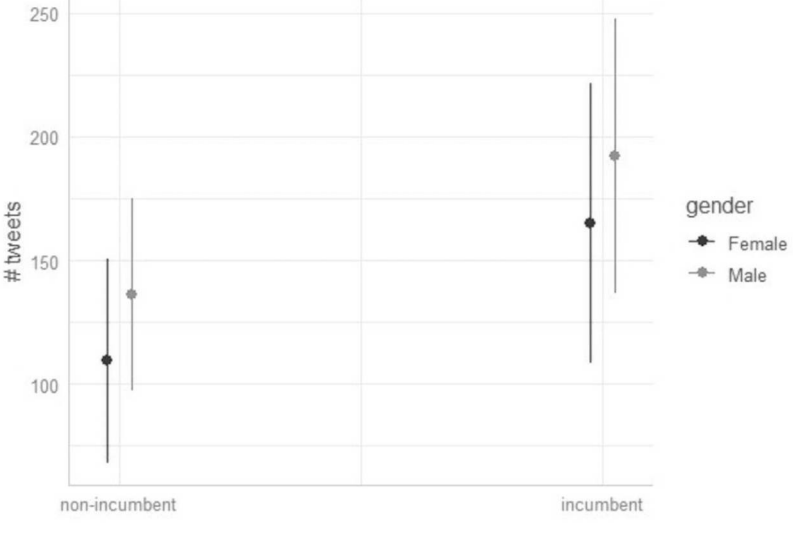

Figure 8. Predicted number of tweets during the campaign by incumbency and gender.
Note: predictions based on the results from the Model 5 shown in the Table A5. in the Appendix

Qualitative insights

To complement our quantitative findings and further illuminate some of the mechanisms underlying the observed patterns, we draw on insights from our semi-structured interviews with female MEPs. While the quantitative analysis allowed us to test hypotheses related to socio-psychological risks, resources, partisan support, and societal support, the qualitative material provides additional depth particularly regarding the first two dimensions – socio-psychological risks and resource availability. Because the interviews were conducted as part of a parallel project, rather than as a designed mixed-methods component, they do not cover aspects related to partisan or societal support systematically. Nevertheless, the interviews offer valuable contextual evidence that helps interpret how female MEPs navigate online campaigning and manage the pressures associated with social media engagement.

On the topic of socio-psychological risks, one female MEP, for example, stressed that she aims to focus on political communication and would not simply post 'some pictures of herself, looking as such today' (Interview 1, 8:06). She also avoids posting pictures with her children, even though such posts might generate strong reactions among followers. In line with this, our interview partners explained that social media engagement often comes at the expense of substantial legislative work; one MEP noted that she frequently spends more time on conceptual work but feels pressured to maintain an online presence (Interview 1, 9:05). Female candidates appear to mitigate these socio-psychological risks through professionalization (cf. Interview 1). Several female MEPs emphasized the importance of avoiding 'shitstorms,' sometimes reflecting over a single tweet for more than an hour and consulting at least one other person before posting to prevent potential scandals (Interview 1, 10:00). Another strategy is carefully selecting which stories to report, ensuring that content is non-contentious and unlikely to provoke backlash or be associated with views they do not endorse (Interview 2, 9:05).

Regarding resources and online campaigning, interviews revealed that women generally have fewer resources and smaller networks than men also in the online world: Most politicians need personal social media assistants in charge for their election campaign on social media. However, as a matter of fact such an additional effort is only possible when future MEPs are equipped with the necessary budget to cover such additional staff; either by the national party, own funds or through already established infrastructures due to political experience. 'Newcomers' have a much harder time as most experienced MEPs have one or two social media experts to cover different social media channels. These experts do not only help to reduce the enormous workload related to social media campaigning but also to develop a professional online strategy and image.[15]

Taken together, these qualitative insights reinforce two central findings from the quantitative analysis. Quantitatively, we find that women candidates are less likely to maintain an active Twitter account than their male counterparts, even after controlling for incumbency, list position and party seat share. This persistent gender gap aligns with the argument that socio-psychological risks – including heightened exposure to online hostility and greater reputational costs – discourage women from establishing and sustaining an online presence, a pattern also documented in recent research (Boukemia, Sältzer, and Boyer 2025). The interviews reinforce this interpretation: female MEPs describe carefully managing their online visibility, avoiding personal content, and devoting substantial

effort to preventing 'shit storms,' all of which highlight the increased psychological burdens they face. At the same time, our quantitative analysis shows no gender differences in posting frequency among those who do have an account, but incumbents, candidates with more followers, and those better positioned on the party list are significantly more active – findings that support the resources hypothesis. These dynamics are echoed in the qualitative material, where women emphasize the centrality of professional assistance and note that newcomers or those with fewer resources struggle to maintain a strategic social media presence. Although the qualitative interviews do not offer systematic insights into partisan or societal support, the combined evidence indicates that socio-psychological risks influence women's likelihood of being present on Twitter in the first place, while resource availability shapes how active candidates are once online.

Conclusions

Gender equality is among one of the main purposes pursued by the EU whereas at the same time gender gaps prevail in almost every domain of European politics. When it comes to election campaigns, gender inequalities persist in traditional media outlets as well as in the context of social media. Since empirical findings are still lacking for a larger set of European countries, our paper seeks to fill this gap in the scholarly literature investigating gender and political campaigning via social media in the run-up of the 2019 EP elections. Our major aim was to explore and explain candidates' Twitter usage for political campaigning. The results can be summarized as follows. First, we find clear empirical results regarding presence of female candidates on Twitter in the 2019 EP elections. There are fewer Twitter accounts of female future MEPs but once they are present on Twitter, their activity level is not significantly different from that of their male colleagues. Socio-psychological risks, such as online harassment, may be important factors here, given that female politicians are more likely to receive online threats (Holm 2020; Krook 2017), more insulting comments (Boukemia, Sältzer, and Boyer 2025), and greater levels of incivility overall (Schmidt, Stier, and Otto 2024), which could lead them to avoid social media campaigning. But if women have decided to face this risk and fight against it, they will be as active as others as the risk of cyber-crime does not linearly increase with the number of tweets. This interpretation is strongly supported by our qualitative interviews, in which female MEPs described intentionally avoiding personal content, carefully deliberating before posting and monitoring their communication extensively to prevent 'shitstorms.' Such practices underscore the heightened socio-psychological risks female politicians navigate online.

Second, our results demonstrate that resources matter substantially for online campaigning. Incumbents, candidates with more followers, and those better positioned on party lists were considerably more active on Twitter – consistent with our expectations and in line with recent research highlighting the importance of professional and organizational resources (Stier et al. 2025; 2026). Our qualitative interviews further corroborate this dynamic: female MEPs emphasized that a lack of staff support, limited networks and reduced access to professional communication assistance constrain their ability to manage the demands of a dynamic social media environment. Experienced politicians with social media teams were better equipped to handle the workload and to develop a strategic online presence.

Third, this picture does not differ significantly between female and male MEPs, meaning that Tweet ownership or activity levels are *not* systematically driven by women owing to on average less resources due to limited political experience or a lower placement on the party list. Once female candidates overcome the psychological and structural barriers to joining, they appear as active as their male colleagues. This suggests that inequalities arise primarily at the stage of entry into online campaigning, rather than in levels of engagement among active users. Additionally, our results indicate that structural biases in party systems – such as men's tendency to receive better list positions – do not translate directly into uniquely gendered disadvantages in online campaigning; inexperienced male candidates also face similar resource-related constraints.

It is important to acknowledge limitations related to the specific electoral context. EP elections remain 'second-order elections' – less salient and less politically consequential than national contests (Schmitt et al. 2020). Moreover, the 2019 EP elections operated under highly heterogeneous national electoral rules. Countries differed in election dates, compulsory voting, voting-age requirements, list structures, statutory thresholds, and the procedures used for seat allocation (Braun and Tausendpfund 2019). These institutional variations may shape candidates' incentives to campaign online and must be considered when interpreting cross-country patterns observed here.

Finally, although Twitter has since rebranded as 'X' and undergone substantial algorithmic and policy changes, our findings remain highly relevant for understanding the broader relationship between social media and political behaviour. In a rapidly changing digital environment, it is nearly impossible to capture a fully up-to-date representation of any platform; nonetheless, our results provide a valuable foundation for evaluating platforms that operated similarly to Twitter during our period of study. At the same time, recent shifts towards more lenient moderation – particularly under Elon Musk's leadership – have been associated with increases in radical content, persistent hate speech and greater bot activity (Nutakki et al. 2025), potentially reshaping the risks and opportunities female politicians face online. Future research should build on our findings by systematically comparing different social media platforms and examining how their evolving structures and norms affect gendered electoral behaviour. Such work will be essential for assessing whether platform-level changes reinforce or mitigate the digital 'glass ceiling' that continues to shape women's political visibility and engagement.

Notes

1. It is important to note that the term gender refers to the social, cultural, and psychological characteristics and roles that societies associate with being male, female, or other identities and is thus not equivalent to biological sex which is based on physical attributes. However, the terms are oftentimes used equivalently in the context of debates around 'gender (in-)equality' or 'gender gap'. This is why we use for the latter the term 'gender'. Nonetheless, for the empirical part of our paper, we are interested in differences between female and male politicians in election campaigns on Twitter. Therefore, in the title and throughout the paper we refer to biological sex.
2. We abstained from referring to the new name ('X') of the platform as our main empirical material stems from times before the renaming has taken place.
3. https://eige.europa.eu/gender-equality-index/2022/SK (19.04.2023).
4. It is important to note, however, that the empirical evidence is not robust in terms of the gender gap in online incivility (see e.g. Colligon and Rüdig 2020; Southern and Harme

2021). A recent study deals with this open empirical question for a broader European country selection point to an indirect effect of online incivility received with prominence moderating the effect of gender (Lühiste, Praet, and Popa 2025).

5. Although online tools were used modestly during the 2009 EP elections (Lilleker, Koc-Michalska, and Schweitzer 2011; Vergeer, Hermans, and Sams 2011), parties and politicians started to stronger rely on these websites to get their message out only five years later in the 2014 EP elections (Nulty et al 2016; Rodriguez 2016; Braun and Schwarzbözl 2019), and the Twitter user base and the amount of political content significantly increased from 2014 to 2019 (Stier et al 2026).
6. See Table A2 in the Appendix.
7. See Table A3 in the Appendix.
8. Descriptive information of the variables in the Table A3 in the Appendix
9. This variable is not included in the models testing whether the candidate has an active Twitter account or not because only those with a Twitter account can have followers.
10. Original scale run from 0 to 10 but it was standardized to a 0–1 scale.
11. https://eige.europa.eu/gender-equality-index/2022/SK (19.04.2023).
12. Eurobarometer 87.4. Question QC33.
13. Eurobarometer 87.4. Question QC75.
14. See Tables A2 and A3 in the Appendix.
15. This strategy varies by social media channel (e.g. Twitter, Facebook) as with each channel different voter groups are approached (Interview 2, minute). One female interview partner (Interview 1, minute 3:08) explained furthermore that social media channels are especially important at the European level and during the legislative term to bridge the geographic distance between Brussels and the national electorate.

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Appendix

Table A1. List of interviews conducted.

Interview no.	Political Party	Gender	Interview date
1C	Christian Democratic Union (CDU)	Female	15.02.2021
4G	Green Party (Greens)	Male	17.11.2020
10A	Alternative for Germany Party (AfD)	Male	14.10.2020
11S	Social Democratic Party (SPD)	Male	06.11.2020
16C	Christian Social Democrats (CSU)	Female	25.11.2020

Table A2. Active Twitter accounts of candidates to the European Parliament by gender and country.

		Female	Male
Austria	($N = 42$)	13 (31.0%)	29 (69.0%)
Belgium	($N = 106$)	38 (35.8%)	68 (64.2%)
Bulgaria	($N = 15$)	5 (33.3%)	10 (66.7%)
Croatia	($N = 32$)	11 (34.4%)	21 (65.6%)
Cyprus	($N = 9$)	1 (11.1%)	8 (88.9%)
Czech Republic	($N = 52$)	10 (19.2%)	42 (80.8%)
Denmark	($N = 70$)	23 (32.9%)	47 (67.1%)
Estonia	($N = 23$)	10 (43.5%)	13 (56.5%)
Finland	($N = 118$)	60 (50.8%)	58 (49.2%)
France	($N = 325$)	167 (51.4%)	158 (48.6%)
Germany	($N = 185$)	66 (35.7%)	119 (64.3%)
Greece	($N = 52$)	20 (38.5%)	32 (61.5%)
Hungary	($N = 39$)	10 (25.6%)	29 (74.4%)
Ireland	($N = 39$)	21 (53.8%)	18 (46.2%)
Italy	($N = 241$)	116 (48.1%)	125 (51.9%)
Latvia	($N = 66$)	19 (28.8%)	47 (71.2%)
Lithuania	($N = 17$)	7 (41.2%)	10 (58.8%)
Luxembourg	($N = 20$)	9 (45.0%)	11 (55.0%)
Malta	($N = 20$)	4 (20.0%)	16 (80.0%)
Netherlands	($N = 171$)	72 (42.1%)	99 (57.9%)
Poland	($N = 286$)	108 (37.8%)	178 (62.2%)
Portugal	($N = 30$)	12 (40.0%)	18 (60.0%)
Romania	($N = 29$)	7 (24.1%)	22 (75.9%)
Slovakia	($N = 11$)	5 (45.5%)	6 (54.5%)
Slovenia	($N = 34$)	16 (47.1%)	18 (52.9%)
Spain	($N = 249$)	114 (45.8%)	135 (54.2%)
Sweden	($N = 164$)	74 (45.1%)	90 (54.9%)
United Kingdom	($N = 362$)	157 (43.4%)	205 (56.6%)
Overall	($N = 2807$)	1175 (41.9%)	1632 (58.1%)

Table A3. Total number of candidates to the European Parliament 2019 by gender and country.

	Female	Male	
Austria	40 (39.6%)	61 (60.4%)	(*N* = 101)
Belgium	103 (47.2%)	115 (52.8%)	(*N* = 218)
Bulgaria	25 (29.4%)	60 (70.6%)	(*N* = 85)
Croatia	57 (39.6%)	87 (60.4%)	(*N* = 144)
Cyprus	8 (26.7%)	22 (73.3%)	(*N* = 30)
Czech Republic	52 (24.1%)	164 (75.9%)	(*N* = 216)
Denmark	53 (39.0%)	83 (61.0%)	(*N* = 136)
Estonia	17 (31.5%)	37 (68.5%)	(*N* = 54)
Finland	74 (46.3%)	86 (53.8%)	(*N* = 160)
France	236 (49.8%)	238 (50.2%)	(*N* = 474)
Germany	216 (35.6%)	391 (64.4%)	(*N* = 607)
Greece	92 (39.5%)	141 (60.5%)	(*N* = 233)
Hungary	51 (22.9%)	172 (77.1%)	(*N* = 223)
Ireland	22 (42.3%)	30 (57.7%)	(*N* = 52)
Italy	224 (51.0%)	215 (49.0%)	(*N* = 439)
Latvia	50 (34.7%)	94 (65.3%)	(*N* = 144)
Lithuania	91 (36.5%)	158 (63.5%)	(*N* = 249)
Luxembourg	23 (47.9%)	25 (52.1%)	(*N* = 48)
Malta	8 (24.2%)	25 (75.8%)	(*N* = 33)
Netherlands	99 (41.9%)	137 (58.1%)	(*N* = 236)
Poland	297 (45.7%)	353 (54.3%)	(*N* = 650)
Portugal	82 (50.6%)	80 (49.4%)	(*N* = 162)
Romania	82 (30.5%)	187 (69.5%)	(*N* = 269)
Slovakia	47 (26.4%)	131 (73.6%)	(*N* = 178)
Slovenia	36 (49.3%)	37 (50.7%)	(*N* = 73)
Spain	204 (47.2%)	228 (52.8%)	(*N* = 432)
Sweden	158 (48.5%)	168 (51.5%)	(*N* = 326)
United Kingdom	201 (38.4%)	322 (61.6%)	(*N* = 523)
Overall	2648 (40.8%)	3847 (59.2%)	(*N* = 6495)

Data: Stier et al. (2020)

Table A4. Variable descriptives.

Individual-level variables	Overall (*N* = 6495)
Gender	
Female	2648 (40.8%)
Male	3847 (59.2%)
Incumbent	
No	6063 (93.3%)
Yes	432 (6.7%)
TW account	
No	3006 (46.3%)
Yes	3489 (53.7%)
Place on the list	
Mean (SD)	17.0 (21.5)
Median [Min, Max]	10.0 [1.00, 175]
Missing	251 (3.9%)
Context Variables	**Overall (*N* = 4980)**
Ideology of the party	
Mean (SD)	5.37 (2.30)
Median [Min, Max]	5.94 [0.526, 9.69]
Missing	157 (3.2%)
Seat share	
Mean (SD)	0.156 (0.147)
Median [Min, Max]	0.0945 [0, 0.552]
Gender quota	
No	2009 (40.3%)
Yes	2971 (59.7%)
Gender equality index	
Mean (SD)	66.1 (9.13)

(*Continued*)

Table A4. Continued.

Individual-level variables	Overall ($N = 6495$)
Median [Min, Max]	67.5 [52.2, 83.8]
Female ministers	
Mean (SD)	30.8 (13.4)
Median [Min, Max]	29.3 [0, 51.8]
Female MPs	
Mean (SD)	30.7 (8.63)
Median [Min, Max]	33.0 [11.3, 46.4]
% gender equality important	
Mean (SD)	0.828 (0.0815)
Median [Min, Max]	0.820 [0.540, 0.960]
% women have the skills for politics	
Mean (SD)	0.798 (0.122)
Median [Min, Max]	0.830 [0.550, 0.960]

Table A5. Tweets during the campaign by gender and country.

			Tweets during the campaign	
			Mean (SD)	Median [Min, Max]
Austria	Female	($N = 13$)	70.3 (63.6)	49.0 [8.00, 245]
	Male	($N = 29$)	250 (475)	53.0 [1.00, 1990]
Belgium	Female	($N = 38$)	66.6 (91.2)	41.5 [1.00, 422]
	Male	($N = 68$)	243 (1090)	50.0 [1.00, 8950]
Bulgaria	Female	($N = 5$)	31.8 (20.4)	31.0 [11.0, 64.0]
	Male	($N = 10$)	44.0 (109)	6.50 [1.00, 352]
Croatia	Female	($N = 11$)	114 (112)	71.0 [23.0, 406]
	Male	($N = 21$)	91.6 (162)	28.0 [2.00, 738]
Cyprus	Female	($N = 1$)	1.00 (NA)	1.00 [1.00, 1.00]
	Male	($N = 8$)	22.0 (20.4)	22.5 [1.00, 55.0]
Czech Republic	Female	($N = 10$)	36.0 (74.7)	15.0 [1.00, 247]
	Male	($N = 42$)	58.5 (90.8)	23.0 [1.00, 423]
Denmark	Female	($N = 23$)	135 (405)	51.0 [1.00, 1980]
	Male	($N = 47$)	53.9 (70.6)	26.0 [1.00, 283]
Estonia	Female	($N = 10$)	20.0 (19.6)	12.0 [1.00, 60.0]
	Male	($N = 13$)	36.8 (39.4)	20.0 [1.00, 138]
Finland	Female	($N = 60$)	89.8 (98.3)	44.0 [1.00, 388]
	Male	($N = 58$)	90.0 (123)	36.0 [1.00, 622]
France	Female	($N = 167$)	171 (188)	105 [1.00, 1200]
	Male	($N = 158$)	232 (360)	153 [1.00, 3480]
Germany	Female	($N = 66$)	88.8 (132)	37.0 [1.00, 702]
	Male	($N = 119$)	84.7 (107)	46.0 [1.00, 475]
Greece	Female	($N = 20$)	128 (140)	70.0 [4.00, 530]
	Male	($N = 32$)	79.6 (116)	44.0 [2.00, 591]
Hungary	Female	($N = 10$)	25.9 (25.0)	17.0 [2.00, 73.0]
	Male	($N = 29$)	30.8 (38.4)	14.0 [3.00, 146]
Ireland	Female	($N = 21$)	376 (321)	262 [27.0, 1060]
	Male	($N = 18$)	406 (479)	258 [32.0, 2120]
Italy	Female	($N = 116$)	81.1 (102)	50.0 [1.00, 589]
	Male	($N = 125$)	80.0 (162)	42.0 [1.00, 1500]
Latvia	Female	($N = 19$)	94.5 (105)	47.0 [1.00, 309]
	Male	($N = 47$)	64.9 (73.1)	39.0 [1.00, 365]
Lithuania	Female	($N = 7$)	10.4 (12.3)	5.00 [1.00, 33.0]
	Male	($N = 10$)	9.90 (13.6)	4.00 [1.00, 42.0]
Luxembourg	Female	($N = 9$)	30.4 (59.5)	6.00 [3.00, 187]
	Male	($N = 11$)	41.9 (48.8)	29.0 [1.00, 143]
Malta	Female	($N = 4$)	165 (188)	113 [17.0, 416]
	Male	($N = 16$)	56.8 (61.2)	31.5 [1.00, 186]
Netherlands	Female	($N = 72$)	85.1 (97.2)	52.0 [1.00, 426]
	Male	($N = 99$)	105 (133)	61.0 [1.00, 680]
Poland	Female	($N = 108$)	134 (183)	60.5 [1.00, 1100]
	Male	($N = 178$)	182 (296)	84.5 [1.00, 1950]

(*Continued*)

Table A5. Continued.

			Tweets during the campaign	
			Mean (SD)	Median [Min, Max]
Portugal	Female	(*N* = 12)	98.8 (130)	58.0 [2.00, 435]
	Male	(*N* = 18)	279 (678)	137 [5.00, 2970]
Romania	Female	(*N* = 7)	17.4 (26.3)	10.0 [1.00, 76.0]
	Male	(*N* = 22)	22.8 (32.3)	13.0 [1.00, 156]
Slovakia	Female	(*N* = 5)	13.0 (9.67)	13.0 [1.00, 27.0]
	Male	(*N* = 6)	16.5 (29.3)	5.00 [1.00, 76.0]
Slovenia	Female	(*N* = 16)	104 (100)	62.0 [1.00, 332]
	Male	(*N* = 18)	183 (292)	76.0 [4.00, 1250]
Spain	Female	(*N* = 114)	287 (495)	147 [2.00, 3950]
	Male	(*N* = 135)	344 (712)	136 [1.00, 5430]
Sweden	Female	(*N* = 74)	77.5 (124)	38.5 [1.00, 733]
	Male	(*N* = 90)	145 (279)	40.5 [1.00, 1760]
United Kingdom	Female	(*N* = 157)	408 (509)	235 [4.00, 2940]
	Male	(*N* = 205)	358 (504)	177 [1.00, 3180]
Overall	Female	(*N* = 1175)	168 (301)	73.0 [1.00, 3950]
	Male	(*N* = 1632)	180 (423)	65.0 [1.00, 8950]

Data: Stier et al. (2020)

Table A6. Logistic regression models with varying intercepts at the party and country levels (Dependent variable – Ownership of an active Twitter account).

	Model 1	Model 2	Model 3	Model 4	Model 5
(Intercept)	**−0.59****	**−0.53***	**−0.81***	**−7.16*****	**−7.96*****
	(0.22)	(0.23)	(0.33)	(1.50)	(1.42)
Individual level					
Male	**0.19****	**0.27*****	**0.32*****	**0.32*****	**0.33*****
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)
Incumbent		**0.91*****	**0.90*****	**0.90*****	**0.90*****
		(0.13)	(0.14)	(0.14)	(0.14)
Place on the list		**−0.03*****	**−0.02*****	**−0.02*****	**−0.02*****
		(0.00)	(0.00)	(0.00)	(0.00)
Party-level					
Left-right			0.00	0.01	0.01
			(0.03)	(0.03)	(0.03)
Seatshare			**1.22***	**1.36****	**1.35****
			(0.52)	(0.51)	(0.51)
Gender quota			0.24	0.32	0.39·
			(0.24)	(0.23)	(0.23)
Country-level					
Female ministers				0.00	
				(0.02)	
Gender equality index				**0.10*****	**0.13*****
				(0.03)	(0.03)
% Gender equality personally important				−0.41	−0.84
				(1.65)	(1.68)
% women have the skills for politics				−0.17	−0.02
				(1.78)	(1.77)
Female MPs					−0.03
					(0.03)
AIC	7581.18	7082.81	5303.95	5285.87	5284.75
BIC	7608.30	7123.24	5361.87	5369.53	5368.41
Log Likelihood	−3786.59	−3535.40	−2642.97	−2629.94	−2629.37
Num. obs.	6494	6244	4608	4608	4608
Num. groups: party	223	207	153	153	153
Num. groups: country	28	26	26	26	26
Var: party (Intercept)	0.41	0.44	0.32	0.33	0.33
Var: country (Intercept)	1.27	1.18	1.12	0.34	0.31

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; ·$p < 0.1$.

Table A7. Logistic regression models with varying intercepts at the party and country levels including interactions (Dependent variable – Ownership of an active Twitter account).

	Model 1	Model 2	Model 3	Model 4
(Intercept)	−7.95***	−7.97***	−8.04***	−8.52***
	(1.41)	(1.42)	(1.41)	(1.46)
Individual level				
Male	0.32***	0.36***	0.39***	1.14*
	(0.07)	(0.10)	(0.10)	(0.53)
Incumbent	0.89***	0.91***	0.90***	0.91***
	(0.20)	(0.14)	(0.14)	(0.14)
Place on the list	−0.02***	−0.02***	−0.02***	−0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Party-level				
Left-right	0.01	0.01	0.01	0.01
	(0.03)	(0.03)	(0.03)	(0.03)
Seatshare	1.35**	1.35**	1.58**	1.35**
	(0.51)	(0.51)	(0.58)	(0.51)
Gender quota	0.39·	0.39·	0.39·	0.39·
	(0.23)	(0.23)	(0.23)	(0.23)
Country-level				
Female MPs	−0.03	−0.03	−0.03	−0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Gender equality index	0.13***	0.13***	0.13***	0.14***
	(0.03)	(0.03)	(0.03)	(0.03)
% Gender equality personally important	−0.92	−0.92	−0.80	−0.81
	(1.67)	(1.68)	(1.67)	(1.69)
% women have the skills for politics	0.19	0.19	0.04	0.08
	(1.76)	(1.78)	(1.77)	(1.79)
Male*incumbent	0.03			
	(0.28)			
Male*place_list		−0.00		
		(0.00)		
Male*Seatshare			−0.39	
			(0.46)	
Male*Gender equality index				−0.01
				(0.01)
AIC	5286.74	5286.41	5286.06	5284.44
BIC	5376.84	5376.51	5376.16	5374.54
Log Likelihood	−2629.37	−2629.21	−2629.03	−2628.22
Num. obs.	4608	4608	4608	4608
Num. groups: party	153	153	153	153
Num. groups: country	26	26	26	26
Var: party (Intercept)	0.33	0.33	0.33	0.33
Var: country (Intercept)	0.31	0.31	0.31	0.32

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; ·$p < 0.1$.

Table A8. Linear regression models with varying intercepts at the party and country levels (Dependent variable: Mean number of tweets during the campaign).

	Model 1	Model 2	Model 3	Model 4	Model 5
(Intercept)	**114.85*** **	**109.17*** **	**129.94** **	−272.76	−229.32
	(22.43)	(23.86)	(40.03)	(212.02)	(199.91)
Individual level					
Male	**23.63**°	23.25	**25.54**°	**26.90**°	**26.99**°
	(13.92)	(14.41)	(14.34)	(14.35)	(14.35)
Incumbent		**44.50**°	**54.84***	**56.10***	**55.92***
		(24.07)	(23.04)	(23.06)	(23.04)
Place on the list		**−1.12***	**−0.92***	**−1.00***	**−1.01***
		(0.49)	(0.45)	(0.45)	(0.45)
Followers on TW		**0.05*** **	**0.04*** **	**0.04*** **	**0.04*** **
		(0.01)	(0.01)	(0.01)	(0.01)
Party-level					

(*Continued*)

Table A8. Continued.

	Model 1	Model 2	Model 3	Model 4	Model 5
Left-right			−49.42	−37.49	−39.96
			(46.63)	(47.33)	(47.70)
Seatshare			−68.30	−52.27	−51.33
			(73.96)	(75.65)	(75.66)
Gender quota			18.56	25.53	22.01
			(30.02)	(32.70)	(34.04)
Country-level					
Female ministers				−42.01	
				(227.18)	
Gender equality index				436.81	310.09
				(390.59)	(438.67)
% Gender equality personally important				41.43	55.18
				(236.58)	(243.97)
% women have the skills for politics				103.17	90.85
				(235.40)	(239.10)
Female MPs					98.87
					(380.38)
AIC	41053.29	38687.39	29351.56	29302.55	29301.50
BIC	41082.99	38734.44	29413.42	29386.90	29385.85
Log Likelihood	−20521.65	−19335.70	−14664.78	−14636.28	−14635.75
Num. obs.	2807	2645	2046	2046	2046
Num. groups: party	205	189	144	144	144
Num. groups: Country_abb	28	26	26	26	26
Var: party (Intercept)	3643.52	3683.15	3602.01	3872.80	3845.73
Var: Country_abb (Intercept)	8499.12	7841.16	5236.54	4462.63	4569.49
Var: Residual	127395.79	127608.17	97155.12	97029.33	97025.97

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; °$p < 0.1$.

Table A9. Robustness checks: Linear regression models with varying intercepts at the party and country levels without including the # of followers in the models.

	Model 1	Model 2	Model 3	Model 4
(Intercept)	109.58***	126.51**	−280.38	−232.47
	(24.10)	(40.32)	(213.68)	(201.63)
Individual level				
Male	25.62°	26.79°	28.15°	28.25°
	(14.47)	(14.40)	(14.42)	(14.41)
Incumbent	50.49*	61.27**	62.53**	62.33**
	(24.16)	(23.10)	(23.12)	(23.10)
Place on the list	−1.08*	−0.84°	−0.91*	−0.93*
	(0.49)	(0.45)	(0.46)	(0.45)
Party-level				
Left-right		−43.12	−31.00	−33.69
		(46.90)	(47.62)	(47.98)
Seatshare		−74.18	−57.80	−56.80
		(74.44)	(76.16)	(76.16)
Gender quota		20.39	27.92	24.11
		(30.25)	(32.93)	(34.28)
Country-level				
Female ministers			−47.94	
			(228.95)	
Gender equality index			450.74	312.07
			(393.83)	(442.45)
% Gender equality personally important			35.20	49.90
			(238.38)	(245.95)
% women have the skills for politics			105.03	91.64
			(237.38)	(241.29)
Female MPs				105.58
				(383.66)
AIC	38705.05	29361.84	29312.74	29311.69

(*Continued*)

Table A9. Continued.

	Model 1	Model 2	Model 3	Model 4
BIC	38746.21	29418.08	29391.47	29390.42
Log Likelihood	−19345.52	−14670.92	−14642.37	−14641.84
Num. obs.	2645	2046	2046	2046
Num. groups: party	189	144	144	144
Num. groups: Country_abb	26	26	26	26
Var: party (Intercept)	3842.70	3662.05	3942.83	3911.78
Var: Country_abb (Intercept)	8050.80	5356.95	4552.51	4671.44
Var: Residual	128805.99	98039.52	97910.82	97907.76

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; °$p < 0.1$.

Table A10. Linear regression models with varying intercepts at the party and country levels including interactions (Dependent variable: Mean number of tweets during the campaign).

	Model 1	Model 2	Model 3	Model 4
(Intercept)	−228.08	−225.97	−214.80	−157.12
	(199.42)	(200.04)	(200.04)	(212.69)
Individual level				
Male	19.82	16.38	10.96	−90.67
	(15.27)	(18.50)	(20.97)	(120.50)
Incumbent	22.90	55.48*	56.08*	55.87*
	(33.36)	(23.04)	(23.04)	(23.04)
Place on the list	−1.02*	−1.45*	−1.00*	−1.01*
	(0.45)	(0.66)	(0.45)	(0.45)
Followers on TW	0.00***	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Party-level				
Left-right	−3.93	−3.85	−3.84	−4.01
	(4.77)	(4.77)	(4.77)	(4.76)
Seatshare	−48.71	−52.33	−107.09	−55.01
	(75.71)	(75.68)	(92.45)	(75.54)
Gender quota	22.77	22.97	21.55	21.76
	(34.02)	(34.06)	(34.01)	(33.98)
Country-level				
Female MPs	1.04	0.93	1.03	0.89
	(3.79)	(3.81)	(3.80)	(3.80)
Gender equality index	3.06	3.13	3.05	2.08
	(4.38)	(4.39)	(4.38)	(4.50)
% Gender equality personally important	56.29	55.96	52.42	64.94
	(243.46)	(244.07)	(243.61)	(244.00)
% women have the skills for politics	93.58	92.46	89.61	85.07
	(238.42)	(239.24)	(238.64)	(239.04)
Male*incumbent	60.41			
	(44.16)			
Male*place_list		0.66		
		(0.73)		
Male*Seatshare			94.52	
			(90.16)	
Male*Gender equality index				1.70
				(1.73)
AIC	29324.45	29333.71	29323.79	29331.84
BIC	29414.43	29423.69	29413.77	29421.81
Log Likelihood	−14646.22	−14650.85	−14645.90	−14649.92
Num. obs.	2046	2046	2046	2046
Num. groups: party	144	144	144	144
Num. groups: Country_abb	26	26	26	26
Var: party (Intercept)	3857.94	3846.61	3834.08	3799.72
Var: Country_abb (Intercept)	4525.99	4577.08	4543.92	4571.60
Var: Residual	96983.69	97033.14	97029.18	97046.77

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; ·$p < 0.1$.