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Voting, fast and slow: ballot order and likeability effects in the five-star movement's 2012 online primary election

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ABSTRACT

We document ballot order effects in the 2012 *Parlamentarie*, the online primary election held by the Italian Five-star Movement to select the candidate Members of Parliament in the 2013 Italian general elections. We show that candidates appearing towards the top of the screen systematically ranked higher in preferences. This effect holds controlling for candidates' socio-demographic features. We also show that the number of competing candidates moderates ballot order effects, with a stronger penalty for candidates appearing at the bottom of the page in more crowded competitions. Finally, we show the influence of candidates' likeability. Our results confirm for the first time that ballot order effects and likeability effects, already documented in traditional paper-based elections, are also found in online set-ups. We conclude by highlighting how the online medium, if properly leveraged, has the potential to reduce the influence of such biases.

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Five-star movement; digital democracy; online elections; cognitive heuristics; ballot order effects; satisficing

1 Introduction

In December 2012, the Italian Movimento Cinque Stelle (Five-star Movement, M5s) launched an unprecedented large-scale experiment in direct online democracy, the *Parlamentarie*. For the first time in Italy, a political formation allowed its party members to vote for the MP candidates running for the subsequent general election, through an online decision-making platform. Members, organized in the same electoral districts as those used for the subsequent parliamentary elections, had to decide among more than 1,400 candidate MPs. Holding an online primary where party members could directly choose the candidates for the general election was consistent with the Movement's commitment to enhancing citizens' participation and avoiding candidates being chosen by party leaders. In this study, we analyse the role that a set of decision heuristics played in the process: the evidence shows that voters relied on cognitive shortcuts, undermining

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the promises that 'direct democracy' would remove the traditional biases of party-based politics. However, we also suggest that most biases could have been reduced had there been a proper decision-making setting.

The 2012 *Parlamentarie* adopted a rather straightforward procedure. Voters visited a web page with candidates listed alphabetically by surname, with a self-uploaded picture, the name and sur- name, a few demographic details, and a voting button. By clicking on the candidate's name, voters could – but, crucially, were *not* required to – visit a separate page, which provided the candidate's CV and a short video presentation. Voters could choose up to three candidates and had four days to cast their votes.

Based on these implementation choices and the election context, one can formulate two hypothe- ses about cognitive heuristics. On the one hand, voters participating in the primary can be assumed to be highly motivated: as the literature suggests, *satisficing* behaviour (Simon 1956) – in which participants provide the first satisfactory answer instead of the optimal one (Krosnick 1991; Roberts et al. 2019) – is known to decrease with higher motivation (Krosnick 1991; Roßmann, Gummer, and Silber 2017). On the other hand, the fact that political differences might have been scarce in a primary and that voters could vote without checking all candidates' political stances might lead to cognitive heuristics playing a larger role in reaching a decision. Moreover, following previous studies (Meredith and Salant 2013; Soderlund, von Schoultz, and Papageorgiou 2021), the ballot order effect is expected to be moderated by the number of candidates in a district: whereas candidates appearing first are always advantaged, we hypothesize that candidates appearing *last* are penalized in districts with more candidates (due to satisficing) and advantaged in districts with fewer candidates due to memory effects (Nairne 1988). We investigate whether ballot order and likeability influenced the election outcome in the 2012 *Parlamentarie*, considering the candidate's rank as our target variable.[1] We controlled for gender, age, and certain features of the self-uploaded pictures (see Section *Parlamentarie 2012* for further details) to ensure that any effect of ballot order was not tainted by other potential voting-cues. Furthermore, we examined the influence of candidates' likeability, broadly construed as the impression elicited by a candidate picture and operationalized by asking participants in an online survey how likely they would be to vote for a candidate based only on their picture, to investigate whether more likeable candidates had an advantage (Lau and Redlawsk 2001; Ballew Charles and Todorov 2007).

In line with previous research on ballot elections (van Erkel and Thijssen 2016; Marcinkiewicz 2014; Miller and Krosnick 1998), we provide evidence of ballot order affecting the outcome of the *Parlamentarie*. We further show a robust effect of likeability that exists alongside the ballot order effect. Therefore, candidates were more likely to attract votes if they appeared towards the top of the screen and if they appeared more likeable from the self-uploaded picture. The number of candidates in a district moderated the ballot order effect in line with our hypothesis: candidates appearing at the bottom of the list were advantaged in districts with fewer candidates. These results challenge the rhetoric of the M5s according to which the mere shift to an online setting improves the quality of crucial democratic processes such as intra-party elite selection. However, the online set-up allows for more effective countermeasures than traditional paper-based elections. We return to these points in the discussion after introducing the theoretical

framework, describing the data and statistical methods, and presenting the empirical results.

2 Theoretical framework

2.1 Decision-making under online settings: what can go wrong?

Elections represent a crucial opportunity for citizens to affect democracies through their decision- making. Citizens' rationality plays an important role in classic democratic theory, which posits that an informed and attentive citizenry is required for democracy to work properly (Estlund and Landemore 2018). However, more recent evidence from cognitive approaches to voting has raised several doubts about the optimism of such assumptions (Achen et al. 2017). Indeed, most citizens know or care little about politics, making assumptions of rationality in political decision-making unrealistic. In the light of evidence from cognitive theories of human decision-making such as the dual-process theory (Kahneman 2011), we know that individuals tend to adopt cognitive shortcuts to deal with the cost that such tasks impose. For instance, according to Krosnick (1991), satisficing is a function of task difficulty, respondent's ability, and motivation, so that the reliance on such shortcuts increases when complex tasks are perceived as low stakes (for applications in survey research, see, e.g. Roberts et al. 2019; Roßmann, Gummer, and Silber 2017). That is, people act mainly as 'cognitive misers', given their tendency to adopt the easiest solutions to deal with problems (Fiske and Taylor 2013), including political decision-making.

In view of these arguments, questions on the reliability of elections as important democratic processes have been raised. In seminal studies conducted by Lau and Redlawsk (2006, 2001), it has been argued that, despite the recourse to cognitive shortcuts, voters can vote 'correctly', where correct voting is defined as 'one that is the same as the choice that would have been made under conditions of full information' (Lau and Redlawsk 2006, 75). In complex contexts such as electoral campaigns, voters can make sense of politics and decide how to vote by relying on heuristics such as party affiliation, ideology, group endorsement or viability. In addition, it has been argued that while single individuals are more likely to produce biased decisions, when taken in the aggregate, individuals can make rational decisions if the proper conditions are met (Surowiecki 2005). However, given that some biases are systematic and therefore errors are never truly random (Bartels 1996), errors are unlikely to cancel out in the aggregate (Lau and Redlawsk 2001).

In the realm of ballot elections, ballot order effects are amongst the most documented heuristics in the literature, as several studies have shown how candidates appearing first on the ballot were systematically advantaged compared to those appearing in the middle or last (Marcinkiewicz 2014; Soderlund, von Schoultz, and Papageorgiou 2021; Lutz 2010; Miller and Krosnick 1998; Däubler and Rudolph 2020). Such evidence indicates that response order effects can impact electoral outcomes. Moreover, in the absence of the political cues typical of party-based elections (e.g. party affiliation and ideology, Marcinkiewicz 2014; Lutz 2010), ballot order can play an even more relevant role in candidate-based primary elections like the *Parlamentarie*. While these elections aim to reduce the influence of parties on decisions and force citizens to make more informed

choices based on candidate competence, they also increase the complexity of voters' decisions: as it is unlikely that voters will collect sufficient information on all candidates, such situations increase the cognitive load and the consequent use of cognitive shortcuts (Meredith and Salant 2013; Soderlund, von Schoultz, and Papageorgiou 2021). Moreover, voters might be more inclined towards cognitive shortcuts in primary elections, where the lack of ideological cues deprives them of a critical discriminative cue (Marcinkiewicz 2014).

While studies on human-computer interactions provide additional evidence of the pervasiveness of response order effects (Burghardt et al. 2017; Burghardt, Hogg, and Lerman 2018; Lerman, Hogg, and Suleman 2014; Dev, Karahalios, and Sundaram 2019; Burghardt et al. 2017; Burghardt, Hogg, and Lerman 2018), we argue that any electoral setting *should* ensure that candidates have fair chances of being elected due to their competence and stances rather than because of their positions on the ballot. To the best of our knowledge, no study to date has replicated this evidence in online elections. In particular, the set-up of the *Parlamentarie* is unique, as it made it possible for voters to get further information about candidates within the platform itself, which may facilitate access to information about candidates when voters make their choices.

2.2 The M5s 2012 online primaries

Since its foundation in 2007, the M5s has strategically used the web to organize its grassroots activism and spread its anti-establishment messages (Bordignon and Ceccarini 2015). While Beppe Grillo's blog was articulating the movement's ideological messages in a 'top-down' fashion, grass-root activists were aggregating and organizing using the digital platform *Meetup*. These two organizational features correspond to what Mair and Katz (2002) called the 'party in central office' and the 'party on the ground', whereas the 'party in public office' was as yet virtually non-existent, aside from a few council members elected in a handful of towns.

However, the fundamental element of innovation the M5s brought into Italian politics was the use of digital media to actualize their narrative of citizens' empowerment. Before the 2013 Italian general elections, the M5s launched the *Parlamentarie*, the primary election to recruit the candidates that would compete in the general elections to become MPs. Unlike any other primary election previously held in Italy, the *Parlamentarie* were organized entirely online and aimed not simply to select the party leader but the entire pool of candidates.

The M5s' example falls within a framework of digital direct democracy experiments that European democracies have witnessed over the last decade (other examples being the Spanish party Podemos (Vittori 2017), the France Insoumise party (Guglielmo 2021), and the pirate parties (Gerbaudo 2018)). Despite some ideological differences, these parties share the use of ICTs to bring citizens closer to institutions in an optic of power decentralization. In so doing, they aim to improve the quality of political participation to actualize their project of digital direct democracy. To this end, internet voting platforms have been used as a tool for decision-making to afford different preference aggregation models, such as intra-party consultations and agenda-setting. By hosting these deliberative processes on online platforms, parties reduce the costs of political

participation for both citizens and institutions, facilitating monitoring of constituencies (Deseriis 2021).

The *Parlamentarie* represent an interesting case-study for at least two reasons. First, they involved more than 20, 000 voters who chose amongst more than 1, 400 activists as candidate MPs (Biorcio and Sampugnaro 2019) in an ecologically valid context, i.e. one in which every actor involved (party, candidates, voters) has genuine stakes. Second, their outcome had a far-reaching impact on Italian politics, as the M5s went on to win about 25% of the popular vote at the ensuing general election, with 163 candidates selected via the *Parlamentarie* being elected to the Chamber of Deputies (109) and the Senate (54).

On top of being regular registered members of the M5s by September 2012, candidates needed to meet several requirements to compete in the *Parlamentarie*, [2] meant to shield the movement from infiltration and last-minute opportunists (Tronconi 2018). Most notably, candidates were ineligible if they had had previous experience as an MP, but had to have run in a local election, either under the M5s banner, or as part of a local list affiliated with the M5s.

These requirements reflect characteristics typical of populist discourses (Mudde 2004), being a product of the anti-establishment narrative of the M5s, where the wisdom of the common citizen is opposed to the corruption of the ruling political elite. Furthermore, political inexperience is seen as a positive feature, political expertise being associated with the moral corruption of the Italian political establishment. In addition, the M5s' ideology has often been linked with *technopopulism* (Bickerton and Accetti 2018), that is, an ideology blending elements of populism (power to the people) with elements of technocracy (power to the experts). Whereas such a mix might look contradictory at first, the two arguments are jointly used to legitimize the Movement's populistic claims and eschew ideological confrontation. Thus, citizens are idealized as the real protagonists of political life and as having greater expertise than professional politicians.

The purpose of the primary was also to let voters decide, albeit indirectly, on the order in which candidates would appear on the ballot in the general election, which would in principle be determined by the number of votes obtained in the *Parlamentarie*.[3] Having voters decide on the order of candidates was particularly important in the M5s' rhetoric since the electoral law in force at the time made no provision for preference voting. Candidates were elected to Parliament based on the share of votes obtained by the party in each district: the more votes, the more candidates were elected, with candidates obtaining seats (or not) according to the order in which they featured on the ballot. Therefore, even though some adjustments to the electoral lists for the general election were made post-hoc (new names were added to the ballots and some candidates withdrew from the competition before the election), the outcome of the primary may have played a role in determining who entered Parliament in the end.

Voters had to be at least 18-years old at the time of the election, be enrolled in the M5s as of 30 September 2012 and certify their identity digitally by uploading their ID. The voting interface was rather simple, as shown in Figure 1. Voters landed on a page listing all candidates in the district in alphabetical order based on the initial letters of their surnames. The landing page provided information about each candidate's appearance through a self-uploaded picture, name, gender, age, and profession. Further details about the candidates and their political priorities could be accessed by clicking on their names

Figure 1. Example of candidate selection page on the Rousseau platform where the *Parlamentarie* took place. The first column shows the self-uploaded picture, followed by the candidate's surname and name. Other columns show age, place of birth and occupation, with the last column displaying the voting button.

and being redirected to a separate page. Here, voters could find the candidate's CV, a short introductory video and a statement about the political projects the candidate would pursue in the event that s/he was elected. It was not however possible to cast a vote on a candidate's personal page: for this, voters had to go back to the landing page. The voting procedures lasted from 3 December to 6 December 2012 a nd involved 20, 252 people (Biorcio and Sampugnaro 2019).

In light of previous studies on ballot order effects, it is immediately clear that this interface created considerable risks that voting heuristics helped to determine the outcome. First, some names were immediately visible while others could only be seen after scrolling, and more so in districts with more candidates competing. Second, voters could cast a vote directly on the landing page without accessing candidates' personal information and political statements. Finally, the availability of the candidate picture on the landing page could have given more likeable candidates an advantage over others.

3 Materials and methods

3.1 Data

3.1.1 Parlamentarie 2012

The main dataset for this study was scraped in 2013 from the website, then accessible under a CC-BY-NC-ND licence, which hosted the results of the *Parlamentarie*.[4] Candidates were grouped into 31 districts, corresponding to the 27 districts in which the Italian territory was divided according to the electoral system in 2013 and the 4 districts covering the rest of the world for Italians resident abroad. For each candidate, we scraped their name, surname, age, profession, and picture (wherever available) and annotated gender based on other demographics. We also derived their position on the screen, based on the alphabetical order of the candidates' surnames, and scraped their final rank (separately for each district) in the election.

We then manually tagged each available picture according to whether it contained a party logo. To this end, we also considered the founder of the party as a logo to account for a possible party- endorsement voting-cue, under the hypothesis that candidates featuring a party logo or the party founder in their picture would boost their credibility in the eyes of voters and so gain an advantage. We flagged pictures containing the scan of an ID document or drawings/comics/writings as not containing a picture.

3.1.2 Likeability ratings

To account for the role of likeability, we collected judgements through an online survey distributed on Prolific and hosted on Qualtrics. To collect likeability ratings, we selected three target districts that i) varied in terms of the number of candidates competing, thereby improving the generalizability of our results, and (ii) maximized the number of usable pictures.[5] We converged on districts number 5 (Lombardia-3; 18 candidates; 18 pictures available), 11 (Emilia-Romagna; 99 candidates; 80 pictures available) and 21 (Puglia; 61 candidates; 49 pictures available).

Since some of the candidates have since 2012 acquired national significance and would be easily recognized by Italian citizens, we recruited participants from France, Spain, Portugal, and Greece, to ensure comparable aesthetic standards to those Italian voters are most likely to have, while limiting the possibility of participants answering on the basis of what they knew of the candidate. We recruited 176 participants, asking each of them to rate 25 pictures, to obtain 30 ratings per picture and so improve the reliability of ratings per picture. Participants were paid £7.20/h for their participation. The experimental design and data management plan were approved by the Research Ethics and Data Management Committee (REDC) of the Tilburg School of Humanities and Digital Sciences (TSHD) of Tilburg University, code REDC2020.201. The Online Supplementary Materials, datasets and R scripts are available for replication purposes on Dataverse (https://doi.org/10.34894/KE8VVY).

After providing their informed consent, participants were asked to provide details of their gender, age, education, and country, these being collected in order to assess whether there were any systematic differences in likeability ratings. Participants who did not provide their consent were redirected back to Prolific and did not receive payment.

Likeability ratings were obtained by presenting subjects with a candidate's picture (of the same size and resolution as the one uploaded to the website, in order to preserve the

conditions of the *Parlamentarie* as much as possible) and were asked to drag a slider to indicate how likely they would be to vote for the candidate basing their decision simply on the picture. They were instructed to move the slider more towards a pole the stronger their intuition about the candidate. The slider was initially presented in the middle and was anchored between −50 (*not at all likely*) and+50 (*extremely likely*). Candidates were presented randomly to each participant. Participants were scanned for uncooperative behaviour, considering whether they always left the slider at the initial position or whether they always dragged the slider to the same extreme of the bar. No participant showed uncooperative behaviour as defined in this way.

3.2 Statistical approach

We adopted a step-wise regression approach: we started by including a set of control variables and added the variable of interest (with possible interactions) to assess whether it improved the model's fit. The control variables included the candidate's age, their gender (binary), and the presence of a party logo in the candidate's picture (to create a categorical variable with three levels: no picture, picture without a logo, and picture with a logo). We further considered possible composition effects to test the possibility that, for example, a 50-year-old candidate would appear young if the median age in the district was 65 but old if the median age in the district was 35, or that a logo would draw more attention if only 5% of the pictures in a district showed one as opposed to 20% of the pictures showing one. Therefore, we derived two measures for age: one applying median centring considering the global median and one applying median centring separately per district, i.e. subtracting the district median age from the age of each candidate in the district. We further computed the proportion of pictures with a logo in each district and the proportion of women in each district). Finally, we quantified the model fit using the Akaike Information Criterion (AIC), which penalizes models for the number of parameters they estimate. We thus checked whether adding the predictor of interest resulted in a reduction of the AIC.

The dependent variable in the main analysis was the candidate's rank per district. However, screen position and rank are inevitably related and co-vary, and while every district features a candidate at screen position 1 and a candidate ranking first, not all districts feature a candidate in screen position 57 and a candidate ranking 57th. It is very different for a candidate to be in position 18 in a district with 18 rather than 80 candidates: considering screen position as the absolute distance from the top of the page does not allow us to take account of the fact that the last position in the list can be very salient as well. Therefore, we transformed both rank and screen position by normalizing the values to the unit range, using the formula $unit(x_i) = x_i - min(X)/max(X) - min(X) \forall x_i \in X$ where X is the vector of screen position values or ranks: candidates appearing at the top of a page or ranking first would get a score of 0, and candidates appearing last on the page or ranking last would get a score of 1, with intermediate values depending on the number of candidates in a district.

We used Generalised Additive Mixed Models[6] (GAMMs, Baayen et al. 2017) to model rank (unit-normalized) as a function of the independent variables of interest. Both GAMMs and CLMMs implement a multilevel approach to account for district-specific variance by including random inter- cepts and (non-linear) slopes for the relevant

independent variables. Moreover, GAMMs allowed us to model possible non-linear effects that continuous predictors may have on rank: this is particularly important considering that we have hypothesized that the ballot order effect may be quadratic in smaller districts. Unless otherwise specified when describing results, we included continuous pre- dictors as simple smooths; used splines to model non-linearities, and did not limit the number of inflection points an estimated effect was allowed to have.

To check whether the number of candidates moderates the effect of screen position, we took the log of the number of candidates (base 2), to reduce the long right tail that would make estimates brittle for districts with several competing candidates, and included a partial tensor product between number of candidates and screen position to fit an interaction between the two.

Finally, we analysed the possible effect of likeability on rank. We again used GAMMs predicting rank as a function of age, gender, screen position and participants' ratings in the online survey, including random intercepts for rater ID to account for the fact that ratings provided by the same participant are likely to have a higher correlation than ratings provided by different raters. We did not consider the presence of party logos in the pictures because we selected pictures which did not have a party logo in the first place to avoid biases due to subjects' recognition of the logo.

4 Results

4.1 Ballot order effects on rank

Our first analysis focused on possible ballot order effects on the ranking of candidates in each district. We fitted a baseline GAMM predicting unit-normalized rank as a linear combination of age, gender and presence of a logo in the picture.[7] We first compared global median centring and district median centring, and observed that the latter provided a better fit. We then tested whether the effect of gender was moderated by the proportion of women in each district, testing whether an interaction between gender and proportion of women per district improved model fit over the simple effect of gender. This interaction resulted in a higher AIC and was thus discarded. The same happened with the interaction between presence of a logo and share of pictures with a logo per district, which was also discarded from further analyses. The baseline model thus included a smooth term for age (median centred by district), parametric terms for gender and presence of logo, and a random intercept for district identifiers ($AIC = 222.718$). No random slope improved model fit.

We then added screen position (unit-normalized)[8] to this model (random slopes for screen po- sition did not improve model fit). This model ($AIC = 171.795$, $adj.r^2 = 0.243$) improved over the baseline ($\Delta AIC = 50.923$), showing that screen position is a significant predictor of rank ($edf = 5.144$, $Ref.df = 6.253$, $F = 9.767$, $p < 0.001$). Figure 2 displays all the effects visually (all effects were statistically significant, exact coefficients are provided in Appendix B of the Online Supplementary Materials).

The effect of screen position appears roughly quadratic: candidates appearing towards the top of the screen (left side of the x-axis) had an advantage over other candidates. However, candidates appearing towards the bottom of the screen (right end of the x-axis) tended to rank higher (bet- ter) than candidates appearing in the middle of the list. We

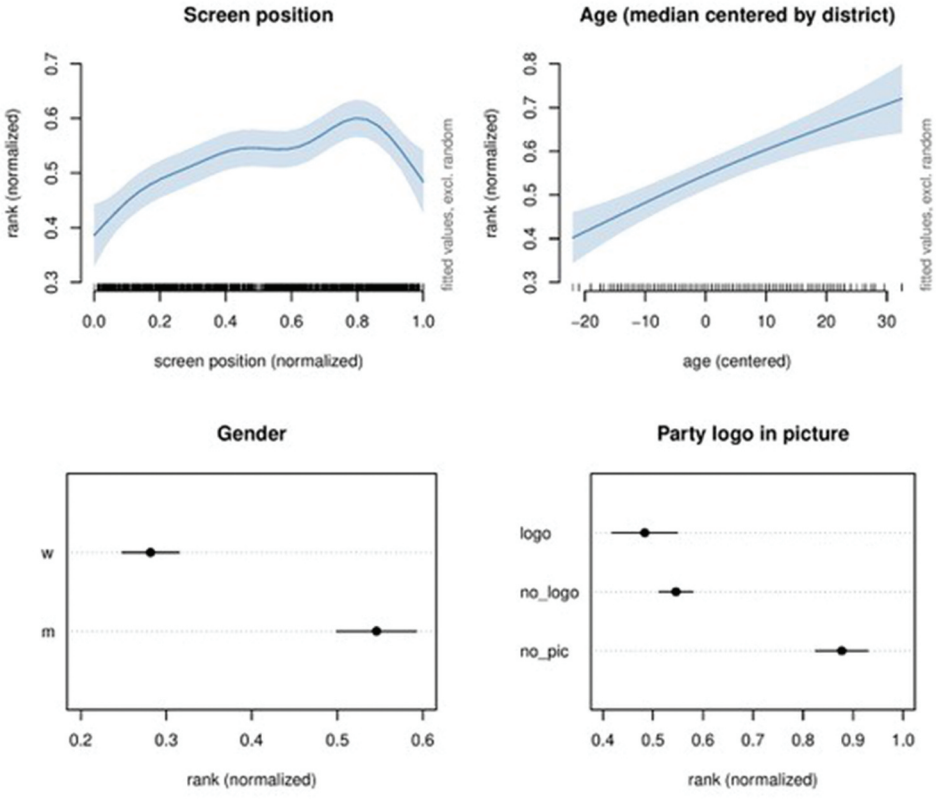

Figure 2. Effects of screen position (unit-normalized; top-left), age (median centred by district, top-right), gender (bottom-left), presence of a logo in the candidate picture ('logo' indicates pictures with a party logo; 'no logo' indicates pictures without a party logo; 'no pic' indicates candidates who did not upload a picture at all; bottom-right). Low values on the y axis indicate better rankings. The underlying statistical model is a GAMM with ranking (uni-normalized as the dependent variable), continuous predictors included as simple smooths, and a random intercept for district.

also observe a linear effect of age, with younger candidates relative to their district ranking first, as well as an advantage for women. Candidates showcasing a party logo in their picture had a slight yet significant advantage over can- didates who did not, but the dominant effect is the stark penalty for candidates who did not upload a picture.

We then included an interaction between screen position (unit-normalized) and number of can- didates per district (logged)[9] to check whether the quadratic effect was primarily driven by smaller districts, in line with our predictions. This interaction was statistically significant ($edf = 3.129$, $Ref.df = 3.701$, $F = 3.869$, $p < 0.01$) and improved the model fit over the model which included screen position alone ($AIC = 163.871$, $\Delta AIC = 7.924$). Visual inspection of the tensor product revealed the expected pattern, visualized in the centre panel of Figure 3 (coefficients are provided in Appendix B of the Online Supplementary Materials). Darker shades of blue indicate lower predicted ranks, while orange shades indicate higher predicted ranks. In the right-hand panel we display the effect of screen position at different numbers of candidates, showing the composite effect

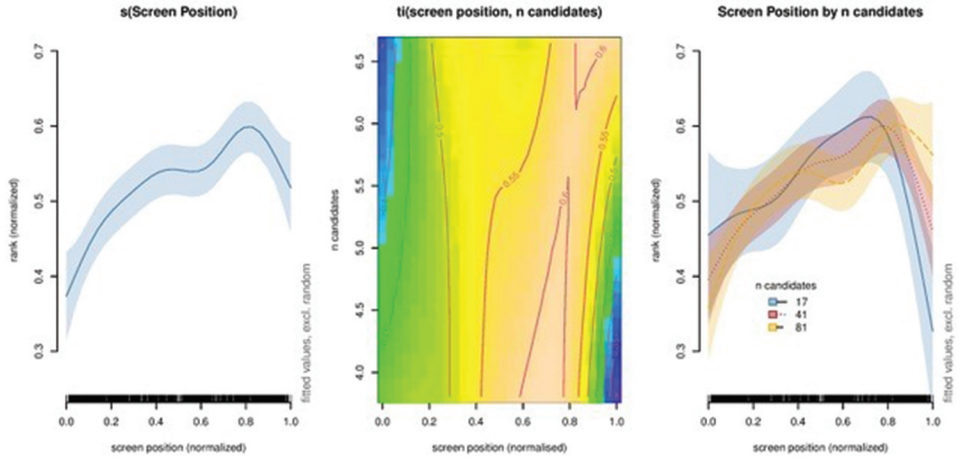

Figure 3. Non-linear interaction between screen position and number of candidates on rank (unit-normalized) estimated using a GAMM while controlling for gender, age, and presence of party logos in the candidate picture. Left: main effect of screen position (x axis, unit normalized) on rank (y axis, unit normalized). Centre: partial tensor product between screen position and number of candidates. Darker shades of blue indicate lower (better) predicted ranks while orange shades indicate higher (worse) predicted ranks. Red lines connect points with the same predicted rank. Right: effect of screen position (x axis, unit normalized) on rank (y axis, unit normalized) for districts with different numbers of candidates (colour and line type legend), showing how the partial tensor product and the main effect of screen position combine.

of the main effect and the partial tensor product: the advantage of candidates displayed at the top exists regardless of number of candidates, but is slightly weaker when fewer candidates compete. In contrast, we see that the advantage for candidates shown at the bottom of the list is clear when fewer candidates compete but almost vanishes in the most crowded districts.

4.2 Likeability effect on rank

We fitted a GAMM model predicting unit normalized rank (to address the differences in number of candidates in the three target districts). The independent variables included age (median centred by district), screen position (unit normalized), gender, and likeability ratings, all in interaction with district ID. We first tested whether all interactions were needed by comparing AIC scores and found that they all improved model fit, showing that the target effects are different in the three target districts. The model also included a random intercept for rater ID. Figure 4 shows the effects of interest, allowing for direct comparisons between districts (see Appendix B of the Online Supplementary Materials for the exact coefficients of screen position and likeability in each district).

Screen position had quite different effects, consistent with our previous analysis: candidates appearing at the bottom were favoured in district 5 (the smallest). In contrast, in the mid- size and large districts, candidates appearing at the top were favoured. Likeability had a largely linear effect, with a slight yet robust non-linearity in the largest district[10]: candidates rated as more likeable from the picture ranked better in all districts,

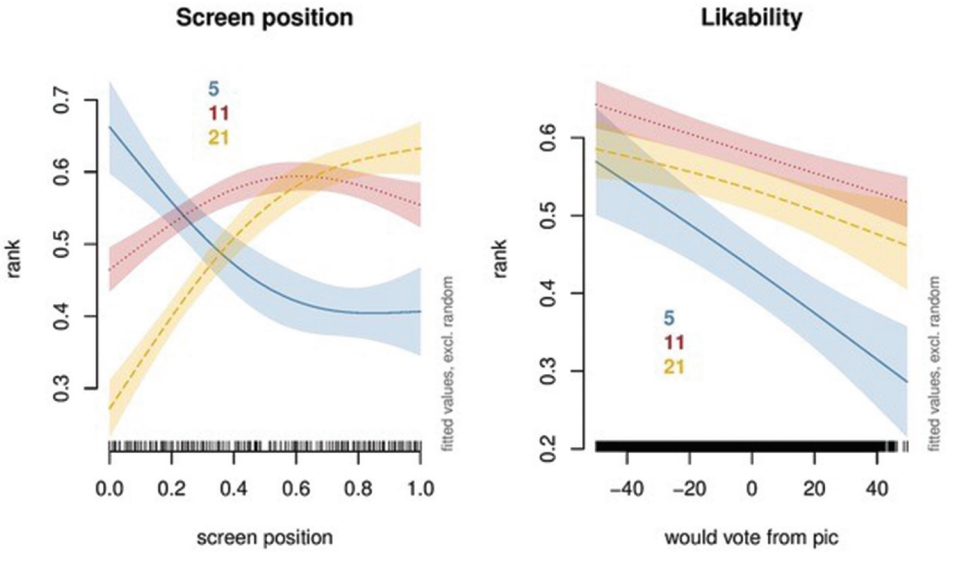

Figure 4. Effects of screen position on rank (left) and of likeability on rank (right) moderated by district id (blue, solid line: district 5 (Lombardia 3, 18 candidates); red, dotted line: district 11 (Emilia romagna, 100 candidates); yellow, dashed line: district 21 (Puglia, 61 candidates)), estimated using GAMMs controlling for sex and age (median centred per district). The non-linearity was limited to a third order polynomial to prevent overfitting.

with a stronger effect in district 5 (the smallest). Finally, we see again that women were favoured, and more so in the largest district (district 5 is not shown as only men competed there). Our results thus suggest that more likeable candidates were advantaged regardless of how many candidates were competing.

5 Discussion

The M5s' 2012 *Parlamentarie* provided a unique experiment in online democracy and nearly ideal conditions for isolating cognitive biases' effects on elections, which are typically difficult to achieve in conventional primaries. In this election, voters' decisions were not influenced by well-known biases such as candidates' affiliations to a specific party faction, or viability (Lau and Redlawsk 2006, 2001). At the same time, the *Parlamentarie* offer a real-life case-study of election biases, allowing a thorough test of our hypotheses outside the lab.

Our results show that the choices of M5s party members are likely to have been affected by ballot order effects – reported in conventional paper-based elections (van Erkel and Thijssen 2016; Lutz 2010; Marcinkiewicz 2014) – and candidate likeability (Ballew Charles and Todorov 2007; Lau and Redlawsk 2001). We document how, in general, candidates appearing at the top of the screen were advantaged as compared to candidates appearing further down the list. We further qualified this effect by showing that the number of candidates competing in a district moderates order effects, with stronger penalties in districts with more candidates competing (Soderlund, von Schoultz, and Papageorgiou 2021; Meredith and Salant 2013). This seems to confirm that the

higher the number of candidates, the more voters resort to satisficing behaviour (Krosnick 1991). In the context of the *Parlamentarie*, this effect can be explained by considering that the larger the number of candidates competing, the more voters had to scroll and the more time they would have had to spend if they had sought to survey all of them. In small districts, however, we found evidence of a recency effect, suggesting that candidates who appeared at the bottom of the page were advantaged, likely due to easier recall and higher salience after exhausting the candidate list (Nairne 1988). These findings are robust net of control variables related to candidates' sociodemographic characteristics and composition effects.

We further found a robust effect of likeability in a sample of districts, with more likeable candi- dates ranking higher. The effect of screen position held even after controlling for likeability. However, in the smaller district, the effect of screen position was reversed, with candidates appearing at the bottom of the page ranking higher in the election. This suggests that different cognitive biases may interact in non-trivial ways and paves the way for future studies, which should also consider halo effects, to assess whether appearing closer to popular candidates may provide a spillover advantage purely because voters will be more likely to consider a candidate whose name appears close to another candidate which, for any reason, draws more attention. In addition, future research may look into which features respondents evaluate when rating candidates' likeability, since our set-up did not disentangle which specific criteria respondents adopted.

The implications of these findings are amplified when considering (i) the electoral results achieved by the M5s (25.55% for the Chamber of Deputies in 2013) and (ii) the electoral rules in place during the 2013 general election, which 'projected onto' the general election the biases of the primary election (see Appendix D of the Online Supplementary Materials for an analysis showing that candidates' screen positions in the *Parlamentarie* indeed had an effect on their probability of entering parliament in the 2013 general election).

Finally, the covariates we included in the statistical model showed interesting effects on their own. First, candidates who are younger than their competitors tended to rank higher. This finding aligns with the Movement's rhetoric and the requirement of candidates not to have had prior political experience in a public office: younger candidates might appear less compromised with the political establishment. Moreover, showing the party logo or party founder in the candidate's picture gave him/her an advantage, suggesting that in a field where differences among candidates are small, being in a position to attest one's history in the movement provided an advantage. Moreover, not uploading a picture resulted in a strong penalty. The reason for this cannot be gleaned from our analysis, but we hypothesize that, in a party with a strong emphasis on digital tools and transparency, candidates not providing their pictures might appear less trustworthy, less committed or less technologically capable, all liabilities on the M5s platform. Finally, we saw that women had an advantage. However, the number of women competing in the election was very small (196 out of 1,486 candidates, of which 154 appeared on the ballot in the 2013 general election), suggesting that self-selection might have played a role, with women competing only if they felt sufficiently qualified.

Considering the hypotheses we started from, therefore, we should conclude that the allegedly higher motivation of voters was not enough to counter the effect of satisficing, operationalized here through order effects and likeability. It is possible that the design choices of the interface played a part in determining these effects by creating more

favourable conditions for voters to resort to shortcuts and heuristics and countering the possible advantages offered by the online medium in making information about candidates more readily available. In addition, such effects may also have hampered the Movement's objective of leveraging digital democracy tools to improve the process of recruitment of new candidates by using open online primaries in place of the conventional approaches adopted by other parties. The *Parlamentarie* were successful in removing several barriers to political access, especially as compared to more structured primaries where parties exert tighter control of the lists: unfortunately, our analyses show that the implementation hampered these possibilities for several candidates, who may have been disadvantaged by platform design choices.

Even though we document a robust effect of ballot order and likeability on election ranks in the *Parlamentarie*, our analyses remain correlational and cannot be taken to provide evidence that screen position *caused* the election outcome. A controlled A/B test would be required to test a causal relation, e.g. showing to a random subset of voters candidates in alphabetical order *vs* candidates listed in a random yet fixed order *vs* candidates randomly shuffled at each access. This experiment is however not feasible in a real election as it would systematically manipulate the electoral lists for subsets of the electorate, likely biasing the decision-making process of some of them. For this reason, we further argue that such an experimental manipulation would not be ethical in a real election, particularly given the results we have illustrated – results that suggest a robust relation between ballot order and election outcome, in line with previous studies (van Erkel and Thijssen 2016; Lutz 2010; Miller and Krosnick 1998). Considering the stakes in such processes, extant knowledge should be leveraged to make a platform that minimizes the influence of cognitive biases, adopting the more pervasive randomization allowed by the medium and the electoral system. Mock elections are a viable option for implementing such a manipulation (Lau and Redlawsk 2006), but they lack ecological validity and would not allow us to draw firm conclusions given that participants are unlikely to adopt the same decision-making processes in an election with no real stakes.

Although we were unable to analyse the Movement's subsequent online primary elections due to changes in the licence under which the website was made public, the 2012 *Parlamentarie* provided an environment that was less influenced by external dynamics. Candidates did not have any advantage due to incumbent status, and media coverage was limited due to the lack of a party in public office and to a ban on television appearances on the part of party members. Our findings further highlight the wide effects of biases in the 2012 *Parlamentarie*: candidates receiving an advantage due to likeability or screen position went on to gain an incumbent advantage and name recognition, improving their chances in the following elections (Meredith and Salant 2013). However, it could be the case that some of the candidates enjoyed local popularity because they had run for previous local elections *and lost* or received occasional media coverage in the local press. While our focus in this work was on information that was immediately available or determined by the voting platform, future work can look into ways of quantifying name recognition for candidates at the time, using news or social media to track user mentions and to test whether name recognition predicts election rank. Future work can also leverage the data that we release to test further predictors. Information provided in videos and personal pages would have been particularly interesting in this respect but could not be scraped as it was only accessible after log-in.

Despite showing that online elections are subject to the same biases found in paper-based elec- tions, our results actually suggest that the online set-up offers several opportunities to limit the influence of such biases. If anything, the *Parlamentarie* represent a wasted opportunity to counter or limit the impact of cognitive heuristics, whose effects have been known for a long time in the polit- ical science literature (van Erkel and Thijssen 2016; Lutz 2010; Miller and Krosnick 1998). Useful suggestions come from research on clicking behaviour (Dev, Karahalios, and Sundaram 2019). For instance, the online set-up offers the chance to randomize the order of the candidates for each user's access to reduce ballot order effects. Such a solution has already been tested in conventional elections (Ho and Imai 2006; Darcy and Mackerras 1993), but it is costly and challenging to implement. In contrast, the online setting provides a cheap and feasible opportunity in this direction. Even though the primacy bias is impossible to eliminate due to the way in which human attention works (Simon 1956), randomizing the order of the candidates for each voter's access could at least reduce the effect of this bias on the election outcome.

Moreover, connected to our results on gender and age effects, another suggestion would be to conceal impression signals to avoid the influence on voting decisions of factors other than candidate competence. Finally, drawing from the evidence that suggests that primacy effects are more likely to be found in cases of quick completion response (Malhotra 2008), another counter measure would be delaying voting. Platforms could set a fixed time before allowing the user to vote to encourage them to consult as many candidate profiles as possible and to counter cost-minimizing behaviour. Such advice can be especially crucial in primary elections, where ideological voting-cues are lacking and the cognitive costs for voters tend to be higher.

In conclusion, our study has investigated the electoral outcomes of – what was at the time – an unprecedented experiment in digital democracy – one that took place in Italy in 2012 and had important implications in terms of institutional representation. We reported a robust ballot order effect, moderated by the number of competing candidates, and a likeability effect in the 2012 *Parlamentarie* – the effects – we suggested – depending on satisficing (Krosnick 1991; Roberts et al. 2019). Our main wager is that digital platforms have the potential to address existing problems but, left unchecked, do not necessarily lead to a better quality of decision-making. The good news is that policy-makers can profit from robust evidence and suggestions that the literature offers. Although cognitive biases will continue to affect the decision- making of many voters, digital platforms provide several possible solutions if properly leveraged.

Notes

1. The share of votes was unfortunately not available for all districts.
2. https://www.ilpost.it/2012/12/02/le-primarie-del-movimento-5-stelle.
3. The procedure by which lists for the general election were put together was however not openly communicated by the M5s.
4. The page can be now accessed through a way-back machine: https://web.archive.org/web/20121217093818/ https://www.beppegrillo.it/votazioni/candidati/elenco_circoscrizioni.php.
5. We provide further details about the exclusion criteria for candidate pictures as well as about the experimental interface and procedure, inclusion criteria for participants,

and participants' demographics in Appendix A of the Online Supplementary Materials.

6. Appendix C of the Online Supplementary Materials presents a replication of the analysis of rank using Cumulative Link Mixed Models (CLMM), treating rank (not unit normalized) as an ordinal variable.
7. We used the mgcv package (Wood 2017) in R to fit GAMMs and the itsadug package (van Rij et al. 2020) toplot effects.
8. To ensure that the normalization did not introduce any artefact, we also fitted a GAMM with the same DV and IVs but replacing normalized screen position with the original variable. The predictor was significant ($edf = 3.258$, $Ref.df = 4.070$, $F = 11.24$, $p<0.001$) but the model had a worse fit ($AIC = 183.5$, $adj.r^2 = 0.235$), showing that normalized screen position best captures the relation between ballot order and rank in each district.
9. We included screen position as a smooth term and the interaction between screen position and number of candidates as a partial tensor product, limiting the number of allowed inflection points to 4.
10. We probed this by fitting a model only on data points from district 21. First, we included the effect of likeability as a simple smooth, and then we included it as a parametric term, forcing the model to estimate a linear effect. The AIC of the first model was 17 points lower, confirming that allowing the model to estimate a non-linear effect for likeability on rank improves model fit.
11. It always takes longer than you expect, even when you take into account Hofstadter's Law.

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No potential conflict of interest was reported by the authors.

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