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Ballot Position and Election Results: Evidence from a Natural Experiment

by

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Abstract:

Candidates listed first on the ballot paper regularly receive more votes than other candidates, but what role does ballot layout play in this connection? Experimental studies from first-past-the-post systems show that the ballot position effect is causal as the order of names functions as a cue to voters. Does this also hold for PR systems where voters may vote for a party instead of a specific candidate? We identify a natural experiment in Danish local and regional elections involving more than 10,000 candidates on 103 different ballot papers using ballot layout to study ballot position effects. We find indeed, the ballot position/layout has a causal effect on election results in PR systems. Our findings indicate that the empirical domain of ballot position and layout effects is much wider than suggested by previous research.

The question of whether a top position on the ballot paper affords a candidate an advantage over other candidates in an election has a long history, both in political science and in practical politics. Woodrow Wilson made the following observation in the beginning of the twentieth century, and it remains valid to this day:

I have seen a ballot ... which contained seven hundred names. It was bigger than the page of a newspaper and was printed in close columns as a newspaper would be. Of course no voter who is not a trained politician, who has not watched the whole process of nomination carefully, who does not know a great deal about the derivation and character and association of every nominee it contains, can vote a ticket like that with intelligence. In nine cases out of ten, as it has turned out, he will simply mark the first name under each office (Wilson 1912: 593).

Since then, a considerable body of political science research has been devoted to identifying more exactly the effect of being listed first on the ballot. Many studies find positive effects, but many studies also find that the contingent effects suggested by Wilson – publicity, engagement, educated voters and many other factors – may modify or even nullify ballot position effects (e.g. Chen et al. 2014; Ho & Imai 2008; Kim et al. 2015; Koppell & Steen 2004; Meredith & Salant 2013).

In practical politics, ballot position effects have figured prominently. Losers have often contested election results arguing that winners were unfairly favored by their position on the ballot. Cases have been taken before courts, which have often acknowledged ballot position effects and sometimes even annulled election results for this very reason (Alvarez et al. 2006; see also Miller & Krosnick 1998).

However, identifying ballot position effects with some accuracy is challenging. The reason is that political parties and candidates are likely to anticipate them and act strategically

to harvest them. If being listed first really brings electoral advantages, parties and candidates are likely to actively seek this position on the ballot.

Strategic positioning is, of course, a widespread phenomenon. Candidates often fight to be placed at the top of the ballot, and political parties place their top candidates first. To the researcher, however, this poses a challenge: How to disentangle the effect of the ballot position from the effect of the characteristics of the individual candidate who has successfully fought to obtain this position? To the researcher, tricky technical issues of selection effects and reverse causality are involved.

This methodological problem is now broadly acknowledged in the literature, and the preferred solution is to turn to experimental methods in which the assignment of candidates to ballot positions is somehow randomized. However, the discipline of experimental investigation of ballot position effects is still in its infancy and overwhelmingly based on natural experiments in the USA where random rotation of candidate names is used in a number of states (e.g. Darcy 1986; Chen et al. 2014; Krosnick et al. 2004). Very little experimental evidence exists on ballot position effects – not to speak of ballot layout effects – in other systems. Ballot layout effects refer to the effects on candidates' votes which can be attributed to the ballot layout as such, i.e. it is a subcategory of ballot position effects (Geys and Heyndels 2003).

It is especially unfortunate that there is so little evidence from proportional representation (PR) systems, which is the most common type of electoral system worldwide (Reynolds et al. 2005: 31). We are primarily interested in list PR systems where voters may vote for a specific candidate or simply vote for a party and thus avoid the challenge of having to select a specific candidate. It is therefore far from clear that ballot position effects will be found in these systems.

The purpose of this paper is to study list PR systems to determine the degree to which they belong to the empirical domain of ballot position effects. Danish local and regional elections offer a unique opportunity to do this. First, these elections are conducted as pure (open or semi-open) list PR systems with no formal electoral threshold. Each municipality and each region constitutes one election district, and each voter has one vote to cast for the municipal council and one for the regional council. Second, the printing of the candidates' names in columns (i.e., the ballot layout) represents a natural experiment in which some candidates are as-if randomly assigned to top positions. Third, factors normally found to mitigate ballot position effects – partisan elections, media attention, educated voters – are all present in the Danish context. This makes Denmark a least-likely case for identification of ballot position and ballot layout effects, even among countries using list PR systems. In sum, if such effects are found in Danish local and regional elections, this would hold important empirical lessons for PR systems generally and theoretical lessons for the literature on ballot design.

The paper is structured as follows: We begin by reviewing the existing empirical literature in order to evaluate the present knowledge of ballot position effects, to identify lacunae in the literature, and to argue for the value added by our study. Second, we introduce the Danish local and regional electoral system and its merits as a natural experiment to identify ballot position effects. Third, we explain our data and our analytical approach. Fourth, we present the results of our empirical analyses, which show that the ballot position of a candidate in the Danish list PR system indeed has a causal effect on election results. Finally, we conclude and discuss the broader implications of the study.

What We Already Know About Ballot Position and Ballot Layout Effects

Ballot position effects are created by psychological mechanisms (Krosnick et al. 2004; Darcy & McAllister 1990; Brockinton 2003; Kim et al. 2015). It may be a temporal phenomenon, i.e., cognitive fatigue builds as the voter considers candidate after candidate on a long vertical or horizontal list. This creates a primacy effect, which is a systematic bias in favor of candidates listed (and seen) first. It may also be a spatial phenomenon, i.e., voters unconsciously associate physical top positions with qualities of the candidate (Kim et al. 2015; see also Tourangeau et al. 2013). Ballot order effects are expected to be generally relevant but most important when other cues are missing, or when voters face multiple choices or complex voting systems.

Given the potential impact on the outcome of elections, it is not surprising that the potential effects of the candidates' position on the ballot paper have attracted considerable scholarly attention. The topic is almost as old as the political science discipline itself (Bagley 1966; Brooks 1921; Dana 1912; Gold 1952; Mackerras 1968; Mueller 1969; White 1950; Wilson 1912), but scientific interest only really took hold in the last quarter of the twentieth century (Bakker & Lijphart 1980; Bowler et al. 1992; Brook & Upton 1974; Byrne & Pueschel 1974; Darcy 1986; Darcy & McAllister 1990; Hughes 1970; Kelley & McAllister 1984; Lijphart & Pintor 1988; Miller & Krosnick 1998; Robson & Walsh 1974; Scott 1977; Taebel 1975; Volcansek 1981) and it has not lost momentum after the turn of the millennium (Alvarez et al. 2006; Brockington 2003; Chen et al. 2014; Faas & Schoen 2006; Geys & Heyndels 2003; Ho & Imai 2008; Johnson & Miles 2011; Kim et al. 2015; King & Leigh 2009; Koppell & Steen 2004; Krosnick et al. 2004; Lutz 2010; Matson & Fine 2006; Meredith & Salant 2013; Villodres & de la Puerta 2006).

When evaluating this literature it is important to keep in mind the methodological problem mentioned in the introduction. Political parties may anticipate name order effects and

therefore place top candidates first. Likewise, individual candidates may fight to gain a top position to increase their chances of election. Studies that do not deal with this problem are likely to overestimate name order effects. However, as noted in Krosnick et al.'s (2004; see also Darcy and McAllister 1990) review of the early literature, most studies do not address this problem, but simply measure whether candidates in different positions on average do better or worse. These studies should therefore be read with caution. To unambiguously identify a name order effect, one must focus on situations where the assignment of candidates to top positions is randomized.

The more recent literature recognizes the problem and turns to experimental methods to deal with it. In the following we focus on such studies – which also include some early contributions – in order to assess the current knowledge of name order effects, to identify lacunae in the literature and to argue for the added value of our study.

A list of experimental studies of ballot position effects is provided in Table 1. We cannot guarantee that it includes all relevant studies, but we have done our best to make it as comprehensive as possible. At first sight, Table 1 indicates that there is solid evidence in favor of ballot position effects. Almost all studies find a positive effect of being listed first on the ballot. However, on closer inspection the evidence is less persuasive. Kim et al.'s survey experiment (2015) is a fine demonstration of the pure name order effect, but its external validity is questionable as it cannot estimate the extent to which this effect is strong enough to matter in real-world elections. The majority of studies of real-world elections are natural experiments from the USA, which mostly use random rotation of candidate names. Almost all these studies find positive ballot position effects. However, it is not clear how well these findings travel beyond the peculiarities of the US election system and political context.

From a non-US perspective it would be desirable to identify ballot position effects in other election systems, especially the PR systems used in so many other countries. However,

of the few non-US experimental studies only the German study by Faas & Schoen (2006) and the Belgian study by Geys & Heyndels (2003) are set in PR systems (the Australian study by King & Leigh (2009) is set in a majoritarian system, the Alternative Vote).

Furthermore, the study by Faas & Schoen based on the Bavarian state elections of 2003 is a most-likely case for finding ballot position effects since voters *must* select individual candidates as is also the case with a more recent (but non-experimental) study by Marcinkiewicz (2014) on the 2007 Sejm elections in Poland. A comparative study on the differences between ballot position effects under compulsory and optional preferential list-PR systems demonstrate convincingly that the former (Poland 2011), as expected, has much stronger ballot position and rank effects than the latter (Czech Republic 2010) (Marcinkiewicz and Stegmaier 2015).

The experimental study of Brussels' 1995 government elections (Guys & Heyndels 2003) is also a most-likely case for demonstrating ballot position effects. It is, however, particularly interesting in our context because the experimental part make use of a different ballot paper layout in four of the city's eight districts, which was required because of the introduction of computer assisted voting. Guys and Heyndels consequently distinguish between ballot position *per se* and ballot layout effects, which they see as a special case of the former. This is obviously a useful distinction, but it has only been applied rarely, even though cases like the US 2000 "butterfly ballot" case is evidence of the potential importance of the ballot layout itself (Guys & Heyndels 2003, p. 150). However, in the Brussels case, voters are free to vote for one, two, three, or four of the candidates (or the party), which supposedly has some impact on ballot position as well as ballot layout effects. As noted earlier, complexity increases the likelihood that voters rely on the cues available; it is therefore difficult to tell how much generalizable information one can take home from the Brussels study, despite some obvious layout similarities with the case under scrutiny here.

(Table 1 about here)

What is needed is a least-likely case, i.e. a study of a simple optional list PR and this is exactly what Danish local and regional elections offer. The theory expects ballot position effects to be strongest in (complex) elections systems with low-saliency, low-importance, and non-partisan elections that do not attract a lot of media attention. It further helps if voting for a candidate is compulsory.

In Denmark, however, local and regional elections are simple, partisan and of considerable salience and importance since local and regional governments are multi-purpose units entrusted with important welfare functions including health care, schools, old-age care, child care and unemployment services (Blom-Hansen and Heeager 2011). Therefore, local elections attract considerable media attention, regional elections less. As the two elections are conducted simultaneously, we should expect to find stronger ballot position effects in regional than in local elections, as voters are supposed to be more knowledgeable about candidates who stand for local than for regional council. Furthermore, in both elections voters can opt to vote only for a party, not a specific candidate. If ballot position and layout effects can be identified in this context, especially in the local council elections, this would lend considerable support to their existence in PR systems more generally.

Danish Local and Regional Elections: A Natural Experiment

In this section we introduce the Danish local and regional seat allocation system and argue that it constitutes a natural experiment for the identification of ballot order effects.

Elections to local and regional councils in Denmark are conducted as straightforward PR systems between parties/lists, where seats are allocated to participating parties/lists by the

d'Hondt divisor seat allocation system. Parties/lists in a municipality or a region decide themselves whether the candidates shall stand “in parallel” or as “a party list”. The former is a completely open list where *only* each candidate’s vote result (in declining order) decides the order of election; the latter is slightly more complicated: After the election, the Droop quota is used to determine which candidates are immediately elected (maybe after some of the party votes are added to the candidate’s number of preference votes), while remaining seats go to candidates in declining order of their votes (like, e.g., in parliamentary elections in the Netherlands). This kind of list system is usually said to be semi-open (or semi-closed). When parties/lists decide that the candidates will stand as a party list, the order of the candidates is indicated on the ballot paper (see the party with the letter O – i.e., Dansk Folkeparti – in the ballot paper reproduced in Figure 1). When candidates stand in parallel, the candidates are listed without numbering on the ballot paper.

(insert Figure 1 about here)

It is a unique feature of Danish local and regional elections that the party or list organizations themselves are free to decide the system by which they will have the seats, they eventually obtain, filled.

The order of the candidates on the list is normally decided in two steps, in some – but certainly not in all – cases by a ballot among local party members. This is an internal party matter and party branches construct their lists in many different ways. One way is to start by finding the party’s top candidate (the mayoral candidate) in a separate ballot, and then hold a new election to determine the order of other candidates on the ballot paper. This is also done for parties/lists where candidates stand in parallel. That way, a party branch, rather than

listing the candidates in alphabetical order,¹ signals the order in which it would like the candidates elected, even though it is still an open list.

In both kinds of lists, a voter can cast one vote for a party (“a party vote”) or a preferential (or personal) vote for a candidate. Both kinds of votes count equally towards the party’s vote total, which is the basis for the d’Hondt seat allocation. If a voter by mistake casts a vote both for a party and for a candidate (from the same party), only the latter is counted. About 75 percent of all voters cast a preferential vote in the municipal election and about 70 percent of all lists are open (Elklit 2013: 50).

We utilize a peculiar feature of the Danish ballot structure and layout in local and regional elections to assess ballot position effects. In order to reduce ballot paper length, ballot papers in both types of elections may be divided into columns. This decision rests with the local election board, which is responsible for printing ballot papers (within centrally determined parameters).

This is important since the order of names in the columns has a vertical as well as a horizontal dimension. As noted above, *temporal order effects* may arise because voters encounter candidate names sequentially on the ballot as they read from top to bottom or from left to right. *Spatial order effects* may arise because voters implicitly associate physical top positions with candidates’ qualities. Being listed in the top of, say, the second column on a party’s ballot list can be considered a good alternative to being listed second in a single-column ballot. Vertical as well as horizontal ordering effects are therefore taken into account in the literature (Darcy 1986; Geys & Heyndels 2003), but their micro-foundation is rarely

¹ A party branch can decide that it wants its candidates ordered alphabetically (in some cases starting with no. 2 on the list), but it is not a legal requirement, as one can see in Figure 1.

investigated. Kim et al. (2015), a rare exception, separate temporal and spatial order effects in a survey experiment and find evidence in favor of spatial effects.

To probe further into the psychological process behind name order effects we ran a lab experiment in which 18 students were asked to select candidates from Danish municipal ballot papers and names from random lists arranged in rows and columns. Tracking of eye movement across these ballot papers and random lists of names revealed (1) almost no systematic reading from top to bottom or from left to right, (2) an almost erratic pattern of eye movements, and (3) a slight tendency to study lists from the top downwards. Results from two of the experiments are shown in Figures 2a and 2b. Figure 2a shows that the subjects looked briefly at the names in the first column, but mostly in the bottom half, and hardly glanced at the names in the top of the second column. Figure 2b shows the results when using a real ballot paper from the 2013 elections in Slagelse municipality (also shown in Figure 1). The respondents studied the parties'/lists' names intensively, but exhibited no systematic pattern when looking at the candidates' names, especially not in the second column. Our subjects were subjected to a total of six experiments,² which all produced comparable non-systematic results. Our findings, like Kim et al.'s (2015), thus indicate that the most likely process behind order effects is spatial.

² Two experiments on finding a specific name from a list of random names organized in two columns (like Figure 2a); two on finding "a name you like" from a list of random names organized in two columns; and the last two were on voting for a candidate or party/list from a real ballot paper (like Figure 2b). The experiments were conducted at the XXX Lab at XXX University (name hidden to protect authors' anonymity), in September 2014. The 18 subjects were recruited from the lab's student pool.

(insert Figures 2a and 2b about here)

Crucial for our purpose, the decision whether to divide the ballot paper into columns in local and regional elections is taken *after* the political parties/lists have submitted their lists of candidates to the local or regional election board. The board then decides on the number of columns based on the total number of candidates listed by parties/lists. This means that the parties/lists do not know in advance which candidate ends up in top positions in columns beyond the first one. In other words, we have a situation where the assignment of candidates to top ballot positions beyond the first column is approximately random or, in experimental analysis parlance, “as-if random” (Dunning 2012: 15-27).

Since as-if randomness is the key difference between natural experiments and conventional observational studies, the validity of this claim is crucial. We offer three specific arguments why assignment of candidates to top positions in columns beyond the first can be considered as-if random.

First, according to the formal rules on the design of local and regional ballots the decision to divide the ballot into columns is taken *after* the decision on the number and ordering of candidates. These rules, which are made by the central government (Act 127/2013; Government order 1195/2013), require that, before the elections, all parties/lists prepare a list of candidates with not more than four candidates more than the total number of councilors to be elected. The parties/lists are free to decide the order of the candidates on the list. The parties/lists submit their lists of candidates to the municipal, or regional, election board, which is a body elected by the incumbent local, or regional, council. The election board then designs the ballot and is free to decide whether the ballot paper shall have one or more columns. If it decides on more than one column, all candidates from all parties/lists

must be divided equally between the columns in the order in which they are placed on the lists submitted to the election board.

In practice, election boards are assisted by election secretariats composed of civil servants from the municipality or region. The secretariats prepare draft ballots for approval by the election board. The ballot is supposed to be designed so that it is as easy as possible to grasp and manage for the voters once they are in the voting booth. Crucial for our purpose, the parties/lists do not know whether the ballot will be divided into one or more columns since this decision is not taken until all parties/lists have completed their lists of candidates and since it depends on the total number of candidates. In other words, when the parties/lists decide on the order of their candidates, they cannot know who will end up at the top of the second, third, etc. columns since they do not know whether the ballot will be divided into columns and, if so, in how many columns. In the 2013 local elections, the number of columns varied between one and five, but the majority of the 98 municipalities had only one or two columns, cf. Table 2. The five regions had ballots with two to-five columns.

(insert Table 2 about here)

Second, one might speculate that even though the parties/lists do not know with any certainty whether the ballot will be divided into columns, they may have an idea based on previous experience. To find out if this is the case we interviewed leaders from two political parties, the Social Democrats and the Liberals, in two municipalities, Aarhus and Randers. The two parties were selected because they are old and experienced players in Danish local politics. The two municipalities were selected because they represent different situations. In Aarhus, the municipal ballot paper has been divided into three columns for many years. In Randers, the municipal ballot paper was redesigned from two to three columns in 2013. The

interviews revealed that the two parties in Randers did not consider the question of columns when they prepared their 2013 candidate lists. In Aarhus, the response from the Social Democrats was the same. The Liberal Party, however, had discussed the issue because there was an understanding that it might affect the election result. Still, this did not affect the order of the candidates on the list since this is not decided by the party leadership but by ordinary party members at a general selection meeting. We conclude that it cannot be ruled out that some local parties/lists have an understanding of potential column effects, but that this understanding is probably impossible to use strategically because the number of columns is not known with any certainty and because the ordering of candidates is not easily manipulated by party leaderships.

Our third argument is that if assignment to a top placement in columns beyond the first column is, indeed, as-if random, then potentially confounding pre-treatment characteristics of the candidates should be statistically unrelated to the candidates' placement in columns. Table 3 reports the results of a logistic regression analysis which seeks to explain which candidates are placed in top positions on local and regional ballots in the 2013 elections. We use the individual characteristics available – gender and non-Danish ethnicity (non-Danish name) – as predictors. As is evident, these characteristics, especially gender, are important predictors of who ends up as number 1, 2 and 3 in the *first* column on the ballot. This suggests, unsurprisingly, that it is not random who receives these top positions. In other words, we see the contours of the endogeneity problem discussed in the introduction. However, the coefficients for the individual characteristics do not obtain statistical significance in the analysis of who ends up in the top of the second, third, fourth and fifth column of the ballot. In other words, these positions are statistically unrelated to the individual characteristics of the candidate, which is evidence of as-if random assignment to these positions.

(insert Table 3 about here)

In sum, we feel confident that assignment of candidates to top positions in columns beyond the first one on Danish local and regional election ballots can be considered as-if random.

Data and Statistical Method

We use the elections in November 2013 to estimate name order effects in Danish local and regional elections. In these simultaneous elections a total of 10,231 candidates ran for office in 98 municipalities (9,068 candidates) and five regions (1,163 candidates). We are interested in estimating the effect of top ballot paper positions on the vote share of candidates. Hence, according to our expectations, the position of an individual candidate affects the vote share for this candidate. We estimate this by OLS regression with vote share as the dependent variable, measures of ballot position as independent variables, and with a number of control variables. As noted by Alvarez, Sinclair & Hasen (2006: 46), the vote share of candidates depends on vote shares of other candidates from the same party (as votes shares sum to 1). We therefore use robust standard errors, clustered at the party level. Table 4 shows definitions, sources, and descriptive statistics for these variables.

The dependent variable should measure the share of votes for each candidate. In Danish elections, voters can – as explained above – vote for a specific candidate (a personal – or preferential – vote) or for a party/list (a party vote). A natural measure of the dependent variable is therefore the share of votes for a specific candidate; more specifically the number of personal votes for this candidate as a share of the total number of personal votes for candidates of his/her party or list. On average, a candidate receives about 11 pct. of the

personal votes of his/her party or list, with a large standard deviation of about 19. Figure 3 (left panel) shows the distribution for this variable.

(insert Figure 3 about here, but not earlier)

The distribution is heavily skewed to the right because most personal votes are cast for a limited number of popular candidates. To obtain a better distribution of the dependent variable, we transform it by the natural logarithm.³ The right panel in Figure 3 shows that the distribution of the transformed variable is closer to normal, and we therefore use this as our dependent variable in the next section. Table 4 shows its descriptive statistics.

(insert Table 4 about here, but not earlier)

The independent variables describe the position of candidates on the ballot paper. More specifically, we are interested in measuring the effect of being positioned at the top of the second column. We measure this with a dummy variable (“No. 1 in 2nd column” in Table 4). Similarly, we use dummy variables to indicate whether a candidate is positioned at the top of columns 3, 4, and 5. Finally, we include the traditional measures (which are likely to be biased due to endogeneity) of top positions in the first column. Table 4 shows that about 11 percent of all candidates hold the top position in column 1, and nine and eight pct. have the second and third position of column 1. The reason that more candidates hold a top position

³ If candidates obtain no personal votes, their vote share will be zero, which cannot be log-transformed. However, this is only the case for 19 of the 10,231 candidates in the 2013 local and regional elections. The exclusion of these candidates has no effect on our results.

than a second or a third is that some parties/lists only field one candidate. Approximately five percent of the candidates hold the top position in column 2. The reason that fewer candidates appear in the top of the second column than in the first is that just under half of the ballots have more than one column (see Table 2).

Since we conduct a natural experiment, it is not crucial to include control variables. However, it can serve as a useful additional control for characteristics of candidates that (1) are likely to be associated with the share of personal votes and (2) are clearly visible to voters when voting. Names on a ballot typically inform voters about the sex and ethnicity of candidates. In our regressions, we control for the gender of the candidate because studies have shown that women are systematically disadvantaged, as they are likely to have a poorer position on the list and to spend less on their campaign and thus attract less attention (Wauters, Weekers & Maddens 2010). We also control for being the top female candidate because there appears to be a positive bias towards this candidate who consequently holds an advantage in the intra-party competition (Hansen & Hoff 2013; Spierings and Jacobs 2014). We further control for the candidate's ethnicity (non-Danish name) and for the total number of candidates for the party/list, since this is a measure of the level of intra-party competition for votes. In the next section we estimate the effect of ballot paper position on the share of votes in a series of OLS regression models.

Empirical Analysis

Table 5 shows the results of three OLS models of the effect of ballot position on vote share. In model (1), seven dummy variables indicating ballot position are included together with a dummy variable indicating whether the candidate is running for a local or regional election and an interaction term. All 98 municipalities and five regions are included. In model (2), we restrict the sample to the 46 municipalities and five regions where the ballots have more than

one column (since ballots with just one column gives no leverage in estimating the effect of holding the top position of column 2). In model (3) the control variables are added together with two additional interaction terms. In model (4) we add a control for candidate rank order. Finally, in model (5) we include a dummy variable indicating that the candidate is located last in the first column and a dummy variable indicating second position in second column.

The first three dummy variables in model (1) indicate, respectively, whether a candidate holds the first, second and third position of the party's/list's list of candidates on the ballot. "No. 1 in 1st column" has a large and clearly statistically significant effect, reflecting the well-known finding that a candidate placed at the top receives more preferential votes than other candidates from the same party/list. The coefficients for "No. 2 in 1st column" and for "No. 3 in 1st column" are smaller, but still statistically significant. This indicates that candidates placed in the second and third place also receive more personal votes on average than other candidates do. These results are not surprising but they are, as we argued above, poor estimates of the causal effect of ballot position, as the top positions in the first column are not allocated randomly by parties/lists. Very similar results are obtained for the restricted sample in model (2).

The fifth dummy variable ("No. 1 in 2nd column") is our core independent variable. It indicates whether a candidate holds the top position in column 2 of the party's/list's list of candidates. As argued above, assignment of candidates to this position is as-if random. If ballot position gives advantages to candidates, this variable should have a positive and statistically significant effect on the share of votes. It turns out that the effect is indeed positive and statistically significant. We take this as evidence that ballot positions have a causal effect on candidates' vote shares. As for the other variables, the results are similar (and – as should be expected – stronger) in the restricted sample.

As mentioned, we expect the advantage of holding the top position in column 2 to be larger in regional elections than in local elections, since candidates in regional elections are generally less well known. The interaction term “No. 1 in 2nd column x Region” confirms this. The positive effect of holding the top position in column 2 is larger in regions than in municipalities and the difference is statistically significant. The dummy variable “Region” is statistically insignificant.

The remaining dummy variables in model (1) estimate the effects of holding the top positions in columns 3, 4, and 5. Holding the top position in column 3 has a positive and statistically significant effect. The coefficients related to the top position in columns 4 and 5 are close to zero and statistically insignificant. In the restricted sample the estimated effects are larger, and also the effect of holding top position of column 4 is statistically significant.

The estimates for the effect of holding top positions in these columns might be affected by the fact that the total number of candidates, and hence the competition for personal votes, tends to be higher in elections with more columns on the ballot paper. We test for this in model (3) by controlling for the number of columns. Controlling for this effect does not substantially change the estimates for holding the top position in columns 1 and 2, but the effects for columns 3-5 becomes insignificant. We also find, as in models (1) and (2), that the advantage of holding the top position in column 2 is larger in regions than in municipalities. Hence, model (3) supports the conclusion that the ballot position has a causal effect.

Model (3) also shows that female candidates, especially the top female candidates, tend to get a larger share of personal votes. Furthermore, if a candidate has listed his/her local area residence on the ballot (the variable “Locality”), the vote share tends to be higher. However, candidates from parties/lists using the “Party list” system, which allocates votes for the party/list according to the order of candidates on the ballot, tend to get about the same share of personal votes. We also add the variable “No. of cand’s of party”. This simply indicates for

each candidate the total number of candidates for his or her party/list. It is not surprising that the effect is negative: As more competitors are added to the ballot for one's party/list, the fewer votes one can get, *ceteris paribus*. We also add interaction terms between "No. 1 in 2nd column" and two control variables. We interact top position with Party list to see whether the effect of top position decreases when it is unlikely that this candidate can be elected.⁴ It turns out that the effect of the interaction term is statistically insignificant. We interact top position in column 2 with Locality to investigate whether the additional cue of attachment to a geographical area reduces the effect of the potential cue associated with holding the top position in column 2. The statistically significant and negative effect is consistent with this expectation. In model (3) the estimated effects of holding top positions in columns 3-5 are all statistically insignificant.

(insert Table 5 about here)

A final issue is whether the effect of holding the top position of column 2 could be an artefact created by a general tendency to vote for candidates higher on the list. We check for this in two ways. First, in model (4) we control for the candidate rank order. If the effect of holding the top position of column 2 is due to the rank position, the effect should disappear in model (4). We find – as expected – that the effects of most dummies indicating a position below top of column 1 drop. However, the effect of holding the top position of column 2 is still statistically significant. Second, in model (5) and (6) we include dummy variables indicating

⁴ This is so because party votes are allocated to top candidates (first to No. 1 in 1st column, then No. 2 in 1st column and so on, to help the candidates reach the Droop quota if their personal votes are not enough).

whether the candidate is located at the second position of column 2 (i.e. just below the top position of interest) and a dummy variable indicating whether the candidate is located at the last position of column 1. If the effects of holding these positions are similar to holding the top position of column 2, the positive effect is not likely to be due to holding the top position. The estimate is clearly larger than the effect of holding the two other positions. Finally, in model (6) we exclude the interaction terms such that the coefficient for No. 1 in 2nd column can be interpreted as the average effect of holding the top position of the second column. The estimate drops slightly but is still clearly significant, and, more importantly, larger than the effect of holding the two other positions.⁵

Hence, we consistently find that holding a top position in the first two columns has an effect on candidates' vote shares. This supports the conclusion that the ballot position has an effect on election results also in PR systems of this kind. Since the allocation of candidates to the top position in column 2 is as-if random, we are confident that this effect is causal, i.e., not due to the candidate selection process.

A final question is whether these effects are large enough to be substantially significant. This is not easy to see from the models in Table 5, as the dependent variable is measured as the natural logarithm of the personal vote share. To get an estimate of the effect of holding the top position on the share of votes (measured in percentage points), we run model (6) of Table 5 with this dependent variable. The estimated effect of holding the top position in column 2 is

⁵ The differences between the coefficients are statistically significant. Comparing (testing for equality of coefficients) Last in 1st column with No. 1 in 2nd column gives $F(1, 630) = 16.29$; $p < 0.0001$. Comparing No. 1 in 2nd column with No. 2 in 2nd column gives $F(1, 630) = 48.30$; $p < 0.000$. The calculations are based on Table 5, model 6, where no interaction terms are included to allow for a comparison of the coefficients.

3.8 percentage points. This can be compared with the average vote share of 11 percent.

Hence, the ballot position effect is substantial and definitely sufficiently large to be decisive for election results. Candidates lucky enough to be listed at the top of a ballot column are sometimes elected because of this and would not have been elected if the ballot had been designed differently.

Conclusion

Using ballot layout to study ballot position effects, the paper demonstrates that results in Danish regional and local elections are influenced by the ordering of the candidates' names on the ballot. Using a natural experiment, which "as-if" randomly allocates some candidates to top positions on the ballot paper, we show that a top position increases a candidate's vote share. For several reasons this represents a considerable contribution to our understanding of ballot position effects.

First, although the literature generally finds a positive effect of being listed first on the ballot, this effect is normally considered substantially small (Alvarez et al. 2006: 51; Koppell and Steen 2004: 279; Krosnick et al. 2004: 68-70). Our results show that the average effect of being listed at the top of the second column is an almost 4 percentage gain in vote share. Compared to the candidates' average vote share of 11 percent this is a substantial effect. It leaves little doubt that a number of Danish local and regional councilors owe their council seat to their position on the ballot paper. Recall, however, that this is a conservative estimate of ballot position effects. It is the effect of being placed at the top of the *second* column on the ballot. Due to the endogeneity problem discussed in the introduction we cannot estimate the effect of being at the top of the *first* column, but it is likely to be larger because this position represents an even clearer cue to the voters. In other words, ballot position effects are likely to be substantial in Danish local and regional elections.

Second, the documentation of ballot position effects in Danish elections expands the empirical domain of this phenomenon. In contrast to FPTP elections in the US, local and regional elections in Denmark are pure list PR systems where voters can cast a party vote and avoid the cognitively demanding task of selecting one specific candidate. This should make voters less likely to rely on cues such as the order of candidates when they vote for individual candidates. However, our results show that ballot position effects are nonetheless prevalent in Danish elections.

Third, the relevance of the Danish findings for other list PR systems is considerable. The literature finds that cues such as the order of candidates on the ballot are most important in elections where voters have the least information, such as non-partisan and low-salience local elections (Brockington 2003; Kim et al. 2015 ; Krosnick et al. 2004). However, Danish local and regional elections are partisan and attract considerable media attention, voters are well educated, and the election system is simple and well known by the voters. In other words, among list PR systems Denmark represents a least-likely case for the identification of ballot order effects. Nonetheless, they are prevalent.

Our study also points to potential avenues for further research. First, although ballot order effects seem to be a general feature of elections, the exact underlying mechanism is not clear. Most scholars consider it a primacy effect of the temporal order in which voters encounter candidate names on the ballot as they read from top to bottom or from left to right. However, in our eye tracking experiments, subjects did not systematically read names on ballots or random lists from top to bottom or from left to right. This finding is more consistent with the other position in the literature, namely that ballot position effects are physical, not temporal, effects of voters unconsciously associating “top” with “good”, even though our support for this position is indirect. More research is needed to identify the psychological process behind ballot position effects.

Second, our findings raise a normative question. If ballot position effects are a general feature of elections, this electoral advantage should be allocated with care among candidates. In the Danish system, political parties control most of the effect since they decide who is placed at the top of the first column on the ballot. However, the advantage of being at the top of the remaining columns is randomly allocated among remaining candidates. In the USA, the random rotation of candidate names used in many places means that all position effects are distributed randomly among candidates. Although this solution does not eliminate position effects, it may be fairer since it reduces bias in election results. However, it is a drastic intervention. It requires an election reform in which, first, election districts are divided into sub-districts and, second, the printing of ballot papers is varied across sub-districts.

These practical problems are not insignificant, but the most serious obstacle is probably that such a reform also requires political parties to relinquish their control of the ranking of their candidates (and in particular the mayoral candidate) on the ballot paper. Apart from the power struggle that such a change would entail, it raises more fundamental questions about the desired position of political parties in our societies. We speculate that in many countries it may be more in line with political culture to let political parties continue to control ballot position effects.

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Table 1. Experimental studies of ballot position effects

Experimental studies referred to	Identified ballot position effect
<i>Natural experiments from the USA (random rotation of order of candidates)</i>	
Alvarez et al. (2006)	Positive effect of being listed first
Chen et al. (2014)	Positive effect of being listed first
Darcy (1986)	No position effect
Ho & Imai (2008)	Positive effect of being listed first
Koppell & Steen (2004)	Positive effect of being listed first
Krosnick et al. (2004)	Positive effect of being listed first
Meredith & Salant (2013)	Positive effect of being listed first
Miller & Krosnick (1998)	Positive effect of being listed first
<i>Other experimental studies from the USA</i>	
Bagley (1966): Lab experiment	No position effect
Gold (1952): Field experiment	No position effect
Kim et al. (2015): Survey experiment	Positive effect of being listed first
Taebel (1975): Lab experiment	Positive effect of being listed first
<i>Natural experiments from outside the USA (random rotation of order of candidates)</i>	
Faas & Schoen (2006): Bavarian state elections in Germany	Positive effect of being listed first
Geys & Heyndels (2003): Regional elections in Brussels in Belgium	Positive effect of being listed first
King & Leigh (2009): Australian federal elections	Positive effect of being listed first

Figure 1. Danish ballot paper from the 2013 election in the municipality of Slagelse (excerpt)

Byrådsvalget 2013 Slagelse Kommune

Sæt x i én af afkrydsningsrubrikkerne til højre for en listebetegnelse (et partinavn) eller et kandidatnavn Sæt kun ét x på stemmesedlen.

A. Socialdemokratiet ☐	
Lis Tribler, Slagelse ☐	Jon Frisgaard Mejlstrup, Slagelse ☐
Helle Blak, Slagelse ☐	Flemming Erichsen, Korsør ☐
Jørgen Andersen, Korsør ☐	Tom Block Larsen, Slagelse ☐
Steen Olsen, Skælskør ☐	Dann Frederiksen, Skælskør ☐
Søren Horn Petersen, Slagelse ☐	Ali Yavuz, Slagelse ☐
Niels Christian Nielsen, Skælskør ☐	Kenneth Nielsen, Korsør ☐
Bodil Knudsen, Slagelse ☐	Benjamin Erichsen, Korsør ☐
Britta Huntley, Korsør ☐	Erik Frimann, Skælskør ☐
Kurt Rasmussen, Slagelse ☐	Jesper Hansen, Korsør ☐
Jacob Borello Carlsen, Skælskør ☐	Tony Bomholt Rasmussen, Korsør ☐
Niels O. Pedersen, Gimlinge ☐	John Dyrby Paulsen, Korsør ☐
Anders Nielsen, Korsør ☐	
B. Radikale Venstre ☐	
Jon Ahrensbo ☐	Poul Bek-Pedersen ☐
Troels Brandt ☐	Ole Rygaard Jensen ☐
Ruth Bek-Pedersen ☐	Leon Johansen ☐
Jacob Gregersen ☐	
C. Det Konservative Folkeparti ☐	
Niels Jørgensen, Hashøj ☐	Flemming Ehlert, Korsør ☐
Micael Duncan, Slagelse ☐	Daniel Munck Søe Jensen, Korsør ☐
Nicki Ottevig, Slagelse ☐	Louise Rasmussen, Slagelse ☐
Helena Vedholm, Korsør ☐	Jørgen Valentin Nielsen, Sørbø ☐
Bo Haldgaard, Slagelse ☐	
.....	
O. Dansk Folkeparti ☐	
1. Michael Gram ☐	6. Bjørn Olsen ☐
2. Frederik Pedersen ☐	7. Palle Kristiansen ☐
3. Ann Sibbern ☐	8. Lone Kiralyfalvy ☐
4. Henrik Brodersen ☐	9. Doris Neumann ☐
5. Tonny Borgstrøm ☐	

Note: The figure is an excerpt. The full ballot paper includes 16 parties/lists and a total of 111 candidates.

Figure 2a. Heat map of eye tracking experiment I

Rebekka Alexandersen	Hedvig Andreassen
Olaf Hansen	Maria Clausen
Hans Kristoffersen	Martin med Christiansen
Thomas Jepsen	Jacob A. Knudsen
Anders Sørensen	Lasse A. Kjeldsen
Henrik Schmidt	Larsnok Hall
Lise Poulsen	Mia Østergaard
Ole Schou	Andrea Thygesen
Alvete Krogh	Andreas Jakobsen
Alvete Jacobsen	Valdemar Iversen
Alexander Sørensen	Nikolaj Mikkelsen
Trine Petersen	Albert Danielsen
Dan Sørensen	Silke Thygesen
Martin Kristoffersen	Martin Jensen
Henrik Karlsen	Maria Søndergaard
Anders Kristoffersen	Martin Jensen
Thomas Jacobsen	Anders Sørensen
Thomas Jørgensen	Anders Jessen
Rasmus Hermansen	Martin Westergaard
Anders Kristensen	Martin Mette Jespersen
Henrik Villadsen	Martin Dahl
Kasper Jakobsen	Martinus Kjeldsen
Martin Kruse	Martinina Jørgensen
Martin Hansen	Martin Lauritsen
Martin Lorenzen	Martin Toft
Anders Lund	Martin Mortensen
Martin Sja Mogensen	Martin Clausen
Martin Jensen	Martin Johnsen
Martin Lise Nygaard	Martin Østergaard
Martinik Svendsen	Martin Pedersen

Note: The figure shows the result of an eye-tracking experiment where 18 subjects were asked to simply find the name “Silke Søndergaard” (placed in the middle of the second column). Dark shades indicate the places where the subjects’ eyes lingered. The names in the two columns were generated by a random name generator.

Figure 2b. Heat map of eye tracking experiment II

Note: The figure shows the result of an eye-tracking experiment where 18 subjects were asked to vote for a candidate or party/list on the ballot paper from the 2013 election in the municipality of Slagelse. Dark shades indicate the places where the subjects' eyes lingered.

Table 2: Number of columns on ballots in the 2013 Danish local and regional elections

	Municipalities		Regions	
Number of columns	Frequency	Percent	Frequency	Percent
1	52	53	0	0
2	39	40	0	0
3	4	4	2	40
4	2	2	2	40
5	1	1	1	20
Total	98	100	5	100

Source: Ballots collected from municipalities / regions and from the Ministry of Economic Affairs and the Interior

Table 3: Logistic regression analysis of the effect of gender and ethnicity on ballot positions in 2013 Danish local and regional elections

	(1) No. 1 in 1st column	(2) No. 2 in 1st column	(3) No. 3 in 1st column	(4) No. 1 in 2nd column	(5) No. 1 in 3rd column	(6) No. 1 in 4th column	(7) No. 1 in 5th column
Female	-0.490*** (0.0753)	0.190*** (0.0725)	0.232*** (0.0764)	0.0572 (0.0947)	-0.226 (0.187)	-0.252 (0.266)	-0.335 (0.513)
Non-Danish name	-0.224 (0.149)	-0.513*** (0.183)	-0.0165 (0.160)	0.0979 (0.185)	0.481 (0.293)	-0.346 (0.591)	
Constant	-1.943*** (0.0366)	-2.331*** (0.0426)	-2.508*** (0.0458)	-2.899*** (0.0543)	-4.171*** (0.0985)	-4.822*** (0.136)	-6.039*** (0.250)
Observations	10,231	10,231	10,231	10,231	10,231	10,231	9,664

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Sources: See Table 4. In model (7) Non-Danish name predicts failure perfectly (i.e. no candidates with Non-Danish names appear as no. 1 in 5. col.). To estimate this model, we drop all 575 observations with Non-Danish names.

Table 4: Variable definitions, sources, and descriptives

Variable	Description	Source	Mean	Std.dev	Min	Max
Personal vote share	Natural log of candidates' personal votes as a share of personal votes on party	Computed from manually coded values from ELECB	-3.239	1.461	-9.171	0
No. 1 in 1 st column	Series of dummy variables indicating top ballot position in columns 1-5	Computed from candidates' ballot positions, obtained from ballots collected from all municipalities	0.111	0.314	0	1
No. 2 in 1 st column			0.092	0.289	0	1
No. 3 in 1 st column			0.081	0.272	0	1
No. 1 in 2 nd column			0.053	0.225	0	1
No. 1 in 3 rd column			0.015	0.121	0	1
No. 1 in 4 th column			0.007	0.085	0	1
No. 1 in 5 th column			0.002	0.045	0	1
Number of columns on ballot	Variable indicating the number of columns on the ballot	Visual inspection of actual ballots collected from all municipalities	1.996	1.097	1	5
Sex	Dummy variable (1 = female, 0 = male)	Manually coded from first name in ELECB. Ambiguous names have been clarified, typically by municipal web sites	0.303	0.460	0	1
Top female	Dummy variable (1 = candidate is top female on list, 0 = candidate is not)	Manually coded from ELECB	0.086	0.281	0	1
Non-Danish name	Dummy variable (1 = first name is not a typical Danish name, 0 = name is typical Danish)	Manually coded from ELECB	0.055	0.229	0	1
Member of mayor's party	Dummy variable (1 = Member of mayor's party 2009-2013, 0 otherwise)	Information of mayor's party has been obtained from municipal web sites	0.203	0.403	0	1
No. of candidates of party	Variable indicating for each candidate the total number of candidates on the ballot for his/her party	Manually coded from ELECB	15.056	8.701	1	45
Candidate rank order	Variable indicating for each candidate the order on the ballot, ignoring the column structure.	Manually coded from ELECB	8.021	6.632	1	45
Party list	Variable indicating whether party votes are allocated according to the order of candidates on ballot	Manually coded from ballots	0.230	0.421	0	1
Locality	Variable indicating whether candidate's local area residence is indicated on ballot	Manually coded from ballots	0.462	0.499	0	1
Region	Variable indicating whether the candidate belongs to region	Manually coded from ballots	0.114	0.317	0	1

Note: ELECB refers to the official Danish election result data base, available at www.kmdvalg.dk. Actual ballots were obtained directly from municipalities/regions or, in a few cases, from the Ministry of Economic Affairs and the Interior. N varies from 10,212 to 10,231.

Figure 3: Distribution of the vote share variable (dependent variable)

Source: See Table 4.

Table 5: Effect of ballot position on candidates' personal vote share of personal votes on party

	(1)	(2)	(3)	(4)	(5)	(6)
No. 1 in 1st column	3.225*** (0.0319)	3.370*** (0.0421)	2.824*** (0.0371)	2.325*** (0.0453)	2.325*** (0.0463)	2.323*** (0.0465)
No. 2 in 1st column	1.817*** (0.0312)	1.881*** (0.0418)	1.426*** (0.0400)	0.941*** (0.0439)	0.943*** (0.0457)	0.941*** (0.0459)
No. 3 in 1st column	1.309*** (0.0332)	1.326*** (0.0486)	0.993*** (0.0442)	0.527*** (0.0456)	0.524*** (0.0463)	0.522*** (0.0464)
Last in 1st column					0.188*** (0.0342)	0.186*** (0.0343)
No. 1 in 2nd column	0.741*** (0.0498)	0.889*** (0.0517)	0.528*** (0.0601)	0.366*** (0.0599)	0.404*** (0.0632)	0.368*** (0.0422)
No. 2 in 2 nd column					0.0429 (0.0421)	0.0414 (0.0420)
No. 1 in 3rd column	0.284*** (0.0930)	0.375*** (0.0915)	0.0276 (0.0741)	0.0192 (0.0709)	0.0510 (0.0713)	0.0450 (0.0705)
No. 1 in 4th column	0.165 (0.121)	0.250** (0.119)	-0.146 (0.0896)	0.00821 (0.0886)	0.0449 (0.0889)	0.0414 (0.0890)
No. 1 in 5th column	-0.119 (0.220)	-0.0284 (0.217)	-0.251 (0.165)	0.113 (0.157)	0.143 (0.156)	0.141 (0.156)
Number of columns			0.0435* (0.0230)	0.0301 (0.0237)	0.0264 (0.0236)	0.0260 (0.0236)
Female			0.118*** (0.0293)	0.0808*** (0.0280)	0.0815*** (0.0280)	0.0827*** (0.0280)
Top female			0.338*** (0.0415)	0.282*** (0.0399)	0.287*** (0.0399)	0.285*** (0.0400)
Non-Danish name			-0.0343 (0.0577)	-0.0244 (0.0559)	-0.0283 (0.0554)	-0.0259 (0.0555)
Member of mayor's party			0.0322 (0.0623)	0.0386 (0.0643)	0.0340 (0.0636)	0.0354 (0.0639)
No. of cand's of party			-0.0525*** (0.00279)	-0.0255*** (0.00250)	-0.0236*** (0.00262)	-0.0236*** (0.00262)
Candidate rank order				-0.0709*** (0.00451)	-0.0704*** (0.00455)	-0.0706*** (0.00456)
Party list			-0.0115 (0.0443)	0.00690 (0.0455)	0.00495 (0.0451)	0.0152 (0.0436)
No. 1 in 2nd col x Party list			0.141 (0.0869)	0.109 (0.0860)	0.114 (0.0868)	
Locality			0.173*** (0.0390)	0.174*** (0.0398)	0.173*** (0.0394)	0.155*** (0.0386)
No. 1 in 2nd col x Locality			-0.202** (0.0799)	-0.193** (0.0775)	-0.196** (0.0782)	
Region	-0.0817 (0.0762)	0.0398 (0.0772)	0.269*** (0.0618)	0.301*** (0.0623)	0.295*** (0.0620)	0.315*** (0.0600)
No. 1 in 2nd col x Region	0.590*** (0.119)	0.469*** (0.119)	0.386*** (0.0991)	0.217** (0.101)	0.222** (0.103)	
Constant	-3.908*** (0.0270)	-4.056*** (0.0364)	-3.317*** (0.0802)	-2.968*** (0.0855)	-3.020*** (0.0895)	-3.013*** (0.0888)
Observations	10,212	6,180	6,180	6,179	6,179	6,179
R-squared	0.551	0.541	0.629	0.681	0.682	0.681

Robust standard errors (clustered at the race level, i.e. at the local party level) in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Sources: See Table 4.