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Strategic Voting in Proportional Representation Systems

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Strategic Voting in Proportional Representation Systems

Tim Ganser and Stan Veuger

February 25, 2014

Abstract

We propose a model of voter decision-making in proportional representation systems: ultra-rational strategic voters construct expectations of coalitions and policy outcomes based on expected seat distributions and vote to maximize their expected utility from the implemented policy. We examine the predictions of our model using data from the Netherlands and successfully predict the voting behavior of significant numbers of voters. Nevertheless, other factors matter more than our strategic prediction. Three main take-aways follow: (1) At least to some extent, voters seem to take complex coalition considerations into account. (2) There is a need for large-scale quantitative studies about voter decision-making in proportional representation systems. (3) Narrowly defined strategic voting might matter less in proportional representation systems than in plurality systems.

Word Count: 6,813

Keywords: Strategic Voting, Proportional Representation, The Netherlands, Coalitions

Strategic voting¹ has been an important topic in psephology as researchers try to understand the ways in which voters decide how to cast their votes. Do they simply vote for their “preferred” party? Or do they target electoral outcomes and derive their vote in a more “strategic” manner? There is no shortage of research documenting that strategic voting figures prominently across electoral systems. Examining 32 elections in 32 countries, Hobolt and Karp (2010) find that, on average, sincere voting can at best account for 85 percent of votes cast, leaving ample room for strategic considerations to play an important role.²

Ultimately, however, what we as researchers want to understand about strategic voting is: How does it work? How does a strategic voter decide whom to cast his vote for? That is, we want to get inside the black box and understand the decision-making process. This is a much easier undertaking in a plurality system than it is in a proportional representation system (henceforth PR system). As early as 1869, Henry Droop, an English proponent of proportional representation and the inventor of the Droop quota³, described the decision-making process in pointing out the susceptibility of plurality systems to strategic voting:

Each elector has practically only a choice between two candidates or sets of candidates. As success depends upon obtaining a majority of the aggregate votes of all the electors, an election is usually reduced to a contest between the two most popular candidates or sets of candidates. Even if other candidates go to the poll, the electors usually find out that their votes will be thrown away, unless given in favour of one or other of the parties between whom the election really lies (quoted in Riker 1982: 756).

Here, we have the strategic voter’s decision-making process in a plurality system in a nutshell: he votes for that one of the two leading candidates whose policy position he likes better.

As a result of the relatively simple nature of this strategic voting process, strategic

¹We follow Feddersen’s (2008) definition of strategic voting in *The New Palgrave Dictionary of Economics* as “cast[ing] a ballot that maximizes [the strategic voter’s] expected payoff from voting in the election.”

²Note that it is well-nigh impossible to bound the extent of strategic voting without understanding the process. The researcher will be left with an estimate of the upper bound of sincere voting if he simply examines whether a voter casts a vote for the party whose policy position he likes best.

³The Droop quota is one of the quotas used to allocate seats in elections using the single transferable vote method.

voting in plurality systems is a well understood topic. The most famous formulation of the importance of strategic voting in plurality systems is Duverger's (1954: 217) law that "the simple-majority single-ballot system favors the two-party system." Palfrey (1989) formalizes Duverger's notion and shows that in equilibrium voters coordinate on only two candidates, withdrawing support from a possible third candidate.

Understanding strategic voting in PR settings, on the other hand, has proved to be a much more elusive goal. Duverger even thought that voters in PR systems have no incentive at all to vote strategically as their vote would count in terms of representation, that is, they would not throw their vote away by not voting for one of the top two parties (cf. Hobolt and Karp 2010: 300-301). A few studies have made some headway in formally examining strategic voting in PR systems (Austin-Smith and Banks 1988, Cox and Shugart 1996, Cox 1997, Baron and Diermeier 2001, and Kedar 2005), but we still lack a convincing model of the strategic voter's decision-making process.

With this paper, we hope to contribute to opening the lid of the black box that is strategic voting in PR systems: we propose a decision-theoretic model of strategic voting. In this model, strategic voters know that they can change at most one seat from one party to another. They then decide which party to vote for based on an assessment of their votes' impact on the likelihood of different coalitions and the associated expectations of implemented policy. That is, we let our voters behave as the definition of strategic voting (see Footnote 1) implies they should behave, i.e. by "casting a ballot that maximizes their expected payoff from voting."

This paper is structured as follows: we first discuss the existing empirical evidence for voters in PR systems taking into account coalition considerations. We provide the intuition that our model will formalize in the next section and present the model immediately afterwards, when we also discuss its contribution to the existing literature. Using survey data from the Netherlands, we test the predictions of our model before we discuss our results and

conclude.

Coalition considerations and strategic voting

The idea that (some) voters in PR systems consider coalition formation in deciding how to cast their votes has received extensive support. In the discussion below, we focus on recent studies particularly pertinent to our investigation.

Bargsted and Kedar (2009) examine whether expectations about coalition composition influence voter choice. They find that coalition considerations do indeed influence voter choice.

When voters perceive membership in the coalition to be out of reach for their preferred party, they often desert it and instead support the lesser of evils among those parties they perceive as potential coalition members. (Bargsted and Kedar 2009: 321)

This finding is robust to controlling for both ideological preferences and coalition preferences, and it sets the tone for the findings on strategic voting in PR settings. In addition, the authors offer suggestive evidence that proximity voting is less prevalent the more prevalent coalitions are, as shown in Table 1, a reproduction of their Table 3 (Bargsted and Kedar 2010: 321). Note that proximity voters can, of course, also be strategic voters in the sense in which we employ the term.

Table 1: Vote Choice and Ideological Distance,
Cross-Sectional Comparison

Country/Election	Rate of Proximity Voting	Coalition Government
Italy 2006	0.80	Yes*
Spain 2004	0.75	No
Great Britain 2005	0.74	No
Canada 2004	0.66	No
Portugal 2005	0.65	No
Iceland 2003	0.64	Yes
Sweden 2002	0.63	No
Denmark 2001	0.62	Yes
Switzerland 2003	0.60	Yes
Australia 2004	0.60	Yes
New Zealand 2002	0.58	Yes
Netherlands 2002	0.57	Yes
Ireland 2002	0.57	Yes
Israel 2006	0.57	Yes
Finland 2003	0.54	Yes
Norway 2001	0.54	Yes
Germany 2002	0.53	Yes
Belgium (Flanders) 1999	0.50	Yes

Note: Bargsted and Kedar (2009) took the data for the calculation of the numbers in the table from the Comparative Study of Electoral Systems. For each voter, they examined whether he supported the party he declared as ideologically most proximate to him. When a respondent noted more than one party, they employed a conservative approach, counting him as a proximity voter if he supported any of the parties mentioned.

* Italy's two coalitions, the Union of the left and House of Freedom of the right, are announced ahead of the elections and appear on the ballot. Parties on the ballot are organized by coalition.

Further evidence that coalition considerations influence voter choice is available in the journal *Electoral Studies*' special issue *Voters and Coalition Governments*. Bowler, Karp, and Donovan (2010) find that strategic voting is conditioned by coalition expectations in the 2002 election in New Zealand. Their finding closely mirrors that of Bargsted and Kedar,

namely that voters are more likely to vote for their second choice party when they assign a small probability to their preferred party winning. In addition, however, Bowler et al. (2010: 355) also find that “voters are more willing to [vote strategically] when a disliked party has a good chance of winning.”

Similar patterns of voting behavior also hold in the 2006 general election in Austria. In this election, Meffert and Gschwend (2010) find that strategic voters are considering both the composition of and the balance of power within a post-election coalition. Strategic voters try to influence which coalition government will be formed after the election, but “if a specific coalition is seen as certain, [they] at least try to influence the weight of the member parties within the coalition.” (Meffert and Gschwend 2010: 348)

In addition to this evidence from actual elections, a laboratory experiment conducted by McCuen and Morton (2010) also finds strong evidence of strategic voting in coalition settings. Again, subjects are found to vote for their second choice among three parties when it makes sense to do so in order to affect the coalition composition. Interestingly, the subjects in this experiment – college students in the US Midwest – were likely unfamiliar with coalition governments and voting in PR settings, but many of them still voted strategically. Coalition considerations are evidently on the minds of (at least some) voters as they ponder how to cast their votes. Irwin and Van Holsteyn (2008, 2011) document the impact of such considerations in a quasi-experimental setup centered around survey questions, and show that some voters adapt their decisions to the expected performance of different parties. Opinion polls seem to drive these expectations to a significant extent (Irwin and Van Holsteyn, 2002).

It is this pondering of vote choice in the light of coalition considerations which we hope to illuminate. Although the available empirical evidence shows that strategic voters take coalition considerations into account, to our knowledge no systematic account exists of how voters assess coalition probabilities and their influence over policy outcomes. To begin filling this void, we propose the following idea.

Strategic voting: Intuition

A strategic voter has expectations about the number of seats obtained by each party participating in the election. He is also aware that his vote can at most change one seat from any of the other parties to the party he considers voting for. This is the same thinking on which the strategic voter's decision-making rests in Cox and Shugart (1996) and Cox (1997). Our strategic voter, however, does not have the kind of hyper-detailed information about vote remainders⁴ that borders on the ridiculous and drives the Cox results. Instead, our strategic voter is agnostic as to where the potential additional seat for the party he considers voting for might come from: he assumes that it comes with equal probability from each of the other parties.⁵

With expectations about the seat distribution and his potential influence on it, our strategic voter wants to cast his vote so as to create an expected policy outcome that is as close as possible to his preferred policy. In order to assess the expected policy outcome for each possible vote, he considers the scenarios that would result from each possible way in which the additional seat could flip to the party he considers voting for.

For each of these scenarios, the strategic voter determines the resulting coalition probabilities and coalition policies. (We describe how exactly we model this process in the next section.) By then weighting each coalition policy by the corresponding coalition probability, he obtains the expected policy outcome for each scenario for each potential vote, that is, for each party from which the seat could flip to the party he considers voting for.

Averaging across these expected policy outcomes for each possible vote, the strategic voter obtains an overall expected outcome for each vote he could cast. He then simply chooses that vote which results in the expected policy outcome that is closest to his preferred policy.

⁴Vote remainders are the numbers of votes left over per party after using up all votes that translate into seats. For example, if a seat “costs” s votes and a party received $s + x$ votes ($x < s$), that party has a remainder of x votes.

⁵In the Netherlands, the setting of our empirical tests, opinion polls typically report expected seats for each party.

Figure 1 illustrates this decision-making process in a setting with six parties and a voter who expects each of them to receive at least one seat.

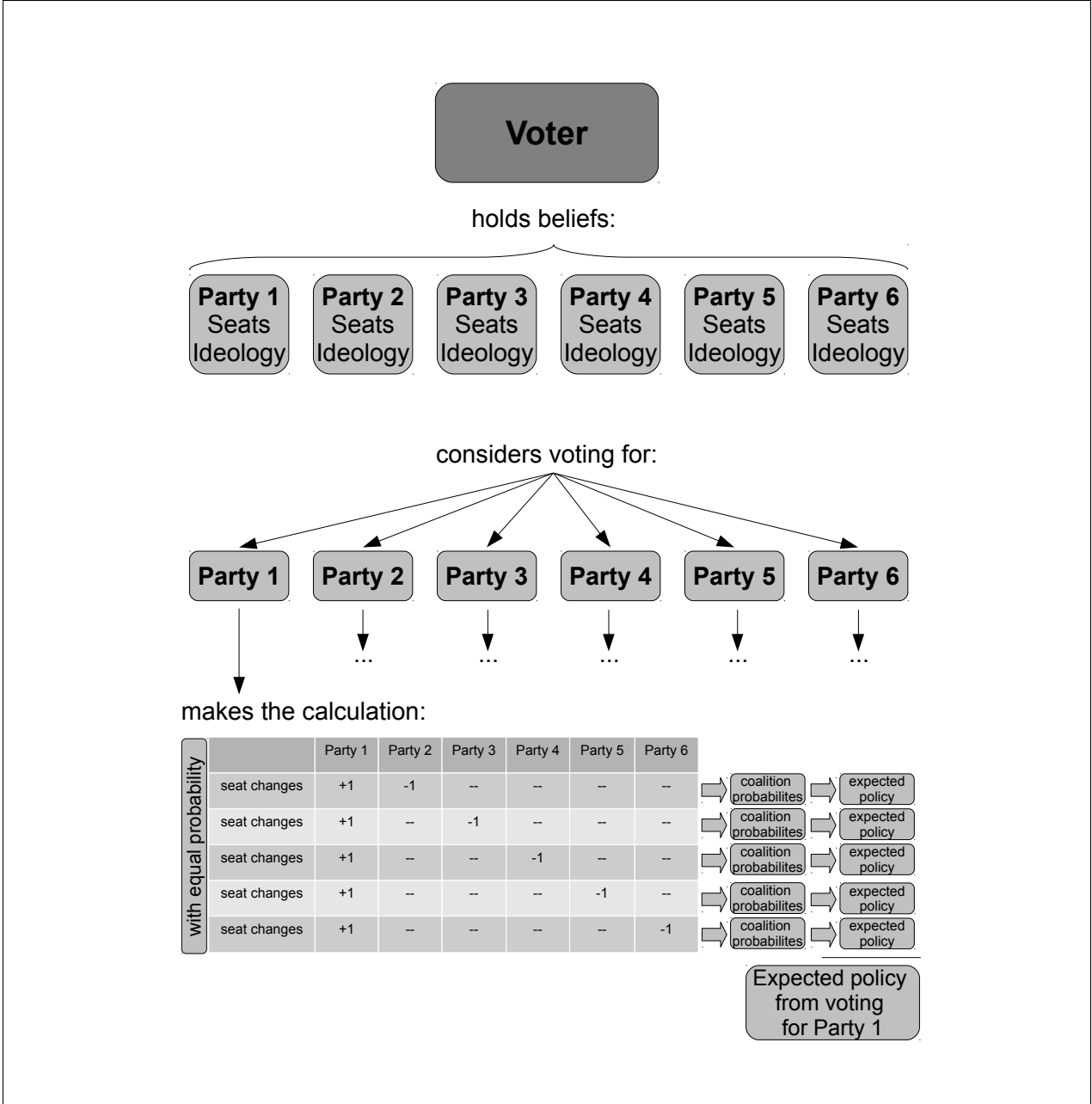


Figure 1: The strategic voter’s decision-making process

Strategic voting: Model

As discussed, the setting of our model is an election, in which voters elect representatives to a legislative body using proportional representation. An absolute majority of these elected

representatives then forms a governing coalition that sets policy.⁶ We focus on the way in which voters generate expectations of the policy outcomes for the different ways in which they can cast their votes. We aim to capture how voters assess how influential parties are, and how close to their own preferred policies the implemented policy would be under the different seat distributions their votes can lead to.

Building Blocks

We let S denote the number of seats in parliament and N the number of parties participating in the election, with seats being assigned by proportional representation. Of course, political parties and electoral systems do not arise out of a vacuum. As their development is, however, governed by high levels of inertia, we take them as given. The policy space we consider is one-dimensional and represented by the closed set $\mathcal{P} = [0, 1,]$ on the real line. There are two groups of agents in our model: political parties and voters.

Parties j care about the (one-dimensional) policy that the government chooses to implement ($p_a \in \mathcal{P}$). Party j 's preferences are given by the loss function

$$L_j = -(p_j - p_a)^2, \tag{1}$$

where $p_j \in \mathcal{P}$ is party j 's exogenously given policy bliss point.

Voters i also care about the policy that the government chooses to implement. Each voter i has policy preferences given by the loss function:

$$L_i = -(p_i - p^*)^2, \tag{2}$$

where $p_i \in \mathcal{P}$ is voter i 's policy bliss point and p^* is the policy voter i cares about.

⁶We ignore minority coalitions, which did not occur in the Netherlands, the setting where we test our model empirically, between 1946 and 2010. That said, the current Dutch government is a minority government, and this may have started a new trend (Van Holsteyn, 2011).

There are potentially two types of voters. Both of these types of voters hold beliefs over each party’s policy bliss point. Non-strategic or naive voters vote for the party with the policy bliss point closest to their own.⁷ That is, with a slight abuse of notation, for naive voter i the loss function given in Equation 2 turns into $L_i = -(p_i - p_j)^2$. In minimizing his loss function, naive voter i thus simply votes for the party with the bliss point closest to his own.

Strategic voters, on the other hand, only care about the policy that is actually implemented by the government coalition. That is, strategic voters only care about p_a , and for strategic voter i the loss function given in Equation 2 thus turns into

$$L_i = -(p_i - p_a)^2. \quad (3)$$

As this loss function shows, strategic voters are not partisan and do not care which party or coalition of parties implements a given policy.

We, and thus our strategic voters, assume that coalition formation is characterized by Nash Bargaining with the bargaining weights equal to each party’s share of the coalition’s total seats. These bargaining weights reflect Gamson’s (1961: 382) “Law of Proportionality” that “[coalition] participants will expect others to demand from a coalition a share of the payoff which is proportional to the amount of resources which they are contributing to it.”⁸ The policy that the coalition c will implement is then given by

$$p(c) = \sum_{j \in c} \frac{s_j p_j}{\sum_{x \in c} s_x}, \quad (4)$$

⁷These voters are also sometimes called sincere voters. This label seems misplaced as strategic voters also vote sincerely, in the sense that they vote in the way they sincerely think will bring about the best policy outcome for themselves.

⁸There is extensive empirical support for this proportionality rule. See, for example, Bueno de Mesquita (1979), Brown and Frendreis (1980), Schofield and Laver (1985), Budge and Keman (1990), Warwick and Druckman (2001, 2006), and Strøm, Müller, and Bergman (2008). Morelli and Montero (2003) construct a demand-bargaining model that predicts coalitions with proportional payoffs. Table (??) shows that this proportionality rule holds for the Netherlands, the setting of our empirical test.

where s_j is the number of seats party j (which is part of the coalition c) obtained in the election. As there are S total seats, the governing coalition has to obtain more than $S/2$ seats in order to obtain a majority.

Strategic voter choice

Before deciding which party to vote for, each strategic voter i constructs expectations about the seat distribution (based, for example, on opinion polls, cf. Irwin and Van Holsteyn, 2002), which allow him to calculate the expected policy outcome (according to the process outlined in figure 1 and specified below), while a naive voter disregards information about the seat distribution. Strategic voter i 's problem then becomes

$$\max_{v_{ij}} - (p_i - p_{v_j})^2, \quad (5)$$

where $v_{ij} \in V_i = \{v_{i1}, \dots, v_{iN}\}$ represents a vote by voter i for party j and p_{v_j} is the expected policy associated with a vote for party j . We now turn to defining p_{v_j} .

The problem each strategic voter faces can be summarized as follows. There are S seats, and N parties participating in the election (P_1, \dots, P_N) , where party j is expected to receive n_j seats. Each strategic voter knows or assumes each party's policy bliss point $p_j, j \in [1, \dots, N]$, and each strategic voter also knows or assumes that coalition formation is characterized by Nash Bargaining and that the bargaining weights are each coalition party's seat share in the coalition.

Given his expectations over the number of seats each party will receive, each strategic voter forms an expectation over the election's policy outcome for each of the votes he can cast by judging how likely each governing coalition is and which policy it will set given the seat distributions that could result from the vote. Strategic voters assign the same probability to flipping a seat to the party they vote for from any of the other parties with positive seat

expectations, as discussed above. Only scenarios under which the seat distribution actually changes matter for the voters' strategic vote choices, and they assume that the probability of their vote yielding an additional seat for the party they vote for is the same across all parties.

In assigning probabilities to each coalition, strategic voters assume that coalitions strive to minimize their joint utility loss (as party preferences are characterized by a loss function). Strategic voters then let the probability of a given coalition forming depend inversely on that coalition's joint utility loss (as described in Ganser 2012), where coalition c 's utility loss is given by

$$\mathcal{L}(c) = \sum_{x \in c} L(x), \tag{6}$$

where $L(x) = -(p_x - p(c))^2$ as defined in Equation 1 above.

Having calculated the joint utility losses for all winning coalitions (i.e. majority coalitions in our setting) that can result from flipping a particular seat, the strategic voter then constructs coalition probabilities in the following way:

$$\pi(c) = \frac{1/\mathcal{L}(c)}{\sum_{y \in C} 1/\mathcal{L}(y)}, \tag{7}$$

where C is the set of all possible winning coalitions. The coalition probability the voter assigns to coalition c is simply that coalition's normalized inverse joint utility loss.

These probabilities correspond to those used by Ganser (2012) to predict the likelihood of different coalitions. His Coalition Probability Index outperforms other ways to predict coalitions and is therefore the most effective one for our strategic voter to use. A strategic voter thus has in mind a vector of coalition probabilities:

$$\boldsymbol{\pi} = (\pi(1), \dots, \pi(\bar{C})), \tag{8}$$

where \bar{C} gives the set number of winning coalitions and the winning coalitions are labeled $1, \dots, \bar{C}$. In addition to this vector of coalition probabilities, a strategic voter has in mind a vector of policies that these coalitions would implement

$$\mathbf{p} = (p_1, \dots, p_{\bar{C}}). \quad (9)$$

Given a seat distribution, a strategic voter thus faces the expected policy outcome p_E :

$$p_E = \mathbf{p} \cdot \boldsymbol{\pi} \quad (10)$$

He then calculates this expected policy outcome for each of the seats that can be flipped by each of the votes he can cast. Assuming he expects positive seats for all parties, the strategic voter ends up with $N - 1$ expected policy outcomes per vote he can cast. That is, per vote he can cast, he will have $N - 1$ expected policy outcomes depending on which party the seat flips from.

The strategic voter then simply averages across these $N - 1$ expected policy outcomes per vote he can cast, because he assigns the same probability to flipping a seat from any of the other parties:

$$p_{v_j} = \frac{\sum_{k \in [1, \dots, N] \setminus j} p_{E_k}}{N - 1}, \quad (11)$$

where p_{v_j} is the expected policy outcome of voting for party j . The strategic voter i then chooses the vote that minimizes the distance between this expected value and his policy bliss point p_i .

Discussion

One central feature that is present in some other models of strategic voting in a PR context is lacking from ours: because our model is decision-theoretic rather than game-theoretic,

it does not lead to a voting equilibrium with rational expectations, that is, with beliefs converging to the observed outcome. We are not, however, overly concerned about this lack of a voting equilibrium. Rather, it seems to us to be a relatively realistic feature of voter behavior. In fact, in the dataset we use voters differ widely in their assessments of both parties' expected seats and parties' policy bliss points (as proxies by their rating of parties on a left-right scale, where 0 is at the extreme left and 10 is at the extreme right). For the six parties, for which beliefs about expected seats were elicited, the standard deviation is at least 1.35 and, for all of these six parties, different voters rank the same party at least eight points apart.⁹

Apart from the question whether or not a voting equilibrium is a desirable feature of a model of strategic voting, we think that our model has distinct advantages over the existing literature. First, it allows for more than three parties. The seminal paper by Austin-Smith and Banks (1988) only considers three parties and finds that the largest and the smallest party are always adjacent in the policy space and always form a coalition government. Even in a country with only three parties, it is implausible that the largest and the smallest party necessarily form the government even if they are adjacent in the policy space.¹⁰ Baron and Diermeier (2001) also consider only three parties. An additional limitation of their setting is that it assumes that one party's policy bliss point is equidistant from the other two parties' policy bliss points.

As discussed, our setup has more in common with Cox and Shugart (1996) and Cox (1997), which loosen the restriction to three parties and formally model strategic voting with N parties and have their voters focus on the fact that they can change at most one

⁹As the sample, we use those respondents for whom we have complete information on vote intention, left-right ratings of self and parties, and seat expectations. See Appendix A for the full results of the left-right ratings.

¹⁰A counterexample is provided by the 1969 federal elections in Germany: after this election the Social Democrats (SPD) and the Liberals (FDP) formed the government although the Christian Democrats (CDU/CSU) were the largest and the Liberals the smallest party, with the Liberals being located in the policy spectrum between the Social Democrats to their left and the Christian Democrats to their right.

seat. Their model relies, however, on the assumption that voters hold preferences over seat distributions rather than policy outcomes. While preferences over policy outcomes could be mapped into seat distributions, their model does not explicitly do so. Finally, it assumes that voters have rational expectations regarding the vote remainders for all parties,¹¹ which requires voters to have extremely detailed information (or at least beliefs) about the exact number of votes for each party. Besides an informational requirement for voters bordering on the absurd, this model has the additional drawback that it cannot be tested empirically.¹²

Kedar (2005), on the other hand, does assume that voters take into consideration each party’s influence on the implemented policy when determining whom to vote for. The difference with our model is that in Kedar’s model voters do not think about coalitions but rather weight each party’s policy bliss point either by its vote share or by its seat share. Also, voters in Kedar’s model do not understand that their votes can change at most one seat. These ad hoc assumptions lack both theoretical and empirical underpinnings.

While we think that our model adds to the existing literature in explicitly considering the voter’s influence on coalition probabilities and policies, there is one main point of criticism we expect, aside from the concern with a voting equilibrium mentioned above. This point is that the way in which we let strategic voters evaluate each potential vote’s influence on the expected policy outcome is computationally extremely demanding. This is a reasonable point and we don’t insist on our model being an exact reproduction of each strategic voter’s decision-making. Rather, we propose it as a first attempt to seriously take into account coalition considerations in strategic voting in a setting with N parties. Further research into how exactly voters assess coalition probabilities is surely needed. In the meantime, however,

¹¹As explained in footnote 4, vote remainders are the numbers of votes left over per party after using up all votes that translate into seats. For example, if a seat “costs” s votes and a party received $s + x$ votes ($x < s$), that party has a remainder of x votes.

¹²While the dataset we use for our empirical tests does not contain any information about expected remainders, it does show that voters hold widely divergent views both over the policy positions they ascribe to parties as well as over the seats they expect parties to obtain. This indicates that assuming rational expectations over vote remainders is indeed a far-fetched assumption.

testing our model as it is allows us to see whether we have missed our mark completely or whether we might be on to something. In this spirit, we now turn to an empirical test of our model.

Empirics

As we turn to empirically testing our model, the biggest problem is to find a testing ground. While the natural testing ground are election data sets, the data required for our model are rather detailed. Fortunately, the “Pre-Post Panel” of the *Dutch Parliamentary Election Study 2002-2003* contains the data we need. (For more information on the *Dutch Parliamentary Election Study 2002-2003* see Irwin et al., 2005.) Face-to-face interviews were conducted before and after the Dutch general elections held on May 15, 2002. 1,907 respondents were interviewed between April 18 and May 14, 2002. Of these, 82 percent (or 1,574 respondents) also answered a post-election face-to-face interview between May 16 and June 27, 2002. What makes this data set uniquely valuable to us are its questions regarding the respondents’ ideology ratings both of themselves and of parties, their expectations about the seat distribution, and the vote the respondents intend to cast at the time of the interview.¹³ (See Appendix B for detailed informations about the variables we use from this dataset.) Figure 2 below shows the average left-right placement of those six parties for which seat expectations are elicited by those respondents for which we have full information.

¹³While there is also information regarding the vote the respondents actually ended up casting, the intended vote at the time of the interview is what we are interested in as it is elicited at the same time as the expected seat distribution. After all, the respondents’ expectation about the seat distribution might have changed by the time they actually cast their vote.

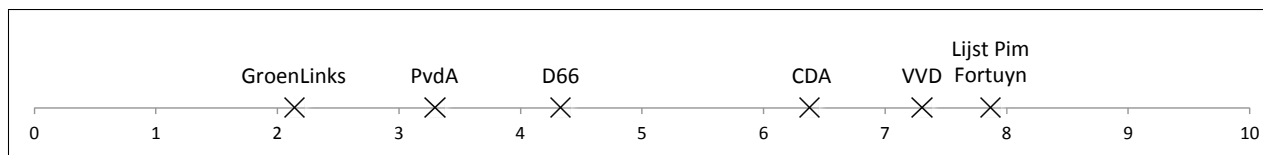


Figure 2: Average party positions on the 0-10 left-right scale.

What makes it even more fortunate that the *Dutch Parliamentary Election Study 2002-2003* contains the information we need, is the fact that the Netherlands per se are an ideal testing ground for theories of strategic voting in proportional representation systems. As Holsteyn and Irwin (2007: 3) point out

The entire country serves as a single electoral district from which all 150 members of the Second Chamber of Parliament are elected. In order to obtain a seat a party must obtain a number of votes equal to the number of valid votes divided by 150, i.e., 0.67 per cent of the vote.

The Dutch electoral system is thus entirely proportional without an additional threshold required for representation. This means that we don't have to worry about "insurance votes" or "wasted votes", which figure prominently in other PR settings with high thresholds for representation (such as Germany with its 5 percent threshold, for example).

Moreover, Dutch voters have decades of experience with a multi-party system and coalition governments.¹⁴ Since the end of World War II, all governments have been coalition governments and almost two thirds of the governments since World War II have been coalitions of three or more parties (Holsteyn and Irwin, 2007: 4). And these governments have fit very well with Gamson's Law. From 1959 to 2002 (from the DeQuay government through the Kok II government) the correlation between a coalition party's seat share in the coalition and its portfolio share¹⁵ is 0.9681.

¹⁴The 2002 election was, however, unusual as it featured the entry of a new party, the Lijst Pim Fortuyn, the leader of which, Pim Fortuyn, was assassinated by an animal rights terrorist on May 6, 2002, just nine days before the election.

¹⁵We measure the portfolio share by the number of "ministers" each party has. Information from *Parlement & Politiek*.

Non-Naive Voting Exists

A preliminary analysis of the data reveals that voting behavior other than naive voting is widely present. Table 2 shows the intended votes of those who have one closest party on the left-right scale. Using this “policy closeness” with a particular party results in an upper bound for naive voting of 56.3%¹⁶ (cf. the 90.1% that Hobolt and Karp (2010: 303) find when using the party the voter “likes best”). This is an upper bound, as there is no reason why a strategic voter would not end up concluding that his policy interests are best served by a vote for the party that is ideologically closest to him.

¹⁶We only show the results for six parties here because these are the only parties for which respondents provide answers regarding expected seats. (See next section.) Table 2 is thus a subsample of our total sample.

Table 2: Intended Voting Behavior of Respondents with One Closest Party^a

Intended vote:	On the left-right right policy spectrum, the voter is closest to:					
	Groen Links	PvdA	D66	CDA	VVD	Lijst Pim Fortuyn
GroenLinks	37	9	10	3	–	2
PvdA	12	57	15	3	2	4
D66	2	8	14	4	–	1
CDA	1	4	15	75	13	11
VVD	–	3	4	17	29	7
Lijst Pim Fortuyn	1	4	5	8	10	17
Votes cast	53	85	63	110	54	42
Votes cast for “own” party:	37 (69.81%)	57 (67.06%)	14 (22.22%)	75 (68.18%)	29 (53.70%)	17 (40.48%)
Total votes cast for “own” party: 229/407 = 56.27%						

Note:

^a The closest party is defined as that party the respondent himself put closest to his own policy position on the 0-10 left-right scale. However, parties in the table are ordered from left to right according to the average respondent’s ranking (see Figure 2).

Strategic Voting Predictions Seem Meaningful

The *Dutch Parliamentary Election Study 2002-2003* dataset is well suited for a test of our model. We can use expectations over the seat distributions which respondents provide in the pre-election survey and combine it with the ideology rankings of parties respondents provide in the post-election survey. Using this information, we can calculate coalition probabilities as each respondent perceives them. It is important to note that respondents are only providing this information for six parties, so we restrict our analysis in this section to those respondents

who have provided answers for all six of these parties and also vote for one of these parties.¹⁷

We use this data to determine which party the respondent should vote for if he behaved strategically according to our model, which we then compare to the respondent's vote intention at the time of the interview. Using vote intention rather than eventual vote is preferable as the respondent's expectations over the seat distribution may have changed by the time they cast their actual vote, or their actual vote may have been influenced by the assassination of Pim Fortuyn (see Footnote 14). When we do this, we find that 36% of voters vote according to our prediction, about twice as much as one would expect if voters deviated randomly from the party that is ideologically closest to them. In order to more closely examine the reliability of this finding, we split the sample in different ways in Table 3.

¹⁷Unfortunately, the left-right scale on which respondents rate themselves and the parties is not very fine grained.

Table 3: Actual and Predicted Voting Behavior^a

	Number of Observations	Strategic Voting Percent Correct
Overall	705	36.45%
<i>By sex:</i>		
Male	409	33.01% **
Female	296	41.22%
<i>By education:^b</i>		
High level	288	37.15%
Low level	416	36.06%
<i>By municipality characteristic:^c</i>		
Urban	451	37.25%
Rural	254	35.04%
<i>By marital status:</i>		
Married	492	34.55%
Not married	213	40.85%
<i>By age group:</i>		
18 - 44	241	38.59%
45+	464	35.34%
<i>By social class (self-image):</i>		
Upper and upper middle class	222	38.29%
Middle and working class	466	36.05%

Notes: Significance levels of two-sided t-tests of subgroup means: ** 5%. All predictions are statistically significant at the 1% level.

^a Actual voting behavior is the vote the respondent intends to cast, while predicted voting behavior is the vote predicted by our model.

^b A respondent has a high level of education if he has completed at least “undergraduate level vocational”. All others have a low level of education.

^c Urban is “very strongly”, “strongly”, and “mildly urban”; rural is “hardly urban” and “not urban”.

The fact that our prediction is correct in over a third of the cases is encouraging, since this is over twice the rate of success a random prediction would have. This result seems to hold with reasonable robustness across demographic subgroups.

Party Size and Closeness Matter, Demographics Not Really

There are, of course, other factors that affect voting behavior beyond the purely policy-driven considerations explored so far. We use a conditional logit framework here to explore some of these: party size, party closeness and the demographic variables presented in Table 3. The model we estimate is one where vote intention is explained by the ranking of parties according to size, according to policy closeness to the respondent, and according to the strategic vote predictions as generated by our model presented in Section ??, as shown in Equation 12:

$$\frac{\log P_{i,j}}{\log P_{i,j'}} = (z_{i,j} - z_{i,j'})' \alpha \quad (12)$$

Here the dependent variable is the relative probability (odds ratio) of votes for two parties, i and j . This ratio is modeled as the product of α , a vector of three coefficients, for the strategic party ranking, for the size ranking, and for the closeness ranking, and $(z_{i,j} - z_{i,j'})$, the difference between the values of these explanatory variables for voter i for the two left-hand parties i and j .

Table 4 shows the results from this estimation: under each of the three specifications, our results indicate that ranking a party one spot higher makes a vote for that party statistically significantly more likely, even once we control for the closeness ranking.^{18,19} The other noteworthy result here is that voters prefer large parties because of their size per se: voters are at least a third more likely to vote for a party that is one spot higher in the size ranking.²⁰

¹⁸The latter has a particularly large amount of explanatory power, which is not surprising in light of the results presented in Table 2.

¹⁹If we alternatively control for a dummy indicating the closest party, the odds ratio for the strategic voting ranking never drops below 1.29. See Appendix C.

²⁰If we alternatively control for expected seats instead of the size ranking, we find that 1 additional seats increases the probability of voting for that party by about 6 percent. The other odds ratios are not affected by controlling for seats instead of the size ranking. (See Appendix C.)

Table 4: Conditional Logit Estimates of Voting Behavior

	Vote Intention			
	(1)	(2)	(3)	(4)
Strategic Voting Ranking	1.520*** (0.039)	1.483*** (0.038)	1.189*** (0.040)	1.149*** (0.039)
Party Size Ranking		1.419*** (0.037)		1.333*** (0.035)
Party Closeness Ranking			1.927*** (0.078)	1.880*** (0.080)
Observations	4,230	4,230	4,230	4,230
Pseudo R-squared	0.12	0.20	0.27	0.32

Notes:

Observations are at the party-voter level; there are 6 parties and 705 respondents.

*** 1% significance.

We should note that controlling for the closeness ranking instead of a dummy of the closest party decreases the odds-ratio of the strategic voting ranking much more (cf. Appendix C).

We also use our conditional-logit framework to explore whether strategic voting considerations are of more importance to various subgroups of voters by including separate “choice” variables for the different subgroups used in Table 3. Mirroring that table, none of these group characteristics seem to predict more or less strategic voting, except for gender and social class, which are marginally significant. (See Table D.1 in Appendix D for details.) Using these observable characteristics does therefore not seem like a fruitful line of investigation in this context.

What does deserve closer examination, on the other hand, is the fact that the party closeness ranking greatly decreases the odds ratio for the strategic voting ranking. This suggests, not surprisingly – given the results of Table 2, that proximity considerations matter a lot and almost overwhelm strategic considerations.

Taking Proximity Voting Out of the Equation

In order to examine our strategic voting predictions when proximity voting should matter much less, we now examine subsamples. The first subsample we examine is where respondents report multiple closest parties and vote for one of them. Table 5 is a two-by-two table examining how well strategic predictions fare against voting for the largest party amongst multiple closest parties.

Table 5: Strategic Voting vs Voting for the Largest Party when Voting for One of Multiple Closest Parties

		Voting for the Strat. Voting Prediction		Total
		Yes	No	
Voting for the Largest Party	Yes	94	54	148
	No	32	51	83
Total		126	105	231

Note: The proportion of correct predictions of strategic voting and of voting for the largest party in this sample are statistically significantly different at the 5% significance level (with 54.5% and 64.1% of correct predictions, respectively). Both are statistically significantly different from a random draw at the 1% significance level. In this sample, there are on average 2.38 closest parties per respondent.

Respondents are more likely to vote for the largest party than for the strategic prediction. This is not true of respondents who are not voting for a closest party (regardless of the number of closest parties) as Table 6 shows.

Table 6: Strategic Voting vs Voting for the Largest Party when Not Voting for a Closest Party

		Voting for the Strat. Voting Prediction		Total
		Yes	No	
Voting for the Largest Party	Yes	51	66	117
	No	60	68	128
Total		111	134	245

Note: The proportions of correct predictions of strategic voting and of voting for the largest party in this sample are statistically identical at the 1% significance level (with 45.3% and 47.8% of correct predictions, respectively). Both are statistically significantly different from a random draw at the 1% significance level. In this sample, there are on average 4.68 “not closest” parties per respondent.

When not voting for a closest party, respondents are statistically as likely to vote for the largest party as they are to vote for the strategic prediction.

The results for both subsamples are confirmed in conditional logits shown in Table 7, where the odds ratios for the strategic voting ranking and the size ranking are significantly different at the 10% level for the subsample where respondents are voting for one of the closest parties but not for the subsample where respondents are not voting for any closest party.

Table 7: Conditional Logit Estimates of Voting Behavior

	Vote Intention			
	Voting for one of the closest parties		Not voting for a closest party	
	(1)	(2)	(3)	(4)
Strat. Voting Ranking	1.386*** (0.145)	1.272** (0.136)	1.424*** (0.074)	1.446*** (0.075)
Party Size Ranking		1.734*** (0.197)		1.567*** (0.086)
Observations	549	549	1,146	1,146
Pseudo R-squared	0.03	0.09	0.07	0.17

Notes:

Observations are at the party-voter level: for the subsample of those voting for one of the closest parties there are 231 voters and, on average, 2.38 parties per voter; for the subsample of those not voting for the (or a) closest party there are 245 voters and, on average, 4.68 parties per voter.

*** 1% significance; ** 5% significance.

Moreover, these conditional logits also show that including the size ranking in the conditional logit decreases the odds ratio for the strategic voting ranking by 0.114 in the first subsample but leaves the odds ratio for the strategic voting ranking unchanged in the second subsample. So, while we find that the strategic voting predictions are significant in both instances, they seem to matter more when the respondent is not voting for a closest party. Overall, we find some support that voters are able to take into account complicated coalition considerations but we also find that other considerations matter at least as much. In fact, in the instance where we would not expect other considerations to matter much at all, that is, when the voting for one of the closest parties, we find that voting for the largest party has significantly more explanatory power. This shows that omitted variables like party size may explain results such as those of Duch et al., who find that ideological coalition-focused voting is of paramount importance. These findings lead us to believe that much more qualitative

research is needed in order to better understand voter motivations in deciding how to cast a vote. We now turn to a discussion of this.

Discussion and Conclusion

We set out to explain the behavior of voters who vote with desired policy outcomes in mind, in the complicated setting of a proportional representation system dominated by complex considerations about coalition formation. It turns out that our ultra-rational model of coalition considerations has explanatory power but is somewhat sensitive to controlling for party size and rather sensitive to controlling for how close the party is to the voter in terms of its preferred policy. One might be tempted to quote Brecht (1983: 113): “We ... are nettled. To see the curtain down and nothing settled.”

Yet, we believe that this paper does, in fact, make three important contributions to the burgeoning literature on strategic voting in PR systems. First, we are convinced that any model of true strategic voting must start with the voter’s insight that he can at most change one seat, and this paper shows that basing voting behavior on this assumption has explanatory power. It would, however, be illuminating to find out what proportion of voters is aware of this fact that their vote can at most change one seat. Much more work is also needed to understand how voters think about coalition probabilities. Voters might vote for the largest amongst multiple closest parties because they believe that larger parties have a better chance to become part of a coalition government, so that our finding in Table 5 might indicate strategic voting.

Another main conclusion that follows from this paper is that what is sorely needed is a comprehensive study of voter’s motivations in deciding how to vote. Similarly to Bewley’s (1998) interviews about motivations not to cut pay, voter interviews that do not rely as heavily as current surveys on easily quantifiable variables might provide interesting insights

into which dimensions of the vote decision matter to voters. Such insights would surely help inform future theories regarding strategic voting. Voters might have mixed motives that take into account both strategic considerations and proximity considerations: for instance, if a voter is reasonably certain that no party sufficiently close to him to vote for will make it into the governing coalition, he is faced with the choice of which of the future opposition parties to vote for. He could vote for the party that best represents his views or he could vote for the largest opposition party sufficiently close to him in order to ensure at least one “strong voice” in the opposition.

In fact, all voters are probably driven by a mix of motives,²¹ including how likable they find politicians, and perhaps also looking ahead to future elections and trying to buck up parties that currently have no chance of being in the coalition but might in the future if they gain mainstream acceptance. It is this confusing array of motives that might prove Duverger right in his notion that there is little incentive to vote strategically in a PR system (in the sense of the Downsian purely policy-oriented voting in one particular election). After all, if a voter does not have to worry about throwing away his vote by not voting for one of the two leading candidates as in a plurality system, all these other considerations loom much larger and need to be understood in order to study how much and in what way voters in PR systems vote strategically.

So, while we certainly do not claim to have “settled” the issue of strategic voting in PR systems with this paper, we believe that our findings can productively inform future studies of voter motivations in PR systems.

²¹For instance there is at least one voter in the dataset we use who is driven by a desire to vote for the “winning party”, explaining his vote as follows: “[I voted for them] because I thought they would become the largest party - I just chose the largest party.” (“[O]mdat ik vermoedde dat dat de grootste partij werd - ik heb gewoon voor de grootste partij gekozen.”)

Appendices

A Party left-right ratings

Table A.1 shows the placement on the left-right scale of the six parties for which seat expectations were elicited. In putting together these placements we only used the ratings provided by the 705 respondents for whom we have data on vote intention, left-right placement of self and parties, and seat expectations. On this scale 0 is the extreme left while 10 is the extreme right.

Table A.1: Party placement on the left-right 0-10 scale

Party	Mean	Std. Dev.	Minimum	Maximum
GroenLinks	2.139007	1.342264	0	8
PvdA	3.295035	1.486986	0	10
D66	4.330496	1.442060	0	9
CDA	6.374468	1.432744	1	10
VVD	7.303546	1.464078	1	10
Lijst Pim Fortuyn	7.868085	1.734809	0	10

B Variable descriptions

The following table provides the descriptions of the variables from the *Dutch Parliamentary Election Study 2002-2003* we used in our analysis.

Table B.1: Variable Descriptions

Variable	Description	Wave
URB02	Degree of urbanization	Pre-election
V0185	PvdA: Expected number of seats in 2002 parliamentary election	Pre-election
V0188	CDA: Expected number of seats in 2002 parliamentary election	Pre-election
V0191	VVD: Expected number of seats in 2002 parliamentary election	Pre-election
V0194	D66: Expected number of seats in 2002 parliamentary election	Pre-election
V0197	GroenLinks: Expected number of seats in 2002 parliamentary election	Pre-election
V0199	Lijst Pim Fortuyn: Expected number of seats in 2002 parliamentary election	Pre-election
V0457	Age of respondent on Election Day 2002	Pre-election
V0459	Sex of respondent	Pre-election
V0460	Marital status of respondent	Pre-election
V0463	Highest education (completed) of respondent	Pre-election
V0505	Social class of respondent (self image)	Pre-election
V0905	Left-right self-rating	Post-election
V0906	Left-right rating of PvdA	Post-election
V0907	Left-right rating of VVD	Post-election
V0908	Left-right rating of D66	Post-election
V0909	Left-right rating of GroenLinks	Post-election
V0910	Left-right rating of CDA	Post-election
V0915	Left-right rating of Lijst Pim Fortuyn	Post-election

C Alternate Conditional Logit Specifications for the Full Sample

This appendix shows that the results in Table 4 are not driven by the fact that we control for party size by party size ranking rather than by seats and for closest parties by a closeness ranking rather than by a dummy for the closest party. Table C.1 reproduces the results from Table 4 with seats instead of the size ranking.

Table C.1: Conditional Logit Estimates of Voting Behavior

	Vote Intention			
	(1)	(2)	(3)	(4)
Strategic Voting Ranking	1.520*** (0.039)	1.475*** (0.037)	1.189*** (0.040)	1.140*** (0.039)
Seats		1.069*** (0.005)		1.057*** (0.005)
Party Closeness Ranking			1.927*** (0.078)	1.883*** (0.080)
Observations	4,230	4,230	4,230	4,230
Pseudo R-squared	0.12	0.21	0.27	0.32

Notes:

Observations are at the party-voter level; there are 6 parties and 705 respondents.

*** 1% significance.

The odds ratios on the strategic voting ranking in both column (2) and (4) are almost exactly the same as in the corresponding columns in Table 4.

Controlling for a dummy for the closest party instead of for a closeness ranking increases the odds ratios on strategic voting as a comparison of Table C.2 with Table 4 shows.

Table C.2: Conditional Logit Estimates of Voting Behavior

	Vote Intention			
	(1)	(2)	(3)	(4)
Strategic Voting Ranking	1.520*** (0.039)	1.483*** (0.038)	1.331*** (0.039)	1.299*** (0.039)
Size Ranking		1.419*** (0.037)		1.365*** (0.037)
Closest Party			4.429*** (0.384)	4.125*** (0.380)
Observations	4,230	4,230	4,230	4,230
Pseudo R-squared	0.12	0.20	0.24	0.30

Notes:

Observations are at the party-voter level; there are 6 parties and 705 respondents.

There are on average 1.56 closest parties per respondent.

*** 1% significance.

Finally, controlling for both seats instead of size ranking and closest party instead of closeness ranking, as in Table C.3, shows that the odds ratio on the strategic voting ranking never falls below 1.29, as would be expected from the results in Tables C.1 and C.2.

Table C.3: Conditional Logit Estimates of Voting Behavior

	Vote Intention			
	(1)	(2)	(3)	(4)
Strategic Voting Ranking	1.520*** (0.039)	1.475*** (0.037)	1.331*** (0.039)	1.292*** (0.039)
Seats		1.069*** (0.005)		1.3061*** (0.005)
Closest Party			4.429*** (0.384)	4.113*** (0.381)
Observations	4,230	4,230	4,230	4,230
Pseudo R-squared	0.12	0.21	0.24	0.30

Notes:

Observations are at the party-voter level; there are 6 parties and 705 respondents.

There are on average 1.56 closest parties per respondent.

*** 1% significance.

D Subgroup Conditional Logits

Table D.1 shows that, except for gender and social class, no group characteristics seem to even marginally predict more or less strategic voting. Not controlling for party size ranking or party closeness ranking only changes the odds ratios but not the fact that group characteristics do not meaningfully predict more or less strategic voting.

Table D.1: Strategic Voting by Subgroup

	Odds Ratio	Number of voters	t-test
<i>By sex:</i>			
Male	1.100	409	*
Female	1.232	296	
<i>By education:^b</i>			
High level of education	1.188	288	
Low level of education	1.128	416	
<i>By municipality characteristic:^c</i>			
Urban	1.163	451	
Rural	1.125	254	
<i>By marital status:</i>			
Married	1.130	492	
Unmarried	1.201	213	
<i>By age group:</i>			
18 - 44	1.231	241	
45+	1.113	464	
<i>By social class (self-image):</i>			
Upper and upper middle class	1.253	222	*
Middle and working class	1.112	466	

Notes:

Reporting significance levels of two-sided t-tests from pooled conditional logic regressions with observations at the party-voter level (with 6 parties per voter): * 10%. Observations are at the party-voter level with 6 parties the voter can choose to vote for.

Controls are party size ranking and party closeness ranking.

All coefficients are significant at the 1% level, except for male and rural, which are only significant at the 5% level.

Definition of demographics as described in Table 3.

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