When Apples and Oranges Taste the Same:  
a Probabilistic Analysis of the Impossibility to Decide 
between Proximity and Directional Theory 
in the European Union*  

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September 4, 2011  

Abstract  

The present paper scrutinizes the efforts to compare proximity voting and directional voting in the European Union. First, we offer a general topology characterizing positions on the left-right political axis where one individual should place herself in order to have distinguishable predictions from the two issue voting theories, dubbing these as discriminant positions. We evaluate how the overlapping predictions stemming from these two theories can bias cross-country comparison of them. We then focus on how the first party preference predictions overlap with the vote intention indicated by the individuals. In order to assess the relative performance of the theories, we filter for those individuals who placed themselves in a discriminant position and evaluate the two theories in conjunction with party-system polarization. Our contribution is two-fold: we offer a new and corrected approach to compare spatial voting theories across countries with multiparty systems, and we also reevaluate the impact of party system characteristics previously found to influence the individual spatial voting strategies (as in Pardos-Prado and Dinas (2010)).

1 Introduction  

Issue voting theories present themselves as convenient ways of depicting peoples’ political preferences and their vote choice. Understanding why people make the electoral choice they do
helps us not only in explaining and predicting electoral results but also in analyzing how parties are rewarded or punished for the policy options they present to the electorate. Two important variations of the spatial issue voting theories are the proximity (Downs, 1957; Enelow and Hinich, 1984) and the directional theory of voting (Rabinowitz and Macdonald, 1989). Proximity theory assumes that each voter will prefer the party that has the closest (perceived) policy position to theirs, whereas directional theory asserts that the most intense party on the same side of the issue will be the one chosen by any voter. Thus, they both acknowledge the importance of issue positions and policy preferences in deciding which party is preferred; however they approach the question from a very different angle. Obviously, the also imply different strategies for party positioning. Proximity theory would suggest – at least, for bipartisan systems – that parties should move to the center of the policy continuum, whereas the directional theory implies centrifugal dynamic, rewarding extreme party positions. Furthermore, proximity logic is used for more general political phenomena reflecting any sort of interaction between voter and party or MP preferences, such as quality of representation (Claassen, 2009). Hence, going beyond the micro level, comparing these voting theories becomes a substantial part of our knowledge about party competition, party strategy, and democratic representation. Essentially, the veracity of the directional theory would indicate that politics should be seen in terms of intensity and extremity, whereas the proximity theory would paint a more nuanced and moderate picture of the voters’ political preferences.

The striking differences in the logic and expected outcome of these theories justify the long-lasting debate about their performance compared to each other (MacDonald et al., 1998; MacDonald and Rabinowitz, 2001; Westholm, 1997, 2001), but a conclusive verdict is still in high demand (Lewis and King, 1999). As most models of voting behavior, spatial issue voting theories are also susceptible to differ in accuracy in different political contexts (Cox, 1990; Kedar, 2006; Pardos-Prado and Dinas, 2010). Party system characteristics and party competition influences the stances political parties take on various issues and policies. These contextual characteristics may limit or may extend the set of possible choices for the voters. Indeed, Pardos-Prado and Dinas (2010) suggest that the proximity voting suffers in countries with high electoral polarization, whereas the directional theory strives under more polarized party systems. However, it is yet still unclear whether these findings suggest that when the proximity theory is weakened, the directional theory takes its place, and vice-versa. Pardos-Prado and Dinas (2010) correctly acknowledge that their method and the results are not suitable for directly deciding which theory is better in which context. Thus, cross-country comparison induces yet another level of complexity in comparing these two theories.

In this paper we intend to fill in this gap by focusing on the relationship between these two theories and vote choice in 27 European countries. We follow this path because the ultimate test of voting theories should focus on vote choice prediction, and employing this approach we can

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1 Cf. papers in the 1997 Special Issue of Journal of Theoretical Politics.
also measure the proximity theory against the directional theory in a comparative setting. In an unconstrained scenario where both models are allowed to predict identical first party preference, we find that both proximity and directional theory (or spatial voting) become stronger in more polarized countries, challenging the results reported by Pardos-Prado and Dinas (2010). Also, both electoral and party polarization has the same impact on the accuracy of these two theories, and hence we fail to find the different effect of electoral and party polarization reported by Pardos-Prado and Dinas (2010).

After reviewing the frequency of spatial voting in Europe, we switch to evaluating the two theories against each other. Given the distribution of voters and parties on the left-right political scale we analyze the cases in which the directional and the proximity theory predict different parties as best fit for an individual voter. Next, we evaluate how party polarization and electoral polarization influences the performance of these theories when matched up against each other. In direct comparisons, we find strong empirical support for the claim that the directional theory works better under conditions with higher party polarization, and it does so by weakening the proximity theory. However, on average, high party and electoral polarization is needed for the proximity theory to lose its general dominance over the directional theory. Our contribution to the comparative electoral behavior literature lies in the direct evaluative comparison of the two spatial voting theories, in the systematic assessment of party-system conditions that influence this competition between the proximity and the directional theory, and a more integrative perspective of contextual determinants of issue voting in multi-party systems.

In the next section we start with the overview of the two theories and reflect on previous debates in the literature, motivating our approach of considering vote choice. Section three presents some theoretical setup of an accurate comparison, developing the conditions of comparability, as well as some initial results. We proceed in section four with an in-depth comparative empirical analysis of 27 European countries. After discussing the results and limitations we offer general conclusions.

2 Two spatial issue voting theories in comparison: proximity vs. direction

Both of these theories are rational choice spatial voting theories, in the sense that preferences over parties are assumed to be representable by a utility function. This function represents voters as possessing a preferred position on an issue space or on a policy option space, and they see the possible gains that parties may offer them through those lenses. Parties have expressed positions on the same issue space, and it is assumed that voters have some information about these positions. In their general form, issue voting theories can be expressed for each political issue, and the final expected utility is given by a weighted summation, according to the salience of each issue for the voter. In our paper we focus on the left-right political scale.
as a “super-issue”, following up on previous work in the field (Pardos-Prado and Dinas, 2010). Thus, the two competing theories will be expressed in only one dimension, the general left-right ideological scale.

The utility of voting on a party defined by the proximity theory is the following:

\[ u_i(v_i, p_j) = -(v_i - p_j)^2 \]

where \( v_i \) is the position of voter \( i \) on the Left-Right ideological scale, \( u_i \) is his utility whereas \( p_i \) is the position of party \( j \) in question on the same scale. It is easy to see that the voter’s utility reaches its maximum when the positions of the voter \( i \) and party \( j \) fully overlap. Furthermore, the neutral position or the middle of the scale has no specific meaning or importance in the proximity logic. If a voter is on the left of the scale, but the most proximate party is on the right, the voter will still prefer that party, disregarding that they are on different sides. In contrast, the directional theory builds on this differentiation, and the voter utility function is defined as follows:

\[ u_i(v_i, p_j) = (v_i - n)(p_j - n) \]

with \( n \) representing the ideological middle, or the point of neutrality between Left and Right. As stated above, the directional theory uses a two-step rationale (Westholm, 1997, 866). The voter looks at first whether there are parties on the side that she took on the left-right scale (side rule). If there are, she will prefer that party that holds that side with the most intensity (party intensity rule). Thus, the choice for the most extreme party on the same side will generate the highest utility for the voter. Overall, the highest utility is reached when the voter and the party are on the same side of the issue, and they are both most extreme. In general terms, this utility function specification reflects the assumption that individuals have diffuse policy options (Rabinowitz, 1978). Alongside the separation between valence and position issues proposed by Stokes (1963), an additional category of issues is needed. These are the dispositional issues, a subset of position issues and are characterized as follows:

“[Dispositional issues], like party identification, imply a neutral rather than a committed center. In addition, since no absolute positions are involved, an electorate responding to issues in a dispositional manner would generally be confined to the options candidates offer. This would explain both the issue sensitivity and the electoral centrality of the space.” (Rabinowitz, 1978, 811)

Thus, any spatial issue voting theory should take into account that “the majority of the public [do] not see issues in the sharp positional fashion that the traditional theory assumes” (Rabinowitz and Macdonald, 1989, 94).

Furthermore, the implications for the party competition are very different depending on which theory one accepts. Relying on the proximity logic we can develop the Median Voter
Theorem (Black, 1948) that suggests centripetal party competition, because the highest electoral gains can be gained with a moderate position. Conversely, the directional theory induces centrifugal dynamic, pushing parties to the extremes because higher vote numbers are predicated by taking that position.

By acknowledging these essential differences between the two individual level theories, it comes as no surprise that the success or failure of these theories has been frequently evaluated in multi-party systems. Previous research pursued different paths of comparison, but there is no clear verdict on which theory fares better. Three major issues constantly reappear in the comparison of the two theories: (1) what candidate placements are used (Gilljam, 1997a,b; Merrill and Grofman, 1997; Pierce, 1997; Macdonald and Rabinowitz, 1997; MacDonald et al., 1997, 1998; Rabinowitz and Macdonald, 1989; Westholm, 1997, 2001; Pardos-Prado and Dinas, 2010), (2) the explanation of intra- or inter-individual differences (Westholm, 1997, 2001; MacDonald and Rabinowitz, 2001), and (3) the non-discernible predictions, a central issue of our paper. Not surprisingly, the first two aspects of this debate are not settled. If indeed all the comparisons depend on operationalization and model assumptions (Lewis and King, 1999), answering which theory better describes voter is still a daunting task. Non-discernible predictions emerge because in a real life setting directional and proximity theories often do not differ in predictions (Claassen, 2009; Lacy and Paolino, 2010; Lewis and King, 1999; Tomz and Houweling, 2008). Depending on the position of candidates and the voter we can only distinguish between decision-strategies used in few permutations (Tomz and Houweling, 2008).

Keeping the utility function modeling approach and using survey data, the possibility to derive critical tests of these theories is limited (Tomz and Houweling, 2008). These methodological difficulties drove researchers to reconsider the goals and methods of assessments of the competing spatial theories. A mixed approach (Merrill and Grofman, 1997; Morris and Rabinowitz, 1997; Merrill and Grofman, 1999) combined with the collection of experimental data produced a paradigm shift in thinking about these issues (Claassen, 2009; Lacy and Paolino, 2010; Tomz and Houweling, 2008). In their experiment, Lacy and Paolino (2010) manipulate fictional candidate descriptions, and compare, for example, how extreme voters rate moderate candidates with how moderate voters rate the same candidates. Testing three hypotheses (two directional and one proximity), they find an overwhelming support for the proximity theory (Lacy and Paolino, 2010).

These difficulties of comparison raise serious concerns about the real possibility of analyzing these issue voting theories in a cross-country setting. Previous literature suggests that contextual factors may influence spatial voting theories (Cox, 1990; Kedar, 2006; Pardos-Prado and Dinas, 2010). This macro-micro interaction does not come as a surprise. Both the directional and proximity theories work with the individuals’ and parties’ distribution on an issue continuum. Depending on the country of observation, we will find different parties and party

\(^2\)Particularly, in a dual-party system the only equilibrium is moving to the middle of the Left-Right space for both parties.
competition that might also influence the voter distribution (or vice-versa, since the casual link is not clarified here). This implies that contextual variables determine the elements of the supply side (parties and their positions) and the ordering of the possible elements. Moreover, given the interaction between the demand and supply side, contextual variables might also influence the distribution of voters’ positions on the issue continuum. En sum, these theories’ performance is contingent on the context, making the directional theory a better theory in some countries and the proximity theory in other countries.

Following a set of separate country analysis, the first overarching comparative attempt comes from Pardos-Prado and Dinas (2010), linking the success or failure of these two theories to electoral and party polarization. They build on the centrifugal vs. centripetal dynamic dichotomy examining the role of party and voter positions in shaping this dichotomy. They model the changing explanatory power of the directional and proximity utility function on party preference (“probability to vote for a party”) in a three-level setting. The results suggest that as electoral polarization increases, the proximity model is weakened. Furthermore, as party system polarization increases, the directional theory will gain in explanatory power (Pardos-Prado and Dinas, 2010).

Although empirical results confirm the presented theory, several methodological aspects need a more careful look. Estimating the effect of the proximity form in the same model with the directional functional form can be very misleading. Given the shape of these functions - and as we will see the substantial amount of identical preference set prediction - issues of multicollinearity can arise.

Moreover, it is rather unconventional how the cross-level interaction between electoral or party polarization and the two different functional forms were specified. In Model 2 (Pardos-Prado and Dinas, 2010, 776), they let to vary across countries the slope for proximity, and this variation is explained by electoral polarization on from the country level. However, exactly as in the case of the proximity function, it should be acknowledged that the effect of the directional function varies across countries, and thus that slope should also vary across countries (even without second level predictors). There is no clear indication whether the directional functional form is affected in any way by the electoral polarization, as no results are reported on that interaction. Considering the magnitude of the effects (assuming the reported coefficients are the beta coefficients), we can see that a change in the electorate’s polarization (expressed as self-placement variance from Table 1, p. 768), from the minimum to the maximum will generate a decrease of 0.017 in the effect of the proximity function. This indeed means that the proximity function suffers in more polarized systems, but this effect is rather minuscule. However, the proximity function will still be superior to the directional function (0.043 vs. 0.03), which was not modeled in interaction with the electoral polarization.

Referring to Figure 2, Pardos-Prado and Dinas (2010) state that “there is a pattern of association according to which the strength (or slope) of the proximity model decreases as the voters’ polarization level (which was measured with the variance of the left-right individual
self-placements) increases”. Regrettably, we fail to see the invoked pattern in the presented figure. For example, Denmark (5.24 for self-placement variation, slightly below the average of the 15 countries) has the strongest slop (close to 0.09), but countries with comparable electoral polarization levels (such as Netherlands, Ireland, Finland, Slovakia, or Britain) are situated around the mean score of the slopes. The maximum electoral polarization score is held by Greece (7.95), but the magnitude of the proximity slope is slightly below 0.06, a value presented as the average slope size across the 15 countries. Portugal (7.9) and Cyprus (7.9) tie for the second place on the electoral polarization score, however Portugal has a slope that is smaller than 0.05 and Cyprus is somewhere close to 0.07. Yet again, we presented all these scattered examples to sustain our claim that we fail to find the pattern referred to in the original article.

The case of Model 3 (Pardos-Prado and Dinas, 2010, 776) is identical, because there is no information available as to how the proximity function is influenced by party polarization. Even more disturbing is that when it comes to assessing the magnitude of the effects things become muddy. First and foremost, the directional functional form is not reported as a significant effect. This in itself would not be a major problem, but without a marginal effect plot with uncertainty measures we cannot really see the changes generated by increasing party polarization. Similarly to the previous case, a change from the minimum to the maximum level of reported party polarization induces an increase of 0.02 in the directional function’s impact, pushing it slightly over (0.013), but suggesting that the proximity function (0.04) still prevails even in this context. Again, the effect may be in the expected direction, but we do not know anything about the changes in the proximity function’s slope across countries (in interaction with polarization), and thus it is highly problematic to correctly contextualize the magnitude (and significance) of the effect on the directional theory.

With these concerns in mind, we consider now the last, and most problematic, aspect of the attempts of comparative analysis of these two spatial issue voting theories. In each party system we can get information on what are the expressed positions of parties. This can be generated from various sources, but if we regard the importance of individual or voter perception about the parties, most researchers use the mean perceived position of a party stemming from voter surveys. Although this measure gives a slight edge to the directional theory, it also avoids problems of projection (Macdonald and Rabinowitz, 1997; MacDonald et al., 1997). After registering an individual’s self-placement on the same issue continuum or dimension, we can calculate the utility generated by each party for that individual. And we can do this for both spatial theories in question. We can keep the absolute values (utility) or we can order the possible choices according to the utility associated with that choice. For each theory, we have an ordered choice set, and when this is confronted with the actual party preferences, we can decide which functional form is a better predictor of the preferences. However, even in multi-party systems, there is quite substantial overlap between the choice sets predicted by the directional theory and the one predicted by the proximity theory. Thus, a problem of substantial multicollinearity arises if we try to estimate the two functional forms in the same model. But more importantly, we com-
pare the two theories against each other, because their separate explanatory power is influenced by the predicted choice sets that identical or slightly overlap.

Furthermore, if we think of these two theories as theories of vote choice - not strictly theories that describe preference sets through a measure of utility, only the prediction of the first choice is important for benchmarking these theories. When using the utility function specifications, we might penalize one of the theories for not predicting accurately the order of the last two or three parties, even if it predicts accurately the first choice. This paired with a scenario in which the other theory misses the prediction on the first choice, but on the other parties (except first and second) are ranked correctly, a standard statistical model picks up on this anomaly, granting better explanatory power to the theory that indeed better reflects the preference set, but fails to predict the first party choice. Another, and more striking, example of this disadvantage appears when there are six parties, one theory correctly predicts the first three preferences, but mixes up the last three, whereas the other correctly predicts the last three preferences, but mixes up the first three. For this case, the correlation between the set of values reflecting the probability to vote with a party and the two utility sets generated by the theories is identical. Though, if we accept that vote choice or vote intention should be predicted, it is clear that one theory is superior to the other one.

These are the two main reasons that determine our choice of operationalization. For each theory, we store the prediction of the first preference (the choice that yields the highest individual utility according to the two distinct functional forms) and match this prediction to the declared vote intention of the individual. Thus, we will have situations where both theories predict the same party as first preference, but this is not reflected by the vote intention of the individual. In this case, there is no spatial voting going on, or at least voting does not happen according to the two main competing spatial theories.3 We also have situations where both theories (still) predict the same, and this prediction is accordance with the expressed vote intention of the individual. This scenario shows that there is spatial issue voting going on, however, we cannot clearly discern which of the two theories better describes the vote intention. For the direct comparisons, we will focus on cases where the predictions stemming from the two theories are different. If only those cases are taken when spatial voting is detected to be activated, the two theories become mutually exclusive. This highly constrained scenario will give us accurate insight on how these theories perform against each other. Moreover, looking at this match-up in a comparative setting we can identify what contextual circumstances favor systematically one of the theories.

In the next section we give an analytical account of the discriminating scenarios between

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3It should be mentioned that directional theory has a version which incorporates a certain region of acceptability to exclude ultra-extreme candidates. However, no operational concept of acceptability has yet been outlined, and we also lack any thorough empirical analysis on the issue on country-wide acceptability of parties, much less so for the individual level. Thus, we exclude any such augmentation of the directional theory, since it would be blatantly arbitrary.
the two theories. In light of this account, we reformulate the hypotheses related to the effects of party and electoral polarization on the success or failure of the proximity and the directional theory of spatial issue voting.

3 Topology and comparability for spatial voting

In principle, both directional and proximity theory can be used to set up voting models in either a continuous or a discrete space. There is no argument in the foundational writings these theories supporting the use of either model. On the other hand, certain interpretations of these theories can have implications on the possible topologies, e.g. when an issue position represents a “numerical” policy choice, such as the budgetary spendings on a certain sector. Overall, there are four topological possibilities:

- Discrete space for voters and parties alike.
- Discrete space for voters and continuous one for parties.
- Continuous space for voters and discrete one for parties.
- Continuous space for voters and parties alike.

The typical treatment uses \( T^1 \). In some studies, voter positions are determined using discrete scales on questionnaires, while party positions are defined as the average of expert placements or perceived party positions (\( T^2 \)). The next type, \( T^3 \), is rather rare, but nevertheless a theoretical possibility. One might think of the policy concerning income taxes: whereas voters can, in principle, consider any positive real number as the optimal rate, parties have to stick to integers, for practical purposes. Finally, when questionnaire data on both voter and party positions is taken using a continuous scale, we have an instance of \( T^4 \).

The modeler can thus choose the particular topology that suites his purposes, given the interpretation of issue positions, and the available data. However this choice obviously has major implications on the share of cases where the two theories give different predictions for voter choice. We note that there has been no systematic research into this area, despite the interwoven problems of model interpretation, data collection, and theory differentiation.

For topology \( T^1 \), we calculated the share of party-voter configurations within all possible ones where 1. both theories give a prediction concerning voter behavior, and 2. the predicted behavior is different i.e. the share of discriminating configurations. Instead of deriving general closed formulas, we decided to do an exhaustive search for a scale size of up to 11 and a maximum of 6 parties. Table 1 shows these results. Overall, even with a scale of 11 options, and 6 parties, the share of discriminating configurations is below 25%. This has very severe implications on any empirical analysis that aims to discriminate between the two theories of
Table 1: The share of discriminating voter-party combinations, %

<table>
<thead>
<tr>
<th>Scale size</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.0</td>
<td>3.2</td>
<td>5.8</td>
<td>7.7</td>
<td>9.0</td>
</tr>
<tr>
<td>3</td>
<td>0.0</td>
<td>5.8</td>
<td>10.0</td>
<td>13.2</td>
<td>15.6</td>
</tr>
<tr>
<td>4</td>
<td>0.0</td>
<td>6.9</td>
<td>12.0</td>
<td>16.0</td>
<td>19.2</td>
</tr>
<tr>
<td>5</td>
<td>0.0</td>
<td>6.9</td>
<td>12.5</td>
<td>17.1</td>
<td>20.8</td>
</tr>
<tr>
<td>6</td>
<td>0.0</td>
<td>6.2</td>
<td>12.2</td>
<td>17.1</td>
<td>21.1</td>
</tr>
</tbody>
</table>

spatial voting using a $T_1$-type topology.\textsuperscript{4}

Since the European Election Studies provides a discrete scale for identifying voter positions, and we wanted to extend the maximize the share of discriminating positions, our work was executed using $T_2$, where a discrete voter topology is combined with continuous party positioning. Obviously, this setup allows for a larger share of discriminating configurations. This is mainly due to the fact that proximity voters will not face ties – i.e. when at least two parties are at the same ideological distance from them – anymore. Moreover, the finer-grained party positions can increase the discriminating intervals, but can never decrease them.

In our data, for 25 out of the 27 countries, there was an increase in the share of voters whose behavior is discriminated by two theories, when using rounded the unrounded mean of perceived party placements instead of rounded ones, whereas in the other two countries the share remained unchanged. Overall, the share of voters of interest when moving from $T_1$ to $T_2$ increased from 8.7\% to 27.6\%, a three-fold increase. Therefore, we used the (unrounded) mean of perceived party placements for distributing the parties on the $[0, 10]$ interval.

Suppose that no two parties occupy the same position, moreover, that no two parties are at the same distance from any of the discrete positions on the interval.\textsuperscript{5} For this topology, the following should be noted:

- Proximity theory makes a vote prediction for all voters.
- Directional theory makes no prediction for voters positioned in the middle of the spectrum (at position 5), but – whenever there is at least one party on each side of the spectrum.\textsuperscript{6}
- The two theories make a different prediction for those voters who are between the midpoint and the average of the two most extreme parties in either direction, whenever

\textsuperscript{4}Note that the share of discriminating configurations does not converge to one as either the number of parties or scale size goes to infinity, just when they both do. Moreover, the number of parties cannot converge much faster than the size of the scale, otherwise, parties would fall on the same spots on the scale, rendering proximity theory impotent for predicting anything for most voters.

\textsuperscript{5}This is not only true for our data, but is a 0-probability event if the party positions are drawn from a distribution with a continuous cumulative distribution function.

\textsuperscript{6}According to the utility model of directional theory, voters who can not find a party on their side of the spectrum would gain negative utility by voting for anyone, which – given that abstaining from voting is viable in most democracies – should lead them to not going to the polls.
there are at least two parties on each side of the spectrum.\footnote{This also holds for our data, except in the case of Malta, where there is only one party positioned right of the middle.}

Stating the last point more formally, suppose there are \( n \) parties, and their positions on the Left-Right Axis are denoted by \( p_i \in [0, 10] \) with \( i \in \{1, 2, \ldots, n\} \), the middle of the spectrum being represented by the position 5. The indices can be chosen such that \( 0 \leq p_1 \leq p_2, \ldots, p_{n-1} \leq p_n \leq 10 \). Suppose \( p_2 < 5 \) and \( p_{n-1} > 5 \), and that the voter is positioned at \( v \in \{1, 2, \ldots, 10\} \) on the discrete scale, but not in the middle, \( v \neq 5 \).

**Theorem 1.** If there is at least one party on each side of the spectrum and the voter is not positioned in the middle of the spectrum, directional and proximity theory make different vote predictions whenever

\[
\frac{p_1 + p_2}{2} < v < \frac{p_{n-1} + p_n}{2}
\]

**Theorem 2.** If there are at least two parties on each side, the converse also holds; thus, the predicted vote is different if and only if

\[
\frac{p_1 + p_2}{2} < v < \frac{p_{n-1} + p_n}{2}
\]

Since for most of our data we can employ Theorem 2., it is hardly surprising that, despite the fact that topology \( T_2 \) allows for more comparability than \( T_1 \), the average share of voters in discriminating positions across countries is still just 27.6%; and any more refined data, e.g. using topology \( T_4 \) could weaken the possibilities of interpretation for the model, but would only add little in terms of discriminating voter shares, namely, does voters placed on the central position of 5 who would presumably move left or right from the middle.

## 4 Hypotheses: Party-system polarization

Our country specific predictor of the (relative) success or failure of the two spatial issue voting theories is polarization. We mainly focus on party-system polarization, but in order to replicate the results by Pardos-Prado and Dinas (2010) we also specify models that include the electoral polarization, expressed by the variance of voters on the left-right scale in a given country.

The polarization measure for a party system with \( K \) number of parties is:

\[
Polarization = \sum_{i=1}^{K} w_i |LR_i - LR|
\]

where:

\[
LR = \text{the weighted mean of the parties’ placement on the left-right scale}
\]

\[
LR_i = \text{the position of the party } i \text{ on the left-right scale}
\]

\[
W_i = \text{the weight attached to party } i, \text{ given by its relative vote share at the time of the election observed}
\]
We use the polarization measures as in Vegetti (2011). The party placement scores were calculated based on the mean perceived left-right position of each party in the EES 2009. Although this survey concerns the EP elections, both the party positions of the left-right scale and the vote intention refer to the national political arena. Furthermore, the party weights reflect the vote share of each party based on the previous elections. One last aspect to mention is that this score includes only relevant parties: parties running in all the country and parties represented in the national Parliament at the time of the European Election 2009 (for exceptions see Vegetti (2011)).

In the case of an unconstrained approach that does not differentiate between cases where the two theories offer different predictions, the accuracy of the directional and the proximity should be influenced in the same way by party-system or electoral polarization. A higher degree of party polarization raises the salience of the given issue (in our case the left-right dimension). In these cases voters become more self-conscious about the political competition and the different competitors on the issue. Moreover, higher polarization also indicates clearer divisions or differentiation between the competing parties on the given dimension. Jointly, these two aspects create a more fertile terrain for spatial issue voting in general (Vegetti, 2011). Yet again, in these cases we cannot decide which theory if better in describing the choice of the preferred party, because in a substantial share of cases they would predict the same party. These overlapping predictions would produce the result that the same effect is found by polarization, and hence our first hypothesis:

**Hypothesis 1.** *In the unconstrained scenario, both the proximity and the directional theory’s vote intention prediction are affected positively by increasing party-system polarization.*

However, party-system polarization also reflects a degree of conflictual politics (Pardos-Prado and Dinas, 2010). This is even more emphasized if we think about the formula we use for polarization. If the given party is more relevant (bigger parties) it will have a higher impact on the overall polarization score as it distances itself from the middle of the scale. Thus, in those countries where we have higher levels of party system polarization, it is also expected that the more important parties deviate more from the middle of the scale. These parties will be relevant players in the political competition, and they will also be considered as valid choices by voters. Furthermore, in more polarized party-systems we will find that people are more reluctant to switch sides in voting (Vegetti, 2011). Although the previous research tackled this problem on the aggregate level, we can extend the implications of these results to the individual level. Given that most of the discriminating cases are in the middle section of the left-right self-placement, we can also see that these are those voters for whom the proximity theory might suggest a close party that is still on the other side of the neutral point. But if party-system polarization is...
associated with less side-switching, this will imply that the proximity prediction will be more often wrong.

Similarly, a recent attempt to answer why some people use directional and others proximity voting (Collins, 2011) argues that individuals “transform” or reduce the perceived continuous policy space into categories, putting each candidate into one category. Then, they have proximity type preferences over categories (not necessarily candidates) and they choose the closest category to their ideal category (Collins, 2011). Thus, if the policy space is divided – by the voter’s cognitive process – into many categories, it is more probable that the voter will be a proximilist. However, if a voter uses only two categories that closely resemble the two sides of the policy space (as measured in surveys for example), the voter will be a directionalist (Collins, 2011). Based on the how the party-system polarization index is operationalized and its divisive nature, we argue that in more polarized systems we can expect people to consider the political arena in less categories, these reflecting the divisions between left and right. En sum:

**Hypothesis 2.** When discriminating scenarios considered, the proximity theory’s vote intention prediction should be less accurate in highly polarized party-systems, whereas the directional theory’s vote intention prediction is positively affected by increasing party-system polarization.

Although Pardos-Prado and Dinas (2010) make a differentiation between electoral and party-system polarization, we cannot fully test this differentiation on our data. This is due to the simple fact that for the 27 countries included in our analysis, the correlation between party-system polarization and electoral polarization was extremely high ($r = 0.73$) for 2009. In light of this empirical constellation, even if we would be able to derive specific hypotheses, we cannot expect significantly diverging results. Nevertheless, we specify models with electoral polarization as country level predictors, but we expect that the effects will be similar in magnitude and in significance. We proceed with our empirical analysis in the next section.

## 5 Empirical analysis

In order to comparatively evaluate the accuracy of the proximity and the directional theory we use the 2009 European Election Studies. Including 27 European multi-party systems, these data present several advantages that facilitate both gaging cross-country differences and deciding in heads-up predictions of the two spatial voting theories. For a more general setup, we will employ the following notation: $J$ reflects the total number of countries, in our case 27, whereas $n$ is the total number of individual observations in our data.

As in previous research, we assume that the left-right political dimension captures the most essential parts of ideology both on the individual and on the party level. Our data contains the classic 11-point left-right political scale. Also, respondents were asked to place the parties from their country on the same 11-point left-right scale. We follow previous work in order to avoid the problem of projection (Macdonald and Rabinowitz, 1997; MacDonald et al., 1997),
and hence compute for each party in each country an average perceived left-right position. This party specific variable also ranges from 0 to 10, but it can take up non-integer values. With the assumption that voter positions (as asked in the survey) are discrete, but party positions are continuous, and given the voter distribution on the left-right scale we compute for each individual position three quantities: (1) what party preference would the directional theory predict ($\text{Part.Pred.Directional}$), (2) what party preference would the proximity theory predict ($\text{Part.Pred.Proximity}$), and (3) what is the proportion of the cases in which the two theories offer distinct predictions for each country. Based on the country of observation and the individual’s left-right self-placement, we augment the individual level data with the $\text{Part.Pred.Proximity}$ and $\text{Part.Pred.Directional}$. For each individual, we compute three dichotomous variables:

$$\text{Directional} = \begin{cases} 1 & \text{if } \text{Part.Pred.Directional} = \text{Part.Vote.Intention} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Proximity} = \begin{cases} 1 & \text{if } \text{Part.Pred.Proximity} = \text{Part.Vote.Intention} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Discriminate} = \begin{cases} 0 & \text{if } \text{Part.Pred.Proximity} = \text{Part.Pred.Directional} \\ 1 & \text{otherwise} \end{cases}$$

As implemented here, this is the most conservative test of the predictive power associated with each of these two theories. We only assess whether the spatial theory predicted first party preference, and we are not benchmarking the theory based on the whole set of ranked preferences predicted. Moreover, we penalize the directional theory for not offering party preference predictions for individuals on the middle point of the left-right political scale. As there are no predictions associated with the directional theory for a voter in the middle position, the $\text{Directional}$ dichotomous variable will always be 0 if $\text{Left.Right}_{\text{voter},ij} = 5$. As depicted in the analytical model and displayed in Figure 1, most of the discriminant predictions stem from the moderate individual cases, whereas the predictions on the more extreme individual positions tend to converge towards the most extreme party on a given side of the left-right continuum.

A first step in the empirical analysis is a careful look at the descriptive results presented in Table 2. The second column displays the percentage of individuals in each country for whom either the proximity or the directional theory correctly predicted their vote intention. Although these statistics are not of primary interest in our analysis, they offer a snapshot about the extent to which people use spatial voting strategies, excluding other theoretical variations, such as the discounting theory. We observe substantial cross-country variation, spatial theories being least correct in Slovenia (16.86%) and overwhelmingly accurate in Malta (71.19%). This country level heterogeneity can stem from interconnected reasons such as the different distributions of voters or on the left-right scale, or other party system characteristics. Furthermore, this offers

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9These percentages also include cases where both theories had a correct prediction.
### Table 2: Descriptive results

<table>
<thead>
<tr>
<th>Country</th>
<th>% Overall Spatial voting</th>
<th>% Overall Proximity</th>
<th>Directional Proximity</th>
<th>Directional if diff. predictions</th>
<th>Polarization [range of parties]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>22.05% (140)</td>
<td>19.21% (122)</td>
<td>7.09% (45)</td>
<td>84.07% (95)</td>
<td>15.93% (18)</td>
</tr>
<tr>
<td>BE</td>
<td>19.18% (122)</td>
<td>18.71% (119)</td>
<td>3.93% (25)</td>
<td>97.00% (97)</td>
<td>3.00% (3)</td>
</tr>
<tr>
<td>BG</td>
<td>42.24% (234)</td>
<td>37.73% (209)</td>
<td>32.31% (179)</td>
<td>68.75% (55)</td>
<td>31.25% (25)</td>
</tr>
<tr>
<td>CYP</td>
<td>67.87% (469)</td>
<td>57.02% (394)</td>
<td>62.23% (430)</td>
<td>34.21% (39)</td>
<td>65.79% (75)</td>
</tr>
<tr>
<td>CZ</td>
<td>56.37% (345)</td>
<td>46.57% (285)</td>
<td>45.10% (276)</td>
<td>53.49% (69)</td>
<td>46.51% (60)</td>
</tr>
<tr>
<td>DK</td>
<td>22.12% (186)</td>
<td>20.21% (170)</td>
<td>6.78% (57)</td>
<td>88.97% (129)</td>
<td>11.03% (16)</td>
</tr>
<tr>
<td>EE</td>
<td>34.87% (181)</td>
<td>33.72% (175)</td>
<td>26.01% (135)</td>
<td>88.46% (46)</td>
<td>11.54% (6)</td>
</tr>
<tr>
<td>FIN</td>
<td>42.59% (299)</td>
<td>36.04% (253)</td>
<td>31.34% (220)</td>
<td>63.20% (79)</td>
<td>36.80% (46)</td>
</tr>
<tr>
<td>FR</td>
<td>21.46% (109)</td>
<td>19.49% (99)</td>
<td>5.12% (26)</td>
<td>89.25% (83)</td>
<td>10.75% (10)</td>
</tr>
<tr>
<td>GER</td>
<td>46.53% (315)</td>
<td>38.11% (258)</td>
<td>29.84% (202)</td>
<td>66.47% (113)</td>
<td>33.53% (57)</td>
</tr>
<tr>
<td>GRE</td>
<td>39.64% (266)</td>
<td>36.81% (247)</td>
<td>12.37% (83)</td>
<td>90.59% (183)</td>
<td>9.41% (19)</td>
</tr>
<tr>
<td>HUN</td>
<td>25.49% (157)</td>
<td>21.59% (133)</td>
<td>10.39% (64)</td>
<td>79.49% (93)</td>
<td>20.51% (24)</td>
</tr>
<tr>
<td>IRE</td>
<td>31.79% (213)</td>
<td>31.49% (211)</td>
<td>23.28% (156)</td>
<td>96.61% (57)</td>
<td>3.39% (2)</td>
</tr>
<tr>
<td>ITA</td>
<td>26.63% (147)</td>
<td>26.27% (145)</td>
<td>3.62% (20)</td>
<td>98.45% (127)</td>
<td>1.55% (2)</td>
</tr>
<tr>
<td>LAT</td>
<td>18.69% (91)</td>
<td>16.43% (80)</td>
<td>7.19% (35)</td>
<td>83.58% (56)</td>
<td>16.42% (11)</td>
</tr>
<tr>
<td>ALT</td>
<td>54.29% (171)</td>
<td>48.89% (154)</td>
<td>53.02% (167)</td>
<td>19.05% (4)</td>
<td>80.95% (17)</td>
</tr>
<tr>
<td>LUX</td>
<td>33.76% (210)</td>
<td>27.01% (168)</td>
<td>27.65% (172)</td>
<td>47.50% (38)</td>
<td>52.50% (42)</td>
</tr>
<tr>
<td>MT</td>
<td>71.19% (257)</td>
<td>65.37% (236)</td>
<td>71.19% (257)</td>
<td>0.00% (0)</td>
<td>100.00% (21)</td>
</tr>
<tr>
<td>NL</td>
<td>21.11% (167)</td>
<td>15.55% (123)</td>
<td>13.65% (108)</td>
<td>57.28% (59)</td>
<td>42.72% (44)</td>
</tr>
<tr>
<td>POL</td>
<td>45.81% (246)</td>
<td>40.22% (216)</td>
<td>29.42% (158)</td>
<td>74.58% (88)</td>
<td>25.42% (30)</td>
</tr>
<tr>
<td>PT</td>
<td>46.57% (285)</td>
<td>40.62% (249)</td>
<td>12.09% (74)</td>
<td>85.43% (211)</td>
<td>14.57% (36)</td>
</tr>
<tr>
<td>RO</td>
<td>22.69% (108)</td>
<td>20.80% (99)</td>
<td>21.43% (102)</td>
<td>40.00% (6)</td>
<td>60.00% (9)</td>
</tr>
<tr>
<td>SLO</td>
<td>16.86% (114)</td>
<td>13.46% (91)</td>
<td>11.09% (75)</td>
<td>62.90% (39)</td>
<td>37.10% (23)</td>
</tr>
<tr>
<td>SPA</td>
<td>39.14% (263)</td>
<td>31.40% (211)</td>
<td>38.39% (258)</td>
<td>8.77% (5)</td>
<td>91.23% (52)</td>
</tr>
<tr>
<td>SVK</td>
<td>25.69% (159)</td>
<td>23.59% (146)</td>
<td>17.61% (109)</td>
<td>79.37% (50)</td>
<td>20.63% (13)</td>
</tr>
<tr>
<td>SWE</td>
<td>47.31% (370)</td>
<td>36.32% (284)</td>
<td>37.60% (294)</td>
<td>46.91% (76)</td>
<td>53.09% (86)</td>
</tr>
<tr>
<td>UK</td>
<td>39.04% (253)</td>
<td>32.10% (208)</td>
<td>33.02% (214)</td>
<td>46.43% (39)</td>
<td>53.57% (45)</td>
</tr>
</tbody>
</table>

Note: Percentages are *valid percentages*, calculated after excluding the missing values. Counts are presented in parentheses (Data: EES 2009).
Figure 1: EU 27: Different predictions of the two theories depending on the party positions and the individual left-right self-placement, and based on the 2009 EES.

a less daunting picture about the performance of issue voting theories in Europe, suggesting that this approach towards voter preferences still has a relatively large explanatory power. Also, by looking at the overall success of spatial voting and party-system polarization, we can already establish a relationship between them.

If we turn our attention to the overall percentages of correct vote intention predictions of the two theories, we can see that three types of scenarios. We have countries — such as Austria, Bulgaria, Belgium, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Poland, Portugal, Slovakia — where the proximity theory has a clear edge on the directional theory. We also have a set of countries — Czech-Republic, Luxembourg, Netherlands, Romania, Slovenia, Sweden, UK — where the two theories perform very similar to each other. Finally, we have a relatively small group of countries where the directional model is clearly a better predictor of vote intention: Cyprus, Malta, Lithuania, Spain. In the direct comparisons when there are different predictions and some spatial voting is going on, for the clear cases of proximity or directional winners the relationship between the performance of the two theories is reinforced. The magnitude of the change in the differences is related to how the number of cases where we can differentiate between the predictions of the two theories. For the second group of countries with small difference between the two theories’ prediction accuracy we see that in the direct comparisons four of them show directional superiority and three of the a proximity win. Furthermore, for all these cases the differences will show a clear winner or looser. Overall, we see substantial cross-country variation, with a relative win for the proximity theory. Nevertheless, a multivariate account is needed to identify and evaluate the systemic differences that affect the performance of these theories.

In multivariate terms, we specified hierarchical models in which the n individuals are nested
in \( J \) countries\(^{10}\). For all specifications, we have \( K \) individual level predictors that vary across countries, and \( R \) individual predictors that are held constant across countries. In addition, there are \( L \) country specific predictors. For all our models, \( K = 2 \), containing the intercept and the slope for the left-right self-placement. Given the high dependence of the two spatial theories on left-right self-placement’s interaction with the supply side in each country, we let this predictor vary across countries. \( R \) will be 5 in all our models, reflecting the set of included control variables. We include a political information proxy and the intensity of feeling close to a party, because Tomz and Houweling (2008) found a relationship between these variables and the distribution of proximity and directional voting. Additionally, we include a control for the respondents’ age, gender, and level of political interest. \( L \) is always 1, because we have only one country level predictor in one given model, being a predictor of the intercept (no cross-level interaction). For each dependent variable and/or subsample we specify a model with party-system polarization as a second level predictor, and one with the electoral polarization reflected by the voter self-placement variance in country \( j \). All predictors included in these models were grand mean centered, the models supplying a meaningful intercept.

The general specification that will be also employed in subsequent analyses is:

\[
y_i \approx \mathcal{N}(X_i^0 \beta^0 + X_i B_{j[i]}, \sigma_v^2), \text{ for } i = 1, ..., n
\]
\[
B_j \approx \mathcal{N}(U_j G, \Sigma_B), \text{ for } j = 1, ..., J
\]

where \( X^0 \) is the \( n \times R \) matrix of individual predictors and \( \beta^0 \) is the vector of their unmodeled regression coefficients. \( X \) is the \( n \times K \) matrix of individual predictors that have coefficients varying by groups (intercept included). \( B \) is the \( J \times K \) matrix of regression coefficients. \( U \) is the \( J \times L \) matrix of group level predictors (in our case it is only a vector, \( L = 1 \)) and \( G \) is the \( L \times K \) matrix of coefficients for the group level regression (again, in our case this is a vector, \( L = 1 \)). \( \Sigma_B \) is the covariance of the varying intercepts and slopes. We allowed all our models to pick up on a possible non-linear effect of the second level predictors, thus \( G \) contains multiple local coefficient values for the group level regression. Hence, we will not report an exact or average coefficient for our second level predictor; instead we will plot the effect accordingly\(^{11}\). Given the nature of our dichotomous dependent variables, we used a logit link function.

Going through our results we will solely focus on the effect of party-system and electoral polarization on the success or failure of these two theories. We report full results in the Appendix. When our dependent variable is spatial voting — meaning that at least one of the two theories or both were correct — we find a strong positive effect associated with increasing party system polarization (Figure 2). This effect is present if we model the directional and the proximity theory separately. In the case of the proximity theory the increase in the predicted probability is smaller (slope not that steep) and the starting point in low polarization systems is much higher

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\(^{10}\) All notation and model specification follows Gelman and Hill (2006)

\(^{11}\) We specified models with penalized regression splines (basis being cubic regression spline) and automatic knot selection.
Figure 2: Party-system polarization as determinant of the probability of spatial voting strategy, directional voting, and proximity voting (Full sample). Dashed lines: 95% confidence intervals.

than the one for the directional theory. This clearly reflects our descriptive interpretation that the proximity logic is more frequent on average, but both of these theories gain in predictive power as party-system polarization increases. We find sufficient empirical support for our first hypothesis ($H_1$), suggesting that spatial voting overall is a better predictor of vote intention in more countries with higher party levels of party polarization. As further hypothesized, this is due to the substantive amount of cases where both of these theories are right or wrong in a similar manner. Furthermore, the same effect can be found when our second level predictor is electoral polarization (Figure 3). However, in this case the confidence intervals a wider, thus it is hard to conclude that these effects are indeed different from 0.

The next step in our analysis is to subset our full sample and specify the same models for the cases where the two theories predict different first party preference. In this case, running an overall spatial model is meaningless. We specify a model in which directional voting is the dependent variable. However, it should be noted that in this case, if the dependent variable is 1, we know that the proximity theory’s prediction was wrong. Also, when the dependent variable is 0, we are in the cases where the directional theory’s prediction was wrong, but this does not necessarily mean that the proximity theory was accurate. It could also be the case that both of these theories missed the prediction of vote intention. The same logic applies when our dependent variable is the proximity vote intention prediction’s accuracy. These models will give us a rough indication of how these theories performance changes across settings, in a scenario where they offer distinct predictions.

As displayed in Figure 4, we see that the directional theory performs much better in more polarized systems than in the ones scoring low on this indicator, and this effect is statistically significant. However, proximity theory is not influenced at all by the changing levels of party
Figure 3: Electoral polarization as determinant of the probability of spatial voting strategy, directional voting, and proximity voting (Full sample). Dashed lines: 95% confidence intervals.

Figure 4: Party-system polarization as determinant of the probability directional voting and proximity voting, when discriminant predictions apply. Dashed lines: 95% confidence intervals.
system polarization. First off, these results suggest that when we constrain our analysis on the discriminant prediction scenarios, only the directional theory gains in more polarized systems. Hence, we have now the empirical support to our claim that suggested that the better performance of proximity theory in polarized systems was driven mostly by those predictions that were identical to the directional theory’s predictions. Most of our scenarios with discriminant predictions stem from the moderate positions on the left-right self-placement. This implies that in highly polarized party-systems, the major aspect is the more conflictual (or side-based) view of politics, and this enhances the performance of the directional theory. Thus, even if spatial voting theories benefit from the induced salience and issue considerations when deciding whom to vote for in polarized systems, when we have the possibility to discriminate between the predictions of the two spatial voting theories, the conflictual nature of political competition overrides this effect, influencing only the directional theory’s capability to accurately predict the vote intention of moderate individuals.

Figure 5: Electoral polarization as determinant of the probability directional voting and proximity voting, when discriminant predictions apply. Dashed lines: 95% confidence intervals.

The picture is slightly different when it comes to electoral polarization (see Figure 6). The effects are very similar, but now there is less uncertainty associated with our estimate of polarization when the dependent variable is proximity voting. This points out that it is not just the directional theory gaining, but actually the proximity theory loosing from its predictive power when the electorate is more polarized. This result replicates the findings presented by Pardos-Prado and Dinas (2010), but also exhibits additional nuances. On one hand, the directional theory is also influenced by electoral polarization, even in the cases of discriminant predictions. On the other hand, the divisive role of polarization is more emphasized when it comes to electoral polarization than in the case of party-system polarization. However, our last question still unanswered: what happens if there is clearly some sort of spatial issue voting at play and the theories predict different first party preferences?
To answer our last question, we subset the full sample to include only the scenarios where the two theories offer distinct predictions, and one of them is right in predicting the vote intention. In this case it is sufficient to specify the model only for one of the two dependent variables, as they are mutually exclusive. Given that we know that one of the theories was right and that they offer distinct predictions, we also know that if the directional theory was accurate, the proximity theory mis-predicted vote intention (and vice-versa). For both second level predictors we find a very strong and statistically significant effect on the accuracy of the directional (and proximity) voting. We see that in more polarized systems, the directional theory overtakes the proximity theory in prediction accuracy. It also has to be noted that a relatively high level of polarization is needed for the directional theory in order to overtake the proximity theory in the direct match-ups. Only four countries in our sample have the level of polarization necessary for the directional theory to reach the 0.5 level in predicted probability. Otherwise, the proximity theory slightly loses its edge, but will still remain the dominant spatial issue voting mechanism to describe the vote intention of individuals in multi-party systems. Nevertheless, as expected, we see again that the possible conflictual aspect associated with increased polarization benefits the directional theory.

6 Concluding remarks

The ongoing debate about various forms of issue voting theories marks our understanding of voter preferences, but also of the manner in which party competition should evolve. In this sense, distinguishing between the success of the directional and the success of the proximity theory is essential. However, this is a daunting task, especially when we attempt to offer a
comparative benchmark of these theories across countries.

In our preliminary analysis, we pinpointed the importance of a conscious choice of scale topology for any attempted comparison of directional and proximity theory. Given the very low number of discriminating configurations when both parties and voters are placed on a discrete scale, any comparative analysis is well advised to make use of continuous topologies. However, even using such scales, introducing regions of acceptability could wash away chances of finding discriminatory intervals, given the low number of parties in supply.

We analyzed how well these two theories perform in predicting the vote intention of individuals. Hence, we compared the first party choice predicted by these theories and the expressed vote intention if national elections would be held in 27 European countries. To make sure that we can directly compare the two theories against each other, we also offered an extended topology of comparison, discussing the assumptions and the possible outcome in terms of discriminating positions in multi-party systems.

First and foremost, the proximity model seems to be more frequent in the 27 European countries, with only a few exceptions. Also, when focusing on the unconstrained scenarios (not necessarily different predictions by the two theories), we find strong empirical evidence that the accuracy of spatial voting increases with party-system polarization. This positive effect can be found both for the directional and for the proximity theory, but it is clear that this evolution is driven by the substantive amount of overlapping predictions between the two theories. When looking at the discriminant cases, the directional theory becomes the clear beneficiary of an increased party-system polarization, while the proximity theory is not strongly affected by it. Finally, if we know that one of the theories is right and we focus only on the cases where the predictions are different, the directional theory becomes increasingly accurate as polarization increases, while the proximity model looses from its predictive power. However, we must note that the level of party-system polarization has to be relatively high (over the 75\% percentile) in order for the directional model to overtake the proximity model.

Overall, we find overwhelming empirical evidence that party-system characteristics influence the success or failure of issue voting. Also, in order to correctly grasp the nature of these relationships, we need to have a clear account of what these theories predict and when can we differentiate between them. Without this necessary step we cannot conclude anything about the direct match-up between the spatial issue voting theories.
### Appendix: Multilevel model results, party-system polarization as second level predictor

<table>
<thead>
<tr>
<th>Fixed effects</th>
<th>Spatial voting</th>
<th>Directional</th>
<th>Proximity</th>
<th>Discriminant predictions sample</th>
<th>Spatial voting correct and discriminant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Full sample models</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fixed effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>$-0.52$ (0.12)**</td>
<td>$-1.51$ (0.22)**</td>
<td>$-0.83$ (0.11)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left-Right</td>
<td>$0.12$ (0.04)**</td>
<td>$0.19$ (0.06)**</td>
<td>$0.12$ (0.04)**</td>
<td>$0.57$ (0.28)*</td>
<td>$0.08$ (0.17)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>$0.21$ (0.09)*</td>
<td>$0.48$ (0.12)**</td>
<td>$0.13$ (0.10)</td>
<td>$0.63$ (0.26)*</td>
<td>$0.02$ (0.15)</td>
</tr>
<tr>
<td>Political Inform.</td>
<td>$0.31$ (0.11)**</td>
<td>$0.16$ (0.14)</td>
<td>$0.23$ (0.11)*</td>
<td>$0.05$ (0.29)</td>
<td>$0.28$ (0.18)</td>
</tr>
<tr>
<td>Female</td>
<td>$-0.09$ (0.04)*</td>
<td>$-0.09$ (0.06)</td>
<td>$-0.08$ (0.05)</td>
<td>$-0.01$ (0.13)</td>
<td>$1E-3$ (0.08)</td>
</tr>
<tr>
<td>Age</td>
<td>$6E-4$ (1$E-3$)</td>
<td>$1E-4$ (2$E-3$)</td>
<td>$2E-3$ (1$E-3$)</td>
<td>$-9E-3$ (4$E-3$)*</td>
<td>$3E-3$ (2E-3)</td>
</tr>
<tr>
<td>Party closeness</td>
<td>$-0.16$ (0.11)</td>
<td>$0.08$ (0.14)</td>
<td>$0.13$ (0.11)</td>
<td>$-0.67$ (0.30)*</td>
<td>$-0.02$ (0.18)</td>
</tr>
<tr>
<td><strong>Random effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (SD)</td>
<td>$0.59$</td>
<td>$1.12$</td>
<td>$0.56$</td>
<td>$0.97$</td>
<td>$0.93$</td>
</tr>
<tr>
<td>Left-Right (SD)</td>
<td>$0.23$</td>
<td>$0.34$</td>
<td>$0.24$</td>
<td>$1.34$</td>
<td>$0.85$</td>
</tr>
<tr>
<td>Residual</td>
<td>$1.00$</td>
<td>$1.07$</td>
<td>$1.01$</td>
<td>$1.14$</td>
<td>$0.98$</td>
</tr>
<tr>
<td>LogLik</td>
<td>$-20230$</td>
<td>$-23538$</td>
<td>$-20577$</td>
<td>$-13645$</td>
<td>$-10658$</td>
</tr>
<tr>
<td>AIC</td>
<td>$40486$</td>
<td>$47103$</td>
<td>$41180$</td>
<td>$27316$</td>
<td>$21343$</td>
</tr>
</tbody>
</table>

Values marked with ***, **, * signify p-levels lower than 0.001, 0.01 and 0.05, respectively.
References


Vegetti, F. (2011). When it’s hard to change, party system polarization and the potential vote shifting in europe. In *ECPR General Conference Reykjavik*.
