Projection and Bias. A Simulation Study

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Abstract
The Downsian proximity and the Rabinowitz/Macdonald directional model of voting assume that relations between voters and parties in a political space matter for vote choice. The proximity camp tends to favor subjective, voter-specific party placements, while the directional camp favors “objective”, unified party placements. Overall, supporters of directional voting are concerned that voter-specific party placements may be biased due to projection effects. This implies that individuals, for whatever reason, may locate parties they like closer to their personal ideal point (assimilation), while pushing parties they oppose further away (contrast).

This paper provides two specific contributions: First, building on data from the European Election Studies series, we demonstrate that projection effects are both statistically significant and substantively meaningful. Our analysis introduces a novel measurement model that is suitable for the analysis of multiparty competition and reveals that, contrary to the published record, contrast effects are larger than assimilation effects. Secondly, we show that projection effects effectively bias empirical assessments of proximity and directional voting. We apply counterfactual simulation studies to illustrate that individual-specific party placements with a real-world magnitude of projection effects do indeed favor empirical estimates of proximity over directional voting.

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1 Introduction

The spatial model of voting, as pioneered by Downs (1957), is often considered the workhorse of modern electoral studies. The controversy among supporters of proximity and directional voting has particularly dominated discussions about spatial models in the last two decades. Downsian proximity models posit that vote choice is determined by ideological and programmatic proximity and distance (cf., for instance, Downs, 1957; Westholm, 1997). In contrast, directional voting models perceive political issues as binary. Voters tend to support candidates or parties that are “on their side” with sufficient intensity (cf. Macdonald et al., 1991, 1995, 1998, 2001a; Rabinowitz and Macdonald, 1989, 2007).

Directional and proximity voting clearly offer opposing theoretical perspectives. Both camps tend to opt for empirical measurement and statistical modeling strategies which systematically “help” to justify their core ideas. Potentially the most controversial issue is the measurement of party positions. Voter-specific party placements are said to increase confidence in proximity voting and are thus preferred by the proximity camp. Fixed party positions supposedly help to increase empirical estimates of directional voting and are therefore emphatically preferred by the directional camp. Supporters of directional voting are primarily concerned that voter-specific party placements may be biased due to projection effects. This implies that individuals, for whatever reason may locate parties they like closer to their personal ideal point (henceforth: assimilation), while they push parties they oppose further away (henceforth: contrast).1

Projection bias indicates that policy utilities are contaminated with non-spatial considerations so that the importance of proximity utilities tends to be inflated and the significance of directional and non-policy utilities tends to be biased downward. While preceding analyses have compiled robust evidence for the presence of projection effects, applied research has often been limited to U.S. elections and places a strong emphasis on two-party competition and the personal vote of congressional or presidential candidates (cf. Granberg et al., 1988; Judd et al., 1983; Krosnick, 1990; Miller et al., 1986; Rahn et al., 1994). Imminent studies therefore almost exclusively focus on the binary distinction between one preferred and one contending party (notable exceptions are provided by Granberg and Brown, 1992; Granberg and Holmberg, 1986; Markowski and Tucker, 2007; Merrill et al., 2001).

This paper will provide three significant insights. The first contribution involves the formal definition and operationalization of a measurement model that helps to identify assimilation and contrast in a meaningful and valid way and that moves beyond binary competition. The second contribution relates to an empirical identification of the presence and the magnitude of projection effects across a number of different contexts. The third contribution builds upon the previous methods and empirical insights and evaluates, by statistical simulation, whether and to what degree assimilation and contrast tend to bias estimates of the strength of proximity in comparison with directional voting.

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1Rabinowitz and Macdonald refer to this as “rationalization”. In contrast, we will stick to the term projection effects, composed of assimilation and contrast, throughout this text. This terminology has previously been utilized by Merrill et al. (2001) and Adams et al. (2005) and it dates back to the seminal works in cognitive psychology (cf. Heider, 1958; Sherif and Hovland, 1961; Wedell et al., 2007).
This paper addresses these issues in four inter-related consecutive steps. We begin with a brief overview of the theoretical and statistical issues that underlie the debates between the proximity and directional voting camps (section 2). The subsequent chapter turns to what is potentially the core feature of these debates - the emergence of potential projection effects, and proposes a measurement model for the differences in subjective and “objective” party placements (section 3). The empirical analysis provides descriptive evidence that confirms the presence and assesses the magnitude of projection bias in (the national segments of) EP elections (section 4). Having established the presence and the magnitude of assimilation and contrast, we ultimately assess the consequences of this projection bias for the comparative evaluation of proximity and directional models of vote choice (section 5). The final section concludes with some remarks on assimilation and contrast and a word of caution to applied researchers (section 6).

2 Two Perspectives on Vote Choice

This section reviews the controversies at stake and provides a brief summary of the substantive and methodological issues related to proximity and directional voting. The potential bias in estimation procedures which have been designed to demonstrate the “superiority” of a particular approach will be addressed along with what is perhaps the most fundamental issue of whether party locations should be assessed by voter-specific or “objective”, mean placements. In these discussions, a particular emphasis is placed on the strategies to evaluate and compare the claims made by both camps.

2.1 The Theoretical Models

In Downsian proximity voting models, both voters and parties are represented by points within the political space. Everything else being equal, voters evaluate party alternatives by proximity. Thus, a party which is located closely to the voter’s preferences on \( n \) individual dimensions yields a high utility. Turning to vote choice, the principle of utility maximization implies that an individual voter \( v_1 \) prefers the electoral platform that offers him/her the highest utility. Employing the city-block metric, the utility \( U^p \) of party \( P \) for voter \( V \) amounts to:

\[
U^p_i(j) = -||V - P||^2 = - \sum_{a=1}^{n} \alpha_a (v_{i[a]} - p_{j[a]})^2
\]

In contrast, directional voting models do not assume an Euclidean geometry, but instead assume an inner-product geometry of the political space. This implies that programmatic scales are not considered to map specific policy positions on a fine-grained issue scale, but are deemed to indicate strictly binary preferences for or against a specific proposition or the direction of policy change desired by voters and offered by parties. Voters thus tend to prefer candidates or parties which are on “their” side of a neutral or status quo point.

We focus on the most established model of directional voting (the RM Model) which has been suggested, elaborated and vigorously defended in a series of articles by Rabi-
nowitz and Macdonald (1989) and by Macdonald et al. (1991, 1998). From this model’s perspective, spatial positions adopted by voters and parties do not indicate any specific policy content, but merely show the direction and intensity of the desired or advertised policy change. Regarding the \textit{direction}, the RM model defines positive utilities when a voter and a party are on the same side of the neutral or status quo point. Regarding the \textit{intensity}, RM utilities increase when voters and/or parties adopt more extreme positions and hover away from the neutral or status quo point. Theoretically, the most extreme platform will receive the support of any voter who desires policy change in the proposed direction, while less extreme candidates would lose all their support and are, in formal terms, not even expected to vote for themselves.

Formally, RM directional utilities are derived by subtracting the position of the neutral or status quo point from the voter $V$ and party $P$ locations and multiplying both these terms. Furthermore, $\alpha_a$ indicates the dimensions of political competition and $\alpha_a$ indicates their respective salience:

$$U^d_i(j) = VP = \sum_{a=1}^{n} \alpha_a (v_{i[a]} - NP)(p_{j[a]} - NP) \text{ and, with } NP = 0,$$

$$U^d_i(j) = \sum_{a=1}^{n} \alpha_a v_{i[a]} p_{j[a]}$$

As indicated, the pure RM model posits that all supporters who support a specific direction cast their votes for the most extreme party competing. Because this notion is clearly at odds with empirical reality, Rabinowitz and Macdonald (RM) have added the “region of acceptability” which is centered at the neutral or status quo point. The directional logic only applies to parties within this circle, while more extreme parties, located outside this circle, are discounted and penalized by all voters. Unfortunately, RM provide little information on how to accurately construct and theoretically justify the region of acceptability. Furthermore, different voters may regard different parties as either acceptable or “too far out”. Critics have thus argued that this constraint may better be incorporated and modeled as a limitation idiosyncratic to each voter (cf., for instance, Iversen, 1994).

2.2 Towards Empirical Models

Proximity and directional utilities capture the different perspectives a voter may adopt in order to evaluate an identical set of competing candidates or parties. It is often difficult (and at times downright impossible) to unambiguously identify the yardsticks of party evaluation and the ultimate motives of vote choice. These ambiguities in the spatial models have helped to sustain extensive methodological debates among the proximity and directional camps. Debates which, specifically, involve the measurement of core variables and specification issues in empirical models of vote choice (Lewis and King, 1999). The measurement of party positions is clearly the single most consequential and certainly the most contested of these choices.

RM criticize the utilization of voter-specific party placements. From a theoretical perspective, they argue that only the “systemic” party positions, which are independent
from voter perceptions, allow us to meaningfully link voter ideology with party positions and government policy. This implies that meaningful relationships of representation may only be modeled when all voters attribute a single, unified position to a political party, and not when party positions crucially depend on the voters’ perceptions (Rabinowitz and Macdonald, 2007, 408). From an empirical perspective, RM are especially concerned about the potential projection effects contained in voter-specific party placements. When voters assimilate the issue positions of parties they like and contrast the positions of parties they dislike, any proximity utility term, which is based on these biased perceptions, is contaminated with non-policy considerations and therefore biased upwards.

While there is considerable literature on the consequences of projection bias in the classical proximity model, we have only very few ideas about what assimilation and contrast would imply in a directional policy space. Clearly, when candidates or parties are evaluated by spatial proximity, voters should establish consistency by fabricating party positions according to assimilation and contrast. In contrast, when vote choice is governed by directional considerations, voters should establish consistency by means consistent with the directional logic: Parties preferred by the voter could both be placed on the voters’ side of a binary issue dimension and could be moved towards the circle of acceptability in order to yield a high RM directional utility. Parties disliked by the voter could either be moved beyond the region of acceptability or even be shifted towards the opposing side of the binary issue dimension.

The principal argument laid out by RM suffers from a conceptual and theoretical inconsistency: RM suggest that voters evaluate parties using directional logic when they form utilities and cast their vote; at the same time, RM believe that voters turn to proximity logic when they place political parties and in doing so pull parties they like closer to their own positions and push parties they dislike further away. To sum up, RM propose two conflicting logics simultaneously where voters are assumed to misplace parties by proximity and to cast their votes by directional reasons.

To address these theoretical and empirical problems with voter-specific party placements, RM suggest to proxy “true” party positions by computing mean party placements over all survey respondents: \( p_j = \overline{p}_{ij} \). Notwithstanding, this alternative measurement option also comes with serious problems. Clearly, the very notion of single, unified and “objective” party positions is conceptually dubious, and guessing “where a party really stands” indicates somewhat esoteric assumptions and goals.

In the remainder of this contribution, we will skip most of the fundamental and theoretical debates among the proximity and directional camps, and concentrate on two core questions which affect empirical models of vote choice. In the initial step, we explore whether real-world, empirical voters actually assimilate positions of liked parties and contrast positions of disliked parties and, if the answer is yes, we also explore the magnitude of these effects. In the subsequent step, we employ these empirical estimates of projection bias in order to gauge the potential effect of assimilation and contrast on evaluations of proximity and directional utilities in a mixed model of vote choice.
3 Defining Projection Bias

Explanations for projection effects build on consistency perspectives suggesting that individuals try to overcome or work against cognitive dissonance. These explanations stem from dissonance theory (Festinger, 1957), balance theory (Heider, 1958), and congruity theory (Osgood and Tannenbaum, 1955). Individuals experience cognitive inconsistency if two cognitions do not correspond, and the resulting perceived discomfort increases with the level of substantive importance that is attributed to these cognitions. The dualism of assimilation and contrast is thus an established building block in the classical literatures on social psychology and cognition theory. These classical approaches have been later adopted by electoral studies and utilized to cross-check studies on voter perceptions of party ideologies and positions.

In cases of cognitive inconsistency, a voter may review and modify the spatial positions taken by alternative parties in order to bring consistency back in: She might pull positions of political parties she likes for non-spatial reasons closer to her unchanged spatial position, or she might push parties she opposes for non-spatial reasons further away from her unchanged ideal point.

We assess assimilation and contrast in two consecutive steps which involve both a necessary and a sufficient condition: As a necessary condition, we compute the deviation of voter-specific party placements from some baseline measure of “true” positions. Differences in subjective and some kind of “objective” party placements provide a necessary, but not a sufficient condition for projection effects. As a sufficient condition, we relate the calculated utility differences to some measure of party attachment or closeness to political parties. A sufficient condition for the definition of projection bias is provided if voters inflate proximity utilities for candidates or parties they like and deflate utilities for candidates or parties they oppose.

More formally, the necessary condition for the assertion of projection effects is a difference between spatial distances based on subjective and on “objective” party placements. Considering that our unit of analysis is not the location which voter \( i \) assigns to party \( j \), but rather the distance between the voter’s self placement and the assigned spatial position, our unit of analysis may be conveniently noted as the difference of two city-block utilities:

1. Subjective utilities \( U^s \) are given by the negative distance of the voter’s self-placements \( (v_i) \) and subjective, voter-specific party placements \( p_{ij} \) \( \left( U^s = -|v_i - p_{ij}| \right) \).

2. “Objective” utilities \( U^o \) are given by the negative distance of the voter’s self-placements and “objective”, unified party positions \( p_j \) \( \left( U^o = -|v_i - p_j| \right) \).

3. The difference \( \Delta U \) of subjective and “objective” placements is, in turn, given by \( \Delta U = U^s - U^o = -|v_i - p_{ij}| - [-|v_i - p_j|] \).

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2 Regarding the limited perspective of this paper, we cannot present a thorough review of the political psychology literature. Instead, Jon Krosnick (2002) provides an excellent overview on the classical works on cognition theory and their application to the study of voter perceptions and projection effects.
The difference of voter-specific and mean party locations $\Delta U$ yields some initial insight into potential projection effects and helps to discriminate between three different scenarios:

1. $\Delta U = 0$: if $\Delta U$ equals 0, the voter’s assessment of a political party equals the “true” position and projection bias is absent by definition;

2. $\Delta U > 0$: if $\Delta U$ is positive, subjective party placements yield a higher utility than mean party positions and this may indicate projection bias (assimilation);

3. $\Delta U < 0$: if $\Delta U$ is negative, utilities based on “objective” placements exceed subjective ones and this may also point to projection bias (contrast).

Having established the necessary conditions for the definition of projection bias, we now turn to the sufficient criteria. The formal identification of projection bias requires one to relate the utility differences $\Delta U$ to some measure of party attachment and to compute the marginal effect of party identification on utility difference. Let us therefore assume that we obtain an indicator $P$ for the closeness of the voter to any of the parties contesting an election. Let lower values of $P$ indicate that she opposes, and let higher values indicate that she likes this specific party. $P$ may be either a simple dummy variable indicating something like party identification or a more fine-grained, quantitative scale indicating the closeness to a specific party. Whenever there is projection bias, the Downsian utilities based on subjective placements should exceed utilities based on “objective” or mean placements. Thus, utility differences $\Delta U$ and closeness $P$ should be positively correlated with one another: $\beta > 0$: $\Delta U = \beta P + \beta_0$. The corresponding marginal effect is given by $\partial \Delta U / \partial P = \beta$. Projection effects are only present when $\beta > 0$; i.e. the intersection of the upward-sloping predicted effects and zero is the point that separates assimilation ($\Delta U > 0; U_s > U_o$) and contrast ($\Delta U < 0; U_s < U_o$).

4 Describing Projection Bias

The empirical section begins with a brief introduction of the data at hand and reviews the operationalization and measurement of the key variables. Against this background, we then go on to demonstrate empirically that projection effects exist, as defined by RM. Finally, we evaluate the specific magnitude of both assimilation and contrast.

4.1 Data and Data Sources

We present a secondary analysis of the European Election Studies data. With the PIREDEU project, the collaborators aimed at providing a unified infrastructure for the study of electoral politics both in the European Union and its 27 member states. The EES questionnaires explore voter self-placements on the general left-right scale ($v_i \in [0, 10]$) and also requires the respondents to place each party contesting the EP elections on the same general left-right dimension ($p_{i,j} \in [0, 10]$). Subjective utilities are

Further details about the aims, the components, and the methodological foundations of the PIREDEU project can be assessed on the internet at: http://www.piredeu.eu.
based on voter-specific party placements \((U^s = |v_i - p_{ij}|)\) and “objective” utilities are derived as unified party positions from the average of voter-specific party placements \((U^o = |v_i - \bar{p}_{ij}|)\). The utility difference is given by subtracting the “objective” utilities from the subjective ones: \(\Delta U = |v_i - p_{ij}| - |v_i - \bar{p}_{ij}|\).

Turning to the principal independent variable, the EES include a fine-grained indicator for attachment or closeness to any of the platforms competing in the EP elections. Respondents are asked to indicate the probability they would ever vote for a certain party on a scale ranging from 0 [“not at all probable”] to 10 [“very probable”]. The empirical distribution of the PtV is, in statistical terms, strongly skewed to the right. This implies that more than forty percent of respondents, when asked whether they would consider casting a vote for a specific political party, promptly indicate that they are “not at all” willing to do this (with PtV at or close to zero). While we believe that a focus on the PtV as a dependent variable is fundamentally flawed and does not allow for any meaningful inferences about actual vote choice, we consider it to be quite reasonable to build upon the propensity to vote as an indicator for the general, abstract closeness or distance towards alternative political parties. There appears to be some minimal consensus that the PtV item captures long-term attachments to national political parties and that its empirical significance relates to national elections rather than the specifics of EP elections (van der Brug et al., 2007).

Building on a more fine-grained measure of party attachment provides additional information and goes beyond preceding studies that persistently employed some kind of binary distinction between supporters and non-supporters of a political party. This gross measure may well be sufficient for the analysis of two-party competition in U.S. presidential and congressional elections. However, in multi-party systems, we believe this is an oversimplification of the more complex and graduated preference structures. When there are multiple political parties competing, as in any member state of the European Union, lumping a variety of different voters, who possibly hold very different partisan and political preferences, into the broad and diffuse category of “non-supporters” does not make much sense. This has the potential to introduce bias in our measurement, and is likely to decrease the empirical significance of contrast effects.

4.2 The Magnitude of Assimilation and Contrast

The empirical analysis begins by providing some descriptive evidence on the average mismatch of subjective and “objective” party placements in either dimension of the European political space. In the PIREDEU dataset, voter-specific party positions are on average about 1.64 scale points off the mark on the left-right dimension, and the average mismatch amounts to 1.92 points on the European integration scale. The higher precision of left-right placements corresponds to the significantly higher salience of the encompassing left-right dimension. Political parties tend to send clear signals on their overall political orientation and voters are sufficiently informed about these positions. By contrast, party positions towards European integration are considerably less salient, as they are not usually communicated and explained with sufficient clarity, and voters often hold very little knowledge about European Union politics. In sum, most voters are able to make sense of spatial competition and to agree on party placements
Table 1: Describing Projection Effects; PtV as a Categorical Predictor

<table>
<thead>
<tr>
<th>PtV_{i,j}</th>
<th>Δ\tilde{U}_{lr}</th>
<th>σ_{lr}</th>
<th>Δ\tilde{U}_{ei}</th>
<th>σ_{ei}</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−1.2185</td>
<td>(0.0465)</td>
<td>−0.6221</td>
<td>(0.0411)</td>
</tr>
<tr>
<td>1</td>
<td>−0.7588</td>
<td>(0.0519)</td>
<td>−0.3596</td>
<td>(0.0513)</td>
</tr>
<tr>
<td>2</td>
<td>−0.5473</td>
<td>(0.0506)</td>
<td>−0.2422</td>
<td>(0.0491)</td>
</tr>
<tr>
<td>3</td>
<td>−0.3220</td>
<td>(0.0513)</td>
<td>−0.1212</td>
<td>(0.0502)</td>
</tr>
<tr>
<td>4</td>
<td>−0.2123</td>
<td>(0.0526)</td>
<td>−0.0464</td>
<td>(0.0526)</td>
</tr>
<tr>
<td>5</td>
<td>−0.0190</td>
<td>(0.0517)</td>
<td>−0.0603</td>
<td>(0.0508)</td>
</tr>
<tr>
<td>6</td>
<td>0.0481</td>
<td>(0.0558)</td>
<td>0.1096</td>
<td>(0.0578)</td>
</tr>
<tr>
<td>7</td>
<td>0.0741</td>
<td>(0.0571)</td>
<td>0.2042</td>
<td>(0.0600)</td>
</tr>
<tr>
<td>8</td>
<td>0.1203</td>
<td>(0.0583)</td>
<td>0.1797</td>
<td>(0.0620)</td>
</tr>
<tr>
<td>9</td>
<td>0.2067</td>
<td>(0.0640)</td>
<td>0.1987</td>
<td>(0.0710)</td>
</tr>
<tr>
<td>10</td>
<td>0.3980</td>
<td>(0.0619)</td>
<td>0.2216</td>
<td>(0.0677)</td>
</tr>
</tbody>
</table>

Notes: The dependent variables capture the difference of utilities based on voter-specific and mean party placements on the left-right (ΔU_{lr}) and on the European integration dimensions (ΔU_{ei}).

which closely resemble their “true” or mean positions. Remember that we diagnose assimilation whenever utilities based on subjective, voter-specific party placements exceed “objective” utilities which are calculated with mean party positions (U_s > U_o). In turn, there are contrast effects whenever “objective” utilities exceed subjective utilities (U_o > U_s). So in order to identify projection effects, we relate empirical utility differences ΔU to our measure of closeness to a certain political party, being the propensity to vote (PtV ∈ [0, 10]). Note that higher values of PtV indicate more favorable evaluations and thus a higher propensity to vote for that specific party. We identify projection effects whenever utility mismatch ΔU and closeness to political parties PtV are related positively. The statistical model accounts for utility differences ΔU by hierarchical linear models which probe variation across different countries and parties.

There are two alternative ways to estimate the descriptive model. PtV, which is captured by an eleven-point-scale, could either be treated as a categorical or as an interval variable. Treating PtV as a continuous variable is more convenient regarding the ease of statistical estimation and the inclusion of interaction terms. However, this strategy involves assumptions about the linearity of parameters which may not be supported by theory and are therefore untenable. Treating PtV as a discrete variable and introducing a series of dummy variables for the levels of PtV yields a somewhat more complicated model, but avoids the above mentioned linearity assumptions regarding the effect of PtV on ΔU.

We first discuss a hierarchical linear model that treats PtV as a strictly categorical predictor and employs random effects on the country and party levels. The empirical estimates confirm highly significant effects of PtV on utility mismatch and, thus, meaningful projection effects regarding both left-right and European integration. Table 1 provides a brief overview of assimilation and contrast on both dimensions. We converted the fixed part of the model to average the predicted effects across all country and party contexts. Beginning with left-right, and all else being equal, a voter tends to pull
Table 2: Describing Projection Effects; PtV as a Continuous Predictor

<table>
<thead>
<tr>
<th></th>
<th>Left-Right ($\Delta U_{lr}$)</th>
<th>European Integration ($\Delta U_{ei}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{lg PtV}_{ij}$</td>
<td>0.6420*** ($0.0146$)</td>
<td>0.3641*** ($0.0189$)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.2160*** ($0.0189$)</td>
<td>-0.6122*** ($0.0457$)</td>
</tr>
<tr>
<td><strong>Random Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1: Country Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RI $[\sqrt{\text{p}_j}]$</td>
<td>0.2027*** ($0.0444$)</td>
<td>0.2101*** ($0.0361$)</td>
</tr>
<tr>
<td>2: Party Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS $[\sqrt{\text{p}_j}]$</td>
<td>0.1841*** ($0.0116$)</td>
<td>0.2375*** ($0.0155$)</td>
</tr>
<tr>
<td>RI $[\sqrt{\text{p}_j}]$</td>
<td>0.3803*** ($0.0224$)</td>
<td>0.2446*** ($0.0184$)</td>
</tr>
<tr>
<td>3: Individual Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual $[\sqrt{\text{p}}]$</td>
<td>1.9526*** ($0.0036$)</td>
<td>2.4005*** ($0.0049$)</td>
</tr>
<tr>
<td>\textbf{N}</td>
<td>144752</td>
<td>121852</td>
</tr>
<tr>
<td>log. lik.</td>
<td>-302774.0679</td>
<td>-279997.6435</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The dependent variables capture the difference of utilities based on voter-specific and mean party placements on the left-right ($\Delta U_{lr}$) and the on European integration dimensions ($\Delta U_{ei}$). We report the results of hierarchical linear models with random effects at the country and party levels; variance components are assumed independent, all covariances are set to zero.

Parties she strongly prefers by almost 0.40 scale points toward her personal position ($\text{PtV} = 10$). On the other hand, she tends to push parties she strongly opposes more than 1.21 scale points away ($\text{PtV} = 0$). Turning to the less salient European integration dimension, projection effects are also potent, but considerably weaker. On average, voters tend to strongly pull favored parties by about 0.22 scale points toward their personal preference and push disfavored ones about 0.62 points away.

We turn next to a multilevel regression model where PtV is treated as a continuous predictor, while we maintain random intercepts and also include a random slope on logged PtV at the party level. The previous model indicated non-linearities of projection effects on both dimensions that constitute the European political space. Considering that contrast effects appear to be much stronger than assimilation, we have decided to use the natural logs of PtV as our key independent variable. Table 2 presents two hierarchical models that also substantiate the presence of projection effects on the left-right and the European integration dimension. The empirical findings reveal a positive effect of logged PtV on the difference of subjective and “objective” city block utilities regarding both dimensions. The descriptive inferences reveal that assimilation and contrast are considerably stronger on the left-right than on the European integration dimension.

Figure 1 illustrates these descriptive inferences graphically and provides a comparison of the previous findings. The sub-panels for left-right and for European integration plot the predicted effects from both models along with their respective confidence

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4We need to add one small caveat. Given that the original PtV scale ranges from zero to ten and that the logarithm of zero is not defined, we have shifted the scale by one point. Our logged scale thus may take on values from $\ln 1$ to $\ln 11$. 

10
Figure 1: Comparing Projection Bias in the European Political Space

Notes: The subpanels reproduce the mean trajectories for projection bias on the left-right (left-hand side) and on the European integration dimension (right-hand side). There are two statistical expressions: (1) the thin solid line and the grey-shaded area specify the predicted values and their 95% confidence interval from the categorical specification in Table 1; (2) the thick dashed line and the thin dashed lines represent the predicted values and confidence intervals from the continuous specification in Table 2. The dashed horizontal line ($\Delta U = 0$) separates contrast (below) from assimilation effects (above).

intervals. The thin continuous line and the grey-shaded confidence interval refer to the categorical predictors (cf. Table 1), the thick dashed line displays the predictions from the continuous model while the thin dashed lines mark the associated confidence interval (cf. Table 2). The fact that both predictions are almost congruent and identical corroborates our confidence in the descriptive inferences and in the specification of logged PtV as the principal independent variable. Confidence in these descriptive inferences is further reinforced by a series of additional robustness checks which we cannot fully document here due to space constraints. We, for example, re-ran the descriptive analysis with the 1999 and the 2004 EES datasets, and we substituted a number of alternative external proxies as yardsticks for "true" party positions such as manifesto data or alternative expert surveys.

Below the line, the descriptive inferences reveal three principal insights into the nature of projection effects: (i.) Projection bias affects party placements both in a statistically significant and substantively meaningful manner. (ii.) Projection bias is more
effective regarding left-right than European integration. This finding confirms the idea of classical contributions to social psychology being that voters try to work around perceived inconsistencies the more the specific issue matters to them, and most voters perceive the encompassing left-right dimension as much more salient than European integration. (iii.) The replacement of binary indicators for party attachment by the more fine-grained PtV item yields, in stark contrast to the findings of previous studies, the dominance of contrast over assimilation effects.

Eventually, the descriptive inferences refer to the context dependency of our findings. Estimates of random coefficients stipulate random slopes on logged PtV which allow projection effects to vary across heterogeneous national and party contexts. Likelihood-ratio tests confirm that there is considerable empirical heterogeneity and thus indicate that random coefficient models provide a far better fit than simpler random intercept models. Among the 195 political parties included, the predicted slopes on the logged PtV range from a low of 0.26 up to a high of 1.27. The empirical findings regarding European integration are similar, but the effects are considerably weaker. For as many as 186 of the 195 political parties we estimate an overall positive slope which indicates the presence of projection effects. The individual predicted coefficients vary between -0.31 and +0.97.

5 The Consequences of Projection Bias

The previous analyses have provided some basic insights regarding the presence, magnitude, and variation of projection effects across various political and institutional contexts. Yet, these simple descriptive inferences tell us little about the consequences of projection effects for the empirical evaluation of proximity and directional models. In this section, we use the estimated strength and variation of projection effects for a simulation study. As we have previously discussed, the data at hand and conventional statistical models are not well suited to compare proximity and directional models of vote choice. Instead, Monte Carlo simulations facilitate direct control over the data-generating process (henceforth: DGP), allow researchers to manipulate dependent and independent variables at will, and do not suffer from intervening variables or unmodeled heterogeneity.

5.1 The Data-Generating Process

This is not the first paper which evaluates political consequences of projection by Monte Carlo simulations. Rabinowitz and Macdonald (2007) build their statistical simulation on voter and party locations as contained in the 1989 Norwegian Election Study so as to ensure they deal with “realistic” data and avoid arbitrary assumptions. Note that this study covers both a broad set of diverse issue dimensions such as the encompassing left-right scale and some more specific issues such as agricultural support, environmental protection, regulation of immigration or alcohol, and the privatization of health care.

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5 Random intercept models (not shown here) are rejected in favor of random slope models, and the statistically significant test statistics are $\chi^2 = 550.33$ for left-right and $\chi^2 = 462.59$ for the European integration dimension.
This particular election study is clearly the most frequent source for comparative analyses of proximity and directional voting, namely by Lewis and King, 1999; Macdonald et al., 1991, 1998, 2001b; Merrill et al., 2001.

Nevertheless, in this paper we suggest a different approach and make a number of idealized, albeit realistic assumptions regarding the distribution of both voter $v_i$ and party ideal points $p_j$ and $p_{i,j}$. Subsequently, we use the descriptive summaries of the PIREDEU data, and the associated measures of uncertainty so as to specify the data-generation processes which connect the simulated voter and party positions with biased party placements $p'_{ij}$, the propensity to cast a vote for a certain party $PtV_{ij}$, latent utilities and, ultimately, vote choice $v_{ij}$. By these means, we are able to fully control (and to modify) the simulation study because we simulate our data “from scratch”, but ensure that we build upon realistic assumptions by calibrating our point estimators and their simulated distributions with descriptive features of the PIREDEU data. Throughout our simulation study, we aim to construct a DGP which produces point empirical data and measures of association which closely resemble the real-world data discussed above.

**Simulating Voter Positions ($v_i$)**

We begin our presentation of the simulations by discussing some assumptions regarding the voter distributions. Empirical voter positions tend to grossly resemble single-peaked normal distributions which are roughly centered at the scale means so that centrist preferences tend to be considerably more frequent than extreme positions on either side of an issue dimension. The presumption of centered, single-peaked preference distributions is clearly confirmed by the empirical data provided by any survey project including the EES series and PIREDEU. Therefore, we draw the self-placements of the simulated voters from truncated normal distributions which are centered at the scale mean $\bar{v} = 5$, which have about the same standard deviation from the mean party position as in the PIREDEU data $\sigma_v = 2$ and which are limited to the interval ranging from 0 to 10, i.e. $v_i \in [0, 10]$. Note that we round these placements to integer values.

**Simulating Party Positions ($p_j$ and $p_{i,j}$)**

In contrast to voter ideal points, “unified” party positions are not drawn from a normal, but from a uniform distribution. Formal models for adopting party positions and subsequent empirical research have shown that, given the provision of PR and multi-party competition, political parties tend to spread out across the whole programmatic spectrum ranging, for instance, from the extreme left towards the extreme right (Calvo and Hellwig, 2011; Cox, 1990). Drawing from uniform distributions yield $J$ fixed programmatic party positions $p_j$. In turn, we use the empirical variation of mean party placements to simulate $I$ unbiased voter-specific placements of $J$ parties. We draw these values from a truncated normal distribution which is centered at the “true” party position and has a standard error of $\sigma = 2$: $p_{ij} = N_{[0,10]}(p_j, 2)$. These two steps provide us with fixed, unified party positions $p_j$ and unbiased, voter-specific party placements $p_{i,j}$. Note that voter-specific party locations $p_{i,j}$ are rounded to integer values, while mean placements $\bar{p}_{i,j}$ are indicated by floating-point variables.
Generating Latent Utilities and Vote Choice ($v_{i,j}$)

Turning now to the modeling of vote choice, we build upon the previous simulations and propose a data-generating process that gives both directional and proximity utilities (each based on unified, mean party positions as demanded by RM) equal weight in determining the unobserved, latent total utility terms and, ultimately, vote choice: $U_{i,j} = \beta U^p + \beta U^d$ with $\beta^p = \beta^d = 0.5$. By reparameterizing the model and treating $\beta$ as a mixing parameter, we may reduce the numbers of parameters to be estimated and simplify the equation as follows:

$U_{i,j}(j) = 2(1 - \beta_{mix}^d)U^d - \beta_{mix}^pU^p$

$= 2(1 - \beta_{mix}^d)(v_{i[a]} - NP)(p_{j[a]} - NP) - \beta_{mix}^p(v_{i[a]} - p_{j[a]})^2$

$= 2(1 - \beta_{mix}^d)v_{i[a]}p_{j[a]} - \beta_{mix}^p(v_{i[a]} - p_{j[a]})^2$

Throughout this analysis, higher values ($\beta_{mix}^d > 0.5$) indicate the dominance of directional voting, while lower values ($\beta_{mix}^d < 0.5$) flag the preeminence of proximity voting. We link the proximity and directional utility terms, latent probabilities to cast a vote for a certain party, and actual vote choice using a data-generating process which closely resembles a conditional logit model. The i.i.d. error terms are drawn from a standard Gumbel or Type-I extreme value distribution, and the CDF of $\epsilon$ is $\Pr(\epsilon < c) = F(c) = \exp(-\exp(-(c + a_i)))$:

$\Pr(v_{i,j} = 1|U_{i,j}) = \frac{U_{i,j}}{\sum_{k=1}^{l} U_{i,k}}$

$= \frac{\exp(-\beta^p(v_i - p_j)^2 + \beta^d[(v_i - N) \cdot (p_j - N)])}{\sum_{k=1}^{l} \exp(-\beta^p(v_i - p_j)^2 + \beta^d[(v_i - N) \cdot (p_j - N)])}$

Our simple random-utility model of vote choice implies that voters actually choose a party which maximizes the latent utility plus the i.i.d. error term. Therefore, we set the binary vote choice variable to one ($v_{i,j} = 1$) for the party $j$ which yields the highest utility for voter $i$ and all other vote choice variables to 0 ($v_{i,j} = 0$).

Generating the Propensity to Vote (PtV)

As we have argued, assimilation and contrast are determined by the degree of closeness to a specific candidate or party. Therefore we need to outline a specific data-generating process addressing the propensity to vote (PtV). Substantively, the above-mentioned probability of an individual $i$ to vote for a specific party $j$ ($\Pr(v_{i,j} = 1)$) and the propensity to cast a vote for that party (Pt$V_{i,j}$) have many things in common. The former refers to a latent utility derived from the spatial policy positions of a voter and the various parties competing, and the latter identifies a stated utility which is directly indicated by the voter herself. Accordingly, we use the latent probability to vote $\Pr(v_{i,j} = 1)$ as a yardstick to model PtV, add a normally distributed random term, expand the scale to a range from 1 to 11, and round the values to integers.
Generating Biased Party Positions \((p')\)

Ultimately, we use the descriptive inferences from the previous part of this paper to generate party positions \(p'_{i,j}\), which are affected by real-world levels of assimilation and contrast. Note that we have regressed the difference of biased and mean utilities on logged PtV so as to ascertain the presence and determine the magnitude of projection effects. The empirical analysis presented in the previous section has provided estimates for the bias parameter \(b^b\) which links utility differences \(\Delta U\) with the closeness to a specific party PtV:

\[
\Delta U = U^s - U^p = -|v_i - p_{i,j}| - [-|v_i - p_j|] = b^b \ln \text{PtV}_{ij} + b_0
\]

By rearranging these terms and solving the equation for \(p'_{i,j}\), we derive a formula which facilitates the straightforward prediction of biased party placements \(p'_{i,j}\) from predicted mean party positions \(p_j\), predicted utility differences \(\Delta U\), and a random error \(\epsilon_{i,j}\):

\[
p'_{i,j} = \begin{cases} 
p_j + \Delta U + \epsilon_{i,j} & \text{if } p_j < v_i \\
p_j - \Delta U + \epsilon_{i,j} & \text{if } p_j > v_i 
\end{cases}
\]

\[
\epsilon \sim N(0, 2)
\]

5.2 Biased Placements and Biased Inferences

Up to this point, we have described the setup of our simulation study. We have chosen not to use and modify any preexisting dataset, instead we utilize a “new” dataset which is simulated “from scratch”, but is modeled to closely resemble basic properties of the PIREDEU regarding the central tendency and distributions of the dependent and independent variables and the associations of these variables with one another. We are thus in a position to select and modify basic features of party competition and to simultaneously ensure that we are focusing on simulated datasets which closely match “real-world” data structures. Applying the above-mentioned procedure we have simulated 1,000 election surveys which each cover 1,000 simulated voters, and there are five parties competing in the fabricated elections. The DGP for party evaluation and, ultimately, vote choice has been designed to give equal weight to proximity and to directional utilities, and we may evaluate the empirical significance of both perspectives by a mixing parameter \(\beta\): \(U_{ij} = (1 - \beta_{\text{mix}})U^p + \beta_{\text{mix}}U^d\). As a result, higher values indicate the dominance of directional voting \((\beta_{\text{mix}} > 0.5)\), and lower values the pre-eminence of proximity voting \((\beta_{\text{mix}} < 0.5)\). In testing the projection bias hypothesized by RM, we have exclusively relied on “objective” utilities(e.g. on fixed, mean party placements) when we designed the DGP.

Figure 2 summarizes and reports the results of our simulation study. A static figure is presented where assimilation and contrast are chosen to be of exactly the same magnitude as in the fixed part of the PIREDEU left-right dimension (shown in Table 1). This implies a model of about the average projection bias across the contexts of diverse countries and parties. The three curves illustrate the density of the simulated mixing parameters \(\beta_{\text{mix}}\) indicating the balance of proximity and directional utilities. The solid
Notes: The data is derived from 1,000 simulated election surveys with 1,000 valid voters each. The DGP has been modeled to assign equal weight to proximity and directional utilities so that the expected value of unbiased mixing parameters is 0.5. The magnitude of assimilation and contrast has been chosen according to the fixed part of the model for the left-right dimension in Table 1. The lines indicate the CDF of estimated mixing parameters for proximity and directional utilities based on (1) mean placements (the solid line), (2) unbiased voter-specific placements (long dashes), and (3) voter-specific placements which are biased by assimilation and contrast (the dotted line).

The short dashes summarize the distribution of the simulated mixing parameters when biased party placements $p'_{ij}$ are used to compute electoral utilities. If we assume real-world, average levels of assimilation and contrast, the estimated mix-
Notes: The vertical bars summarize simulated mixing parameters across a range of bias parameters $\beta^b$ from 0.00 to 1.30 in steps of 0.05. Note that some jitter has been added to improve readability and to show the respective densities. Each bar summarizes 1,000 simulated election surveys with 1,000 valid voters each. The DGP has been modeled to assign equal weight to proximity and directional utilities so that the expected value of unbiased mixing parameters is 0.5.

The mixing parameters are actually far off the mark and considerably biased downwards. Assuming an average magnitude of assimilation and contrast, the distribution of the 1,000 mixing parameters moves away from the true value $\beta^{\text{mix}}$ and is centered at about 0.3. This implies, as suggested by RM, the considerable extent to which we overrate the significance of proximity voting and underrate that of directional voting.

However, the previous snapshot only provides a static picture capturing the consequences of average magnitude assimilation and contrast bias. We have repeated our simulations a number of times and modified core parameters such as the number of parties and voters, or the magnitude of assimilation and contrast effects. While facet-like changes in the number of simulated parties had almost no meaningful effect on the balancing of proximity and directional utilities, shifts of the bias parameters were clearly consequential. In order to explore the varying consequences of shifting bias parameters, we performed additional simulations using real-world levels of assimilation and contrast. More specifically, we varied the bias parameter $\beta^b$ from 0 (no bias) up to 1.30 (the maximum bias predicted for the left-right dimension in Table 1).
Figure 3 shows the consequences of increasing bias parameters. With no bias (i.e. $b^b = 0$) the distribution of simulated mixing parameters $\beta^{\text{mix}}$ is centered at the “true” value $\beta^{\text{mix}} = 0$. Sure enough, when we gradually increase $b^b = 0$ the values of $\beta^{\text{mix}}$ decrease monotonously and indicate that increasing levels of assimilation and contrast systematically bias the simulated parameters in favor of proximity voting. As shown above, for decreases in average values of projection bias $\beta^{\text{mix}}$ to about 0.3, with the maximum empirical extent of projection effects at $b^b = 1.25$, the distribution of $\beta^{\text{mix}}$ is centered at one and (falsely) indicates a pure proximity model.

The simulation study clearly indicates that projection effects, which consist of assimilation and contrast, bias our estimates of proximity as opposed to directional voting. When projection effects are absent, the empirical parameters are centered at the values modeled in the DGP. When the magnitude of projection bias increases, has hypothesized by RM, proximity voting tends to be significantly over- and directional voting tends to be significantly underestimated. Note that our real-world estimates of assimilation and contrast do not seem to be very substantive at first hand: on average, preferred parties are shifted by about 0.40 scale points towards the voter’s position and disliked ones are pushed away by about 1.22 scale points. Yet, these real-world levels of assimilation and contrast may have very substantive effect on the evaluation of proximity and directional voting. With average projection effects, the directional model is underestimated by around fifty percent. With the maximum level of assimilation and contrast found in the EES dataset, the mixing parameter $\beta^{\text{mix}} = 0$ indicates a “pure” proximity model and no effect of the directional utility component.

6 Findings, Remedies and Perspectives

The take-home messages of this paper are plain and simple. There are good theoretical reasons to assume that voters report biased party placements, although these reasons do not fit particularly well with the overall ideas embodied in the directional voting model. Our simulation study clearly indicates that assimilation and contrast do exert significant and robust effects on models of vote choice, i.e. projection effects tend to magnify estimates of proximity voting and underplay the effects of directional voting. The theoretical arguments and empirical findings in this paper are important and consequential for a number of reasons: The established hypotheses from political psychology are effectively mirrored by our analysis of party placements in European Election Studies. Party placements are systematically distorted by an individual’s propensity to vote for a certain party, and these projection effects are much stronger on the salient left-right scale than on the less salient European integration scale.

Projection effects are an interesting phenomenon per se, but there are also significant consequences for models of electoral choice. Supporters of the directional voting camp have repeatedly argued that projection effects imply a contamination of proximity utilities with non-spatial considerations so that the significance of proximity voting may be over- and the impact of alternative models of spatial voting and of non-policy motives may be underestimated (Macdonald et al., 1991, 1998, 2001a). The bias implied by projection effects effectively leads to biased inferences on the determinants of electoral choice.
In a nutshell, the empirical picture unambiguously corroborates the reservations put forward by RM. Voter-specific party placements appear to be affected by assimilation and contrast, and these projection effects do produce considerable bias in models of electoral choice. We have, however, serious reservations regarding the logic and the stringency of the theoretical argument provided by RM. Above all, we believe it is inconsistent to assume that voters use the proximity logic to construct consistence between their own position and that of a preferred candidate or party (by assimilation and contrast), while they follow the directional logic when they evaluate the same parties and cast their vote. In this vein, empirical demonstration of assimilation and contrast, contrary to the intentions of RM, may actually reinforce the overall significance of the rival proximity model.

References


