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Projection effects and specification bias in spatial models of European Parliament elections

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Abstract
Substantial empirical evidence suggests that voters cast their ballot not only by considering the different policy positions of parties or candidates, but also appear to pull candidates/parties they prefer closer to their own ideal position ('assimilation') while pushing candidates/parties they dislike, farther away ('contrast'). These effects are called 'projection effects'. We illustrate that voters' perceptions of policy positions of candidates/parties are contaminated by non-spatial considerations. Building on data from the EES series, we empirically demonstrate that projection effects are substantively meaningful and statistically significant in elections to the European Parliament. We moreover distinguish between unsystematic projection bias that only depends on the closeness to a specific candidate or party and systematic projection bias that is also affected by party-, voter-, and context-specific determinants.

Keywords
Comparative politics, European elections, projection effects, spatial modelling

Introduction

The spatial model of voting, as pioneered by Downs (1957), is often considered the workhorse of modern electoral studies, and belongs now to the standard toolbox of applied empirical researchers. Any spatial voting model, in principle, claims two things: (i) there exists a meaningful relationship between the ideal points of voters

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and the programmatic positions of political parties in a one- or multidimensional political space, and (ii) these relations matter for party evaluation and vote choice.

The validity of empirical research therefore depends on the ability of voters to meaningfully locate parties within a competitive political space. However, eminent contributions to political psychology have shown that there are limits to this. Particularly, concerns are raised over whether voter-specific party placements may be biased due to so-called projection effects. This implies that individuals may locate parties they like, for whatever reason, closer to their personal ideal point ('assimilation'), while they push parties they oppose, for whatever reason, further away ('contrast').[1]

Empirical analyses have compiled valid and robust evidence for the presence and consequences of projection effects (Judd et al., 1983; Miller et al., 1986; Granberg et al., 1988; Krosnick, 1990; Rahn et al., 1994). There are still some significant gaps. Most studies have focused on US elections and have placed a strong emphasis on the personal vote of presidential or congressional candidates. Further, political scientists often limited their methodological perspectives to binary party competition, concentrating most of the time therefore on the distinction between one preferred and one disliked party (notable exceptions are provided by Granberg and Holmberg, 1986; Granberg and Brown, 1992; Merrill et al., 2001; Markowski and Tucker, 2007). European voters are, in contrast, regularly faced with more fragmented party systems, and with much more complicated patterns of inter-party competition and cooperation that may well be expected to have an impact on their preference structures. Instead of binary preference structures, they will more often support various parties to varying degrees.

In this contribution, we fill this crucial research gap and analyse projection effects within a systematic and comparative framework. We compare the magnitude and the determinants of projection effects in elections to the European Parliament (EP). More specifically, we focus on the most recent wave of the European Election Studies (EES) series, the PIREDEU study of 2009. To our knowledge, we provide the first systematic comparative assessment of projection effects and utilize the most comprehensive dataset to date. The PIREDEU study also offers the opportunity to compare projection effects along a highly salient national left–right dimension and a supranational European integration dimension of low salience.

The presence of projection effects may affect both actual vote choice and scientific models of vote choice. Regardless of whether voting behaviour is motivated by spatial proximity, direction, or by discounting, distorted party placements influence electoral behaviour and lead to wrong inferences about electoral choice. Empirical evidence for projection effects thus calls into question the principal findings of the spatial voting framework regarding national and European elections. This is particularly true when projection effects are heterogeneous and context-dependent, and when the presence and the extent of assimilation and contrast differ across alternative dimensions of political contestation. Further, voter- and party-specific determinants may introduce systematic distortion and thus bias studies of EU issue voting. The presence of projection effects is therefore not confined to

socio-psychological labs or insider discussions in niche journals. Rather, the presence of assimilation and contrast potentially modify vote choice and bias scientific analyses of EP elections.

Our article addresses these issues in three consecutive steps. We first present our principal argument, develop a formal definition, and propose a measurement model for the differences between subjective and 'objective' party placements. The empirical analysis provides descriptive evidence of the presence and the magnitude of projection bias. In order to check and cross-validate the consistency and robustness of our findings, we compare projection effects on a high salience dimension, the left–right scale, and a low salience dimension, the European integration scale. In a third step, we present and justify the distinction between unsystematic and systematic projection effects and review evidence on the causal determinants of projection effects at the voter, party, and system levels. The final section concludes with some remarks on assimilation and contrast and a word of caution to applied researchers.

Defining projection effects

Explanations for projection effects build on consistency perspectives positing that individuals try to overcome and work against cognitive dissonance; predominant are 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 perceived discomfort increases with the level of substantive importance 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 adopted by electoral studies and used for studies of voter perceptions of party ideologies and positions.[2] Applied to voter-specific party placements, psychological consistency may be achieved by moving either the voter's personal ideal point or by manipulating the spatial positions of the political parties. The existing literature often builds on rather ambiguous assumptions, on the one hand, regarding the difference between persuasion and projection effects, and on the other hand, concerning the relation of assimilation and contrast. Thus, we start by tailoring these key terms from cognition theory to electoral studies:

1. The voter may adjust or change her individual spatial position due to efforts taken by political parties to persuade potential voters of specific party policies ('persuasion').
2. The voter may review and modify the spatial positions taken by alternative parties in order to bring consistency back in that:
   a. she might pull positions of political parties she likes for non-policy reasons closer to her unchanged spatial position ('assimilation');
   b. she might push parties she opposes for non-policy reasons further away from her unchanged ideal point ('contrast').

The inherent causal mechanisms are established with reference to classical contributions to political psychology: following Heider's 1958 balance theory, the individual need for establishing cognitive consistency first depends on the existence of 'unit relations' with the respective candidate or party, in other words, the stronger the attachment to a specific candidate or party, the higher the individual pressure to eradicate cognitive dissonance. Second, dissonance theory also stresses the role of choices in strengthening the need for projection effects. For instance, casting a vote for a specific candidate or party increases the chance of assimilation effects to eliminate any possible post-decisional cognitive dissonance and vice versa. Third, not only electoral preferences and choices, but also the importance attributed to specific issues, regulate how sensitive an individual is to cognitive inconsistencies. The salience of an issue dimension therefore determines the extent of projection effects.

This contribution focuses on the extent and determinants of projection effects rather than the electoral consequences of party cues and persuasion effects. Assimilation and contrast label causal effects which cannot be directly observed (cf. Krosnick, 1990, 2002). Political scientists are thus not in a position to unambiguously establish whether a voter has modified her individual position due to successful persuasion, or whether she has altered the spatial positions she assigns to the party alternatives as a result of assimilation and/or contrast (cf. Conover and Feldman, 1982; Tomz and van Houweling, 2008).

Krosnick (2002) points out that cross-sectional data alone is not particularly helpful for the straightforward isolation and differentiation between persuasion and projection effects.[3] Dynamic panel studies potentially facilitate the isolation of causal factors due to the temporal sequencing of events, but panel data is usually not available and comes with problems of its own. In multi-party elections, applied researchers may validate their findings by exploring contextual data. Recall that policy-based persuasion effects will result in a movement of the voter position towards the policies represented by her favoured candidate or party; changes in the spatial distances towards other parties are merely a by-product of this. In contrast, the parallel dynamics of assimilation and contrast involve the movement of *all* party placements and thus produce a much more structured pattern.

Furthermore, issue salience may help to separate persuasion and projection. As indicated above, higher issue salience is expected to increase projection effects. Regarding persuasion, the voters' policy preferences are stable and tend to resist change when they attribute high importance and salience to a certain dimension of political conflict. In turn, voter positions are fragile, unstable, prone to change, and may be significantly altered by persuasion when attributed issue salience diminishes (Krosnick, 2002: 124).

Given that projection effects, assimilation and contrast, imply that non-spatial motives systematically bias voter-specific party placements, our measurement strategy proceeds in two consecutive steps:

1. Differences of subjective and some kind of 'objective' party placements constitute a necessary, but not a sufficient, condition for the presence of

projection effects. Therefore we compute the deviation of voter-specific party placements from some baseline measure of 'true' positions.
2. A sufficient condition for the definition of projection bias exists if voters deflate (inflate) spatial distances for candidates or parties they like (oppose). To measure whether this condition is met, we relate the calculated placement differences to some measure of party attachment and evaluate the marginal effects as a sufficient condition indicating projection effects.

'Objective' party positions

A crucial point for the measurement of projection effects is whether we need some yardstick of 'objective' party positions and, if so, how such a specific baseline value may be theoretically justified and empirically assessed. Of course, the very notions of 'objective' or 'true' party positions are conceptually dubious, and guessing 'where a party really stands' intimates somewhat esoteric assumptions and goals. In fact, operationalizations and measurement strategies suggested by political scientists are often ambiguous. Established measures of party ideology frequently start out with different assumptions, are often designed for different purposes, and differ empirically.[4]

In empirical terms, the studies by Granberg and Holmberg (1986), Granberg et al. (1988), Merrill et al. (2001), and Adams et al. (2005) reach similar conclusions: there is ample, solid, and robust evidence for the existence of projection effects. Its two components, assimilation and contrast, appear to be of approximately similar significance in US presidential and congressional races. Beyond the US as the last remaining example of classical bi-partism, the assimilation of preferred parties appears to have a much more meaningful effect than the contrast of disliked ones. This has often been called the 'asymmetry' of projection effects which is defined by the alleged dominance of assimilation over contrast effects (Granberg and Holmberg, 1986; Granberg et al., 1988; Merrill et al., 2001; Krosnick, 2002).

Approaches to measuring projection effects frequently focus on the departure of subjective, voter-specific party placements from some baseline measure of 'objective' or 'true' party positions. The most common choice is to proxy unified party positions by the arithmetic mean of voter-specific party placements. This is based on the hope that the differences of subjective and 'objective' party positions and projection bias cancel each other out (Macdonald et al., 1991, 1995, 1998, 2001; Rabinowitz and Macdonald, 1989, 2007).

Alternative measurement strategies focus on external data sources such as roll calls, expert judgements, or manifesto data as indicators of 'true' party positions. External data may help to address problems such as endogeneity, but often come with problems of their own. Scalability problems complicate the use of any data source as an indicator of 'true' party positions. Differences of voter-specific party placements and external data, such as expert judgements, manifestos, or roll-call

data, may not unambiguously relate to misplacement and projection, but are also affected by conceptual and empirical inconsistencies among the data sources.

While we subscribe to most of the criticism put forward against unified and 'true' party positions, we nevertheless think that a straightforward quantification of projection bias needs to rely on some proxy for 'objective' party positions. We continue to use mean party placements over all respondents, because this measure still provides the least problematic yardstick for 'true' party positions. Notably, mean placements help to minimize scalability problems and avoid the loss of observations due to incomplete matching with other data sources.[5] However, we have replicated the analyses with alternative proxies of 'true' party positions such as expert judgements. While these results obtained with different indicators do not differ systematically, the combination of diverse measures and datasets adds a substantive amount of random noise. The web appendix documents these robustness checks.

Placement differences and projection bias

A necessary condition for the assertion of projection effects is a difference between spatial distances based on subjective and 'objective' party placements. Considering that our unit of analysis is not the location voter i assigns to party j, but rather the distance between the voter's self-placement and the assigned spatial party position, our unit of analysis may be written analogously to the difference of two city-block spatial distances or utilities:

1. Subjective placement differences U_s are given by the negative distance of the voter's self-placements (v_i) and subjective, voter-specific party placements p_{ij} ($U_s = -|v_i - p_{ij}|$).
2. 'Objective' placement mismatch U_o is given by the negative distance of the voter's self-placements and 'objective', unified party positions p_j ($U_o = -|v_i - p_j|$).
3. The difference between subjective and 'objective' placements ΔP is, in turn, given by

$$\Delta P = U_s - U_o = -|v_i - p_{ij}| - \left[-|v_i - p_j|\right]$$

Note that we label the difference of voter-specific and mean party locations (p_{ij} and p_j) relative to the voter v_i placement differences with ΔP. Actual values of ΔP yield some first insight into potential projection effects and differentiate between three alternative scenarios:[6]

1. $\Delta P = 0$: if ΔP equals 0, the voter's assessment of a political party equals the 'true' position and projection bias is absent by definition;
2. $\Delta P > 0$: if ΔP is positive, subjective party placements yield a higher utility than mean party positions and this *may* indicate projection bias (assimilation);

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

There are many potential reasons why voter-specific party placements may differ from 'objective' positions of political parties. Projection bias, be it assimilation or contrast, is only one possible explanation. The formal identification of projection bias requires one to relate the placement differences ΔP to some measure of party attachment and to compute the marginal effect of party identification on placement differences. Let us therefore assume that we obtain an indicator A for the attachment of the voter to any of the parties contesting in an election. Lower (higher) values of A indicate that she opposes (likes) this specific party. If there is projection bias, placement differences ΔP and party attachment A should be positively related: $\beta_1 > 0$: $\Delta P = \beta_1 A_{ij} + \beta_0$. The corresponding marginal effect is given by $\partial \Delta P / \partial A_{ij} = \beta_1$. Projection effects are only present when $\beta_1 > 0$. The intersection of the upward-sloping predicted effects with the zero line ($\Delta P = 0;\ U_s = U_o$) by definition separates contrast and assimilation.

Describing projection effects

We begin the empirical part with a justification of our case selection and briefly introduce as well as review the data at hand. The subsequent section turns to descriptive empirical findings about placement differences and projection bias regarding the two dimensions that define our political space, the left–right and the European integration scales.

Data and data sources

In this article, we present a secondary analysis of the EES data. The rich information gathered by the PIREDEU questionnaires includes data on self- and party-placements on the left–right and European integration dimension, a fine-grained indicator of party attachment, and some contextual variables which will be used to explore the causal determinants of projection effects.[7]

The PIREDEU questionnaires explore voter self-placements on a left–right and a European integration scale ($v_i \in [0, 10]$). The voters are required to place each party contesting in the EP elections on parallel programmatic scales ($p_{ij} \in [0, 10]$). This yields a total of four different scales which provide sufficient information to relate voter and party positions and to compute the principal dependent variables. Placement differences are given by the subtraction of 'objective' from subjective spatial distances which are computed separately for each dimension of political contestation: $\Delta P = -|v_i - p_{ij}| - [-|v_i - \bar{p}_{ij}|]$.

Turning to the principal independent variable, the EES include a fine-grained indicator for attachment to any of the platforms competing in the EP elections. Respondents are asked to indicate the probability with which they would 'ever' vote for a certain party on a scale ranging from 0 ['not at all probable'] to 10 ['very

probable'] yielding the 'propensity to vote' indicator (PtV). The empirical distribution of the PtV is, in statistical terms, strongly skewed to the right. This implies that more than 40 percent of those who are 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 the remaining categories are about evenly distributed, the distribution has two additional, but less sharp-cut, peaks that indicate neutrality (with PtV at about five) and extremely favourable evaluations of the respective party (with PtV at or close to ten).

At this point, we need to specify a brief caveat and justify our use of PtV. Previous research has often been criticized for evaluating PtV instead of actual vote choice and thus confusing political preferences with political behaviour. While this survey question provides a lot of empirical variation, it is not always obvious what the probability to *ever* vote for a certain party actually means. This is even more complicated regarding the EES data given that empirical tests have shown that stated PtV is consistent with vote choice in national rather than EP elections (cf. Van der Brug et al., 2007). On these grounds, we believe that it is fundamentally flawed to use PtV, for example, as a proxy for stated vote choice. In contrast, we believe that it is justified to use PtV as a self-contained variable which is not modelled as a proxy for vote choice. For all practical purposes, the PtV item captures long-term attachments to political parties, provides an indicator of preferences rather than political behaviour, and is essentially merely another feeling thermometer which offers a fine-grained perspective on party attachment.

In this analysis, building on PtV as a more fine-grained measure of party attachment, A 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 kind of gross measure may well be sufficient for the analysis of two-party competition in US presidential and congressional elections. In multi-party systems, we believe this is an all too large simplification of the more complex and graduated preference structures. When there are multiple political parties competing, as in any member state of the European Union (EU), 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, potentially introduces bias to our measurement, and is likely to decrease the empirical significance of contrast effects.

In order to facilitate the statistical analysis, the complex data matrix given by the PIREDEU dataset is transformed into a stacked, alternative-specific layout. Altogether, the dataset includes 27,069 individual voters, more than 155,000 party placements on the left–right dimension, and almost 130,000 party placements regarding European integration. The PIREDEU data provides sufficient empirical information to explore projection effects within the 27 national segments and for a total of 198 individual parties competing in the national segments of the 2009 elections to the EP.

Measures of placement differences

We begin the empirical part with some descriptive evidence on the average mismatch of subjective and 'objective' party placements on either political dimension. Note that the label 'mismatch' refers to absolute values of placement differences ΔP which algebraically boil down to the absolute mismatch of voter-specific and mean party placements: $|\Delta P| = |U_s| - |U_o| = |p_{ij} - p_j|$. We provide a brief descriptive summary of the distances between voter-specific placements and mean positions on both dimensions. The average mismatch on the left–right dimension is lower than on the European integration dimension. In the PIREDEU dataset, voter-specific party positions are on average about 1.64 scale points off the mark on the left–right dimension; the average mismatch amounts to 1.92 points on the European integration scale. The empirical distributions on both dimensions are positively skewed; in other words, the empirical values are concentrated on the left-hand side of the distribution, and the right-hand tail is considerably longer. More than fifty percent of the misplacements lie below 1.26 for the left–right and below 1.56 for 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. In contrast, party positions towards European integration are considerably less salient, not communicated explicitly, and voters often hold very little knowledge about EU politics. In sum, most voters are able to make sense of spatial party competition and to agree to a very significant extent on placements which closely resemble their 'true' positions which are proxied by the mean placements over all respondents. There is certainly also some visible disagreement concerning party placements, and we have to analyse these first findings in more detail to ascertain whether these differences occur due to projection effects or other factors such as limited cognitive resources and low salience of European integration matters.

Presence and magnitude of projection effects

As indicated before, we model the effects of party attachment A on placement differences ΔP to capture the sufficient conditions for projection effects. Given that voters are nested in party alternatives which are, in turn, nested in national contexts we apply hierarchical linear models with random intercepts at the party and voter levels and an additional random coefficient on party attachment at the party level.

There are, in principle, two alternative ways to estimate the descriptive model: PtV, our indicator of party attachment, is captured by an eleven-point scale and could either be treated as (1) a categorical or as (2) an interval variable. Building on this model, Table 1 provides a brief overview of projection effects on either dimension of the political space. We converted the fixed part of the hierarchical model to

Table 1. Describing projection effects; PtV as a categorical predictor

	Left–right		European integration	
Party attachment [PtV_{ijk}]	$\Delta\hat{U}_{lr}$	σ_{lr}	$\Delta\hat{U}_{ei}$	σ_{ei}
0	−1.2144	(0.0465)	−0.5459	(0.0429)
1	−0.7352	(0.0527)	−0.3125	(0.0550)
2	−0.5063	(0.0514)	−0.1692	(0.0522)
3	−0.2732	(0.0524)	−0.0503	(0.0536)
4	−0.1570	(0.0541)	0.0547	(0.0560)
5	0.0635	(0.0535)	0.1700	(0.0540)
6	0.1376	(0.0585)	0.2108	(0.0619)
7	0.1826	(0.0605)	0.3394	(0.0646)
8	0.2669	(0.0624)	0.3463	(0.0669)
9	0.3691	(0.0695)	0.3638	(0.0776)
10	0.6642	(0.0674)	0.4245	(0.0733)
N	128,145		105,813	

Notes: The dependent variables capture the placement differences on the left–right (ΔP_{lr}) and on the European integration dimension (ΔP_{ei}).

average predicted effects across all country and party contexts. Beginning with left–right, a voter tends to pull parties she strongly prefers by 0.66 scale points ($\sigma_{lr} = 0.067$) toward her personal position (assimilation; PtV = 10). On the other hand, she tends to push parties she strongly opposes by more than 1.21 scale points ($\sigma_{lr} = 0.047$) away (contrast; PtV = 0). Turning to the second policy dimension, European integration, projection effects are considerably weaker. Voters tend to pull strongly favoured parties by about 0.42 scale points ($\sigma_{ei} = 0.073$) toward their personal preference (assimilation) and push disfavoured ones about 0.55 points ($\sigma_{ei} = 0.043$) away (contrast).

The empirical estimates confirm highly significant effects of PtV on placement mismatch and, thus, meaningful projection effects regarding both left–right and European integration. The results obtained by the categorical model also corroborate the asymmetry hypothesis and provide a stronger contrast than assimilation effects on both political dimensions. Apparently, the magnitude of projection effects on the left–right is higher than on the European integration dimension and this reinforces our presumption that individuals feel a higher need to compensate cognitive inconsistencies when political issues are more salient.

The second option, namely treating PtV as a continuous variable, is more convenient regarding the ease of statistical estimation and the inclusion of interaction terms. Admittedly, this strategy involves assumptions about the linearity of parameters which are not supported by theory and may not be tenable. Recall that the previous model indicated substantive non-linearities of projection effects on both

Table 2. Describing projection effects; PtV as a continuous predictor

	Left–right		European integration	
	ΔP_{lr}		ΔP_{ei}	
Fixed effects				
Party attachment [ln PtV_{ijk}]	0.7076***	(0.0169)	0.3958***	(0.0204)
Constant	−1.2230***	(0.0483)	−0.5459***	(0.0469)
–Random effects–				
1: Country level				
RI [$\sqrt{\psi_k}$]	0.1922***	(0.0466)	0.2064***	(0.0384)
2: Party level				
RS [$\sqrt{\psi_{j,1}}$]	0.2178***	(0.0134)	0.2558***	(0.0169)
RI [$\sqrt{\psi_{j,0}}$]	0.4109***	(0.0240)	0.2940***	(0.0214)
3: Voter level				
Residual [$\sqrt{\theta}$]	1.9647***	(0.0044)	2.4755***	(0.0054)
N	128,145		105,813	
log. lik.	−269224.2756		−246455.6659	

Standard errors in parentheses.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
Notes: The dependent variables capture placement differences on the left–right (ΔP_{lr}) and European integration dimensions (ΔP_{ei}). We report the results of hierarchical linear models with random effects at the country and party levels. RI indicates random intercepts, RS indicates random slopes and both give the standard deviation of the random effects at the respective level. The individual variance components are assumed independent, and all covariances are set to zero.

dimensions that constitute our political space. Because contrast effects appear to be much stronger than assimilation, we have decided to use the natural logs of PtV as our key independent variable.[8] 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, statistically significant, and substantively meaningful effect of logged PtV on placement differences regarding both dimensions.

Figure 1 illustrates these descriptive inferences graphically and provides a comparison to previous findings. The subpanels for left–right and for European integration plot the predicted effects from both models along with their respective confidence 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, and the thin dashed lines mark the associated confidence interval. 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. Our confidence in

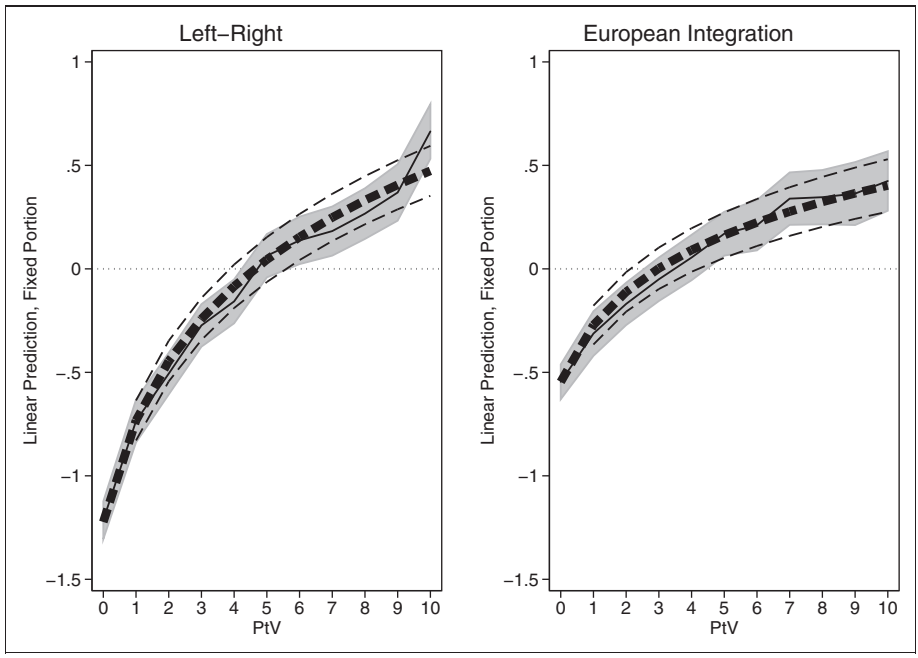

Figure 1. Comparing projection bias in the European political space.
Notes: The subpanels reproduce the mean trajectories for projection bias on the left–right (left-hand side) and on the European integration dimension (right-hand side). There are two statistical expressions: (1) the thin solid line and the grey-shaded area specify the predicted values and their 95 percent 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 ($\Delta p = 0$) separates contrast (below) from assimilation effects (above).

these descriptive inferences is further reinforced by a series of additional robustness checks which we cannot fully document here due to space constraints.[9]

The descriptive inferences reveal three principal insights into the nature of projection effects:

1. Projection bias affects party placements both in a statistically significant and a substantively meaningful manner.
2. Projection bias is more effective on the left–right than on the European integration dimension. This finding confirms the idea of classical contributions to social psychology 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. In contrast, if we measured the persuasion of voters by advertised party politics, we would be likely to find higher levels on the by far less salient European integration dimension.

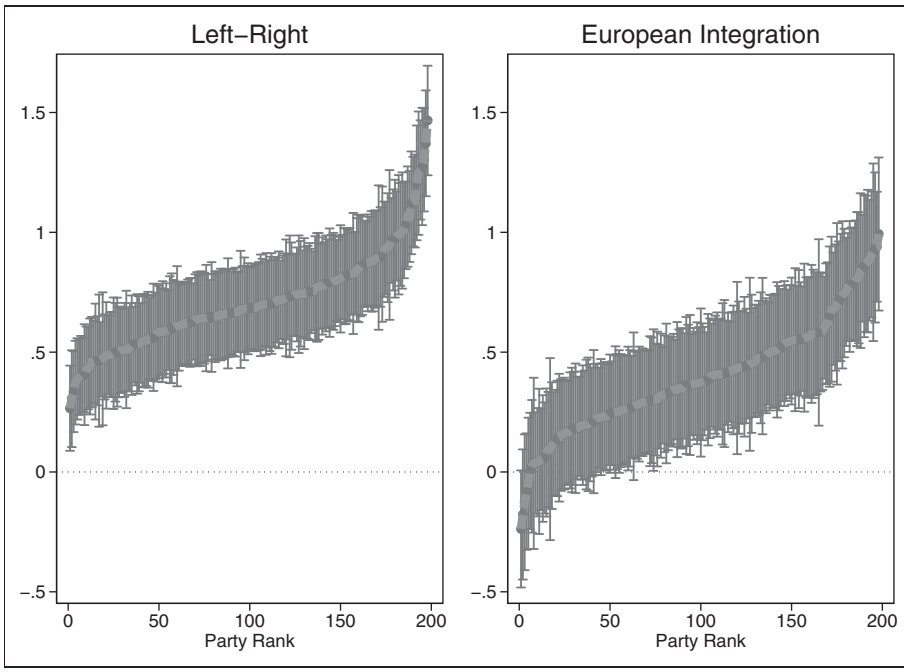

Figure 2. Party-specific random slopes on the left–right and European integration dimension in European Parliament elections.
Notes: The subpanels reproduce the election- and party-specific slopes on PtV and their respective 95 percent confidence intervals.

3. The novel operationalization of party attachment with a straightforward focus on the PtV explicitly refers, in stark contrast to the findings of previous studies, to the dominance of contrast over assimilation effects.

To probe more deeply into the context dependency of our findings, we now examine the random effects part of our models. The descriptive inferences in Table 2 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 indicate that random coefficient models yield a far better fit than simpler random intercept models.[10]

Figure 2 presents a more detailed assessment of causal heterogeneity at the party level. Note that the total projection effect is given by the estimated coefficients β plus the respective party-specific predictions for the random slopes ζ_j. While empirical evidence for projection effects on the left–right scale is robust and stable, the specific magnitude of assimilation and contrast varies considerably. Among the 198 political parties included, the predicted slopes on logged PtV range from a low of 0.26 up to 1.39. The empirical findings regarding European integration are similar,

but effects are considerably weaker. For as many as 191 of the 198 political parties we estimate an overall positive slope which indicates the presence of projection effects. The individual predictions of party-specific coefficients vary between −0.41 and 1.02.

Explaining projection effects

While we have presented reliable and robust descriptive evidence for the presence of projection effects, we still lack empirical evidence on whether assimilation and contrast occur independently of different contexts or whether these phenomena are actually caused by specific contexts. In this section, we first introduce a distinction between unsystematic and systematic projection effects and discuss potential explanatory variables. Subsequently, we demonstrate that assimilation and contrast are unsystematic rather than systematic phenomena and are not linked to key contextual determinants at the voter, party, or national level in any robust fashion.

Unsystematic and systematic projection effects

Regarding the causal inferences, we distinguish between unsystematic and systematic projection effects. We have, roughly speaking, less to worry about when projection effects are unsystematic. Without the important role of contextual and systematic determinants, the presence and the magnitude of assimilation and contrast effects are exclusively defined by the evaluation of a specific party alternative and an i.i.d. random error. Systematic projection effects in contrast warrant additional concerns. When assimilation and/or contrast effects are systematically conditioned by contextual effects at the voter, party, or country level, our voter-specific party placements are not only systematically distorted, but also much more difficult to correct or rescale.

Because the descriptive inferences have shown the empirical asymmetry of projection effects and indicated that contrast is more effective than assimilation, we have decided to split our empirical sample and to analyse the determinants of assimilation and contrast in separate samples. Effectively, we focus on one dataset of cases that fulfills the necessary condition for assimilation ($\Delta P = U_s - U_o > 0$) and another that meets the necessary condition for contrast effects ($\Delta P < 0$). Cases of 'leapfrogging' have again been removed from the analysis. To yield comparable results and facilitate the interpretation of our findings, we use absolute values of our dependent variables. Therefore, they indicate placement mismatch $|\Delta P|$ so that lower values refer to potentially weak, while higher values indicate potentially strong, levels of assimilation or contrast.

To build our models, we regress the absolute values of placement mismatch $|\Delta P|$ on a set of explanatory variables and on the interactions of these independent variables with logged PtV: $|\Delta P| = \beta_0 + \beta_1 \mathrm{PtV}_{ijk} + \beta_2 \boldsymbol{X} + \beta_3 \mathrm{PtV}_{ijk} \boldsymbol{X}$. This is done separately for assimilation and contrast and for the left–right and the European integration dimension. Note that an association of absolute placement mismatch

with a contextual variable does not sufficiently define projection effects, but rather indicates whether a contextual variable facilitates or exacerbates the correct placement of a political party.

To assess the effects of contextual variables on assimilation and contrast in a more straightforward fashion, we interact contextual characteristics $\boldsymbol{X}$ with the key indicator of party attachment PtV_{ijk}. The marginal effects of $\boldsymbol{X}$ indicate the impact of context variables on assimilation and contrast. We consider projection effects to be systematic if (and only if) the interaction of PtV with an explanatory variable is statistically significant and substantively meaningful. In contrast, projection effects may be considered unsystematic and independent of the electoral contexts when there are no statistically *and* substantively noteworthy interactions. Ultimately, we add random intercepts at the party ($\zeta_{0,j}$) and country ($\zeta_{0,k}$) levels and also include a random slope on logged PtV at the party level ($\zeta_{1,j}$) in order to control for the effects of unmodelled contextual variables:

$$\begin{aligned}\Delta\mathrm{P} &= \beta_{0,jk} + \beta_{1,jk}\ln\mathrm{PtV}_{ijk} + \beta_2\ln\mathrm{PtV}_{ijk}\cdot\mathrm{X}_i + \beta_3\ln\mathrm{PtV}_{ijk}\cdot\mathrm{X}_j + \beta_4\ln\mathrm{PtV}_{ijk}\mathrm{X}_k + \varepsilon_{ijk}\\ &= [\beta_0 + \zeta_{0,j} + \zeta_{0,k}] + [\beta_1 + \zeta_{1,j}]\ln\mathrm{PtV}_{ij} + \beta_2\ln\mathrm{PtV}_{ijk}\cdot\mathrm{X}_i + \beta_3\ln\mathrm{PtV}_{ijk}\cdot\mathrm{X}_j\\ &\quad + \beta_4\ln\mathrm{PtV}_{ijk}\mathrm{X}_k + \varepsilon_{ijk} \qquad (1)\end{aligned}$$

Having defined systematic and unsystematic projection effects, we will now review and operationalize a number of potential causal effects at the individual, the party, and the national level and present testable hypotheses regarding (1) their direct effects on the overall magnitude of placement differences and (2) their interaction with logged PtV which indicates their modifying impact on, respectively, assimilation and contrast.

Voter sophistication. We start with voter-specific causes of projection bias and discuss whether some voters are more likely to misplace parties and/or more likely to project their own positions upon preferred parties than others. The voters' varying levels of political information and sophistication should correlate with the capability to process political information and to locate parties within a political space. Preceding research has demonstrated that educated, informed, and sophisticated voters are more likely to base their electoral choice upon the evaluation of policy positions.

Each of the subsequent hypotheses comes in two parts and includes suppositions about the effects of contextual variables on the absolute level of mismatch $|\Delta P|$ (the main effects) and about the modifying impact of the variable on, respectively, assimilation or contrast (the interactive effects):

(i) Regarding the absolute level of mismatch, our voter sophistication hypothesis posits that sophisticated voters are, by and large, more likely to place political parties close to their 'true' position.
(ii) With reference to the impact of voter sophistication on both assimilation and contrast, we posit that sophisticated voters ascribe a higher salience to issues,

tend to rely more frequently on issue voting, and are thus more likely to shift party positions either away from or towards their own policy position.

The PIREDEU survey modules allow us to construct an index of political sophistication, since the questionnaires include a total of seven items on the factual political knowledge of both domestic and European politics. Our indicator of political knowledge simply adds up the number of correctly answered knowledge questions, therefore ranging from zero to seven (every question answered correctly).

Voter extremism. Individual ideological or programmatic orientations may affect mismatch, assimilation, and contrast. We assume that extremist voters tend to interpret and understand ideological and/or programmatic scales differently from centrist voters:

(i) Party placements of extremist voters will therefore be more 'off the mark' than those of moderate voters with regard to the absolute mismatch of subjective and objective party placements $|\Delta P|$.
(ii) We further assume that these differences in the interpretations of spatial dimensions also affect the specifics of projection bias and increase the magnitude of assimilation and contrast effects.

In terms of left and right, we consider voters extremist when they lean either to the very left or to the very right, and we operationalize left–right extremism with the squared values of the centered left–right placements ($[v_i^{\text{lr}}]^2$). In terms of European integration, we look at voter extremism via squared voter self-placements on the European integration scale ($[v_i^{\text{ei}}]^2$).

Party extremism. Possible determinants of projection effects are not restricted to the voter level, but are also considered with regard to the issue positions of political parties and basic features of party competition. Usually, when parties move towards the political extremes, their position is clearly visible, their extremist ideology is discussed in public discourses, and their positions may be easily discerned from those of the mainstream parties:

(i) Voters will therefore have less problems agreeing on the positions of extremist than on those of mainstream parties, and
(ii) Party extremism will increase the magnitude of projection effects.

For instance, voters who like an extremist party tend to rank it not as extreme as voters do who do not like or even strongly dislike it. We assess party extremism with the squared values of the average, centered party placements by all respondents on the left–right ($[p_j^{\text{lr}}]^2$) and on the European integration dimension ($[p_j^{\text{ei}}]^2$).

The ambiguity of party positions. We continue with features of political parties and inspect the clarity of programmatic party positions. Quite often voters simply lack

sufficient information to place parties on issue scales, because these parties deliberately present ambiguous policy positions. A broad range of contributions have shown that parties that blur their issue positions may actually be better off (cf. Shepsle, 1972; Tomz and van Houweling, 2009; Rovny, 2012). When parties present clear, explicit, and unified positions, it will be harder for voters to ignore these prevalent signals and then to project their own preferences upon party platforms:

(i) With regard to the main effects of party unity and clarity, we hypothesize that clear and unified party positions tend to reduce the average mismatch of subjective and 'objective' party placements.
(ii) We also posit that the ambiguity of programmatic party positions will increase and that the unity and clarity of party positions will diminish the extent of assimilation and contrast. Programmatic party ambiguity is measured by the standard deviation, σ_j, of party placements on the left–right and European integration scales. Low scores of σ_j indicate unified party positions, and higher values indicate ambiguous party positions.

Incumbency. Projection bias may be causally related to incumbency. Parties in national government have a high degree of visibility in the media and in public discourse. Their track record in office usually provides sufficient information to locate incumbent parties on a number of issue dimensions. In contrast, opposition parties often demand and/or propose substantive political change that is often only vaguely defined. We thus expect that voters generally have more difficulties in accurately placing opposition than government parties and that opposition parties are more likely to be evaluated with high levels of assimilation and contrast, because they lack a visible track record and are regularly associated with decisive, but often insufficiently defined, policy change. In the empirical analysis, incumbency is assessed by the dummy variable G_j. Data on the incumbency status on the election date was compiled from the ParlGov database and merged with the PIREDEU dataset (cf. Döring, 2013).

Fragmentation of party systems. We now shift our focus from individual parties to systemic features of party competition. In terms of overall placement mismatch, it will be easier for voters to process information and to correctly place political parties on competitive issue dimensions when there is only a limited level of party system fragmentation. However, focusing more explicitly on projection effects, a lower number of parties opens up more room for manoeuvre and for shifting individual parties within the political space. The concentration of party systems also allows for the emergence of more clear-cut, manifest patterns of party evaluation. We thus hypothesize that a lower number of parties tends to allow for, on average, more accurate party placements, but also for more intense projection bias.

We measure the fragmentation of national electorates in EP elections by the effective number of parties (Laakso and Taagepera, 1979). Building on the vote

shares gained by political parties, the index is given by $N_v = [\sum_{j=1}^{n} v_j^2]^{-1}$. Empirical data on the individual parties' vote shares that is required to compute fragmentation scores was also taken from the ParlGov dataset.

Polarization of party systems. Ultimately, we broaden our perspective to also cover features of party system polarization. Expectations about potential effects of polarization on assimilation and contrast may be considered from various angles:

(i) Significant levels of polarization among political parties indicate the politicization of an issue and the provision of crystallized and discernible party positions. We argue that clear programmatic divisions allow voters to clearly capture individual party positions and this helps to reduce the average mismatch of subjective and 'objective' placements.
(ii) In contrast, if polarization also induces bitter conflicts, voters may develop more uncompromising evaluations of political parties which, in turn, propel and reinforce projection effects. While polarization therefore reduces the average mismatch of subjective and 'objective' party placement, we expect that, at the same time, it increases the propensity to assimilate liked and to contrast disliked candidates.

We use the Dalton index to measure party system polarization (Dalton, 2008: 906). Generally speaking, the index builds on the average deviation of individual party positions from the mean party position, $\bar{p}$, and these differences are weighted by the respective parties' vote shares v_j:

$$D = \left[\sum_{j=1}^{n} v_j (p_j - \bar{p})^2 \right]^{0.5}.$$

Given that we evaluate seven independent causal determinants on the mismatch of subjective and objective party placements and on assimilation and contrast, our theoretical argument is complex and involves both the main effects of the explanatory variables and their interaction with party attachment. For convenience, Table 3 wraps up the hypotheses at the voter, party, and national levels.

Empirical determinants of assimilation and contrast

Table 4 presents the empirical findings and summarizes our causal inferences on the determinants of assimilation and contrast. We have analysed the absolute values of mismatch for potential cases of assimilation ($\Delta P > 0$; Models 1 and 3) and contrast ($\Delta P < 0$; Models 2 and 4) separately. We also ran separate models for the left–right and the European integration dimension. Recall that evidence for assimilation and contrast is present whenever the difference of subjective and mean party placements systematically co-varies with the voters' propensity to cast a vote for a certain party.

Table 3. A summary of the causal hypotheses

Variable	(1) Mismatch $\lvert\Delta P\rvert$	(2a) Assimilation	(2b) Contrast
–Voter level–			
Sophistication	decrease	increase	increase
Extremism	Increase	increase	increase
–Party level–			
Extremism	decrease	increase	increase
Ambiguity	decrease	decrease	decrease
Incumbency	decrease	decrease	decrease
–Party system level–			
Fragmentation	increase	increase	increase
Polarization	decrease	increase	increase

Beginning with the individual level, voter sophistication tends to reduce placement differences so that informed voters regularly place parties much closer to their 'true' positions. Across the board, voters who hold extremist preferences or support extremist ideologies tend to place parties less accurately than centrist, mainstream voters, because their understanding of issue dimensions and programmatic competition obviously 'differs'.

Turning towards the party level, we find a clear association of programmatic party ambiguity with the average levels of misplacement. Parties which offer unified and clear programmatic positions are significantly less likely to be misplaced by the voters in any of the four models. In contrast, the findings with regard to the effects of party extremism are mixed: a majority of our models indicates that party extremism reduces placement error (Models 2–4), but there also appears to be conflicting evidence (Model 1).

Moving up levels, we find, contrary to our hypotheses, almost no evidence for the empirical consequences of party system features such as fragmentation and polarization. Across our four models there is no significant or substantively meaningful association of placement differences with the fragmentation of electoral party systems and no consistent and meaningful association with our polarization indicator either.

These results shed some light on the determinants of party misplacement. Yet, as indicated, assimilation and contrast are causal effects and cannot be directly observed. Differences among subjective and 'objective' party placements per se do not sufficiently identify projection effects. Instead, causal determinants are captured by conditions that modify the effect of party attachment on utility differences. With regards to the interactions of (logged) PtV with contextual variables from the three hierarchical layers of the model, the empirical evidence is much more ambiguous. There are only a few indications of systematic projection effects. The empirical estimates are either statistically insignificant, substantively meaningless, or differ

Table 4. Causal inferences on projection effects

	Left–right				European integration			
	Assimilation; $\Delta P > 0$ (1)		Contrast; $\Delta P < 0$ (2)		Assimilation; $\Delta P > 0$ (3)		Contrast; $\Delta P < 0$ (4)	
–Main effects–								
Party attachment [$\ln \mathrm{PtV}_{ij}$]	0.6927***	(0.1250)	−0.4080**	(0.1270)	−0.1235	(0.1479)	−0.1961	(0.1667)
Pol. sophistication [S_i]	−0.0601***	(0.0059)	−0.0511***	(0.0042)	−0.0652***	(0.0060)	−0.0187**	(0.0059)
Voter extremism [v_i^2]	0.0575***	(0.0010)	0.0304***	(0.0007)	0.0926***	(0.0010)	0.0250***	(0.0010)
Party extremism [p_j^2]	0.0752***	(0.0059)	−0.0694***	(0.0042)	−0.0178*	(0.0082)	−0.0754***	(0.0076)
Party unity [δ_j]	0.6399***	(0.0495)	0.7228***	(0.0357)	0.4265***	(0.0610)	0.9174***	(0.0538)
Incumbency [G_j]	0.0892*	(0.0453)	−0.0760*	(0.0336)	0.1155**	(0.0377)	0.0790*	(0.0369)
Fragmentation [N_v]	0.0026	(0.0170)	−0.0080	(0.0143)	0.0023	(0.0153)	−0.0030	(0.0120)
Polarization [D]	0.0113	(0.0319)	−0.0554*	(0.0264)	−0.0066	(0.0344)	0.0647*	(0.0284)
Constant	−0.7175**	(0.2362)	0.8773***	(0.1859)	−0.0760	(0.2690)	−0.2860	(0.2349)
–Interactive effects–								
$\ln \mathrm{PtV}_{ij} . S_i$	−0.0044	(0.0035)	−0.0071*	(0.0034)	0.0203***	(0.0038)	−0.0027	(0.0043)
$\ln \mathrm{PtV}_{ij} \cdot v_i^2$	0.0007	(0.0006)	−0.0013*	(0.0007)	−0.0072***	(0.0006)	−0.0002	(0.0007)
$\ln \mathrm{PtV}_{ij} \cdot p_j^2$	−0.0268***	(0.0036)	0.0362***	(0.0037)	0.0347***	(0.0056)	0.0623***	(0.0062)
$\ln \mathrm{PtV}_{ij} \cdot \delta_j$	−0.1589***	(0.0287)	−0.0619*	(0.0288)	0.0223	(0.0340)	−0.0887*	(0.0387)
$\ln \mathrm{PtV}_{ij} \cdot G_j$	−0.0692*	(0.0270)	0.0554*	(0.0275)	−0.0811***	(0.0237)	−0.0436	(0.0268)
$\ln \mathrm{PtV}_{ij} \cdot N_v$	−0.0116	(0.0080)	0.0028	(0.0081)	−0.0027	(0.0074)	0.0298***	(0.0081)
$\ln \mathrm{PtV}_{ij} \cdot D$	−0.0302	(0.0161)	0.0321	(0.0165)	0.0052	(0.0174)	−0.0325	(0.0196)

(continued)

Table 4. Continued

	Left–right				European integration			
	Assimilation; $\Delta P > 0$ (1)		Contrast; $\Delta P < 0$ (2)		Assimilation; $\Delta P > 0$ (3)		Contrast; $\Delta P < 0$ (4)	
–Random effects–								
1: Country level								
RI [$\sqrt{\psi_k}$]	0.0891***	(0.0300)	0.0875***	(0.0221)	0.0848***	(0.0247)	0.0427***	(0.0262)
2: Party level								
RS [$\sqrt{\psi_{j,1}}$]	0.1329***	(0.0104)	0.1385***	(0.0105)	0.0981***	(0.0103)	0.1112***	(0.0114)
RI [$\sqrt{\psi_{j,0}}$]	0.2142***	(0.0185)	0.1568***	(0.0130)	0.1502***	(0.0166)	0.1473***	(0.0153)
3: Voter level								
Residual [$\sqrt{\theta}$]	1.1061***	(0.0038)	1.2363***	(0.0036)	1.2451***	(0.0043)	1.4001***	(0.0047)
N	43397		58912		42250		44627	
log. lik.	−66258.1384		−96372.4656		−69421.4484		−78531.9015	

Standard errors in parentheses.
*$p < 0.05$, **$p < 0.01$,***$p < 0.001$.
Notes: RI indicates random intercepts, RS indicates random slopes and both give the standard deviation of the random effects at the respective level. The individual variance components are assumed independent, and all covariances are set to zero.

between our models for assimilation and contrast or with regard to the two dimensions of political contestation.

In sum, the causal analysis has identified some empirical determinants of the absolute mismatch of subjective and 'objective' party placements. Particularly, low levels of voter sophistication, extremist voter ideologies, programmatic ambiguity, and discordance within political parties contribute to placement differences and errors. However, our analysis failed to point out any specific interaction between these (and other) context effects on the association of placement mismatch and the PtV. Projection effects thus appear to occur rather independently of socio-political and institutional contexts. Thus, assimilation and contrast are unsystematic rather than systematic effects.

Findings, remedies, and perspectives

The theoretical arguments and empirical findings in this article are important and consequential for a number of reasons: established hypotheses from political psychology are effectively corroborated by our analysis of party placements in the most recent wave of the EES. Party placements are systematically distorted by the individuals' PtV 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.

Building on what is, to our knowledge, the most comprehensive and exhaustive comparative dataset on projection effects, we were also able to assess the robustness of our findings across the currently 27 member states of the EU, 198 political parties or lists competing in the 2009 EP elections, and two specific dimensions of political competition. While the well-established patterns of assimilation and contrast play out on both dimensions, our novel empirical operationalization, which builds on the fine-grained PtV as the key independent variable, reveals that contrast appears to outweigh assimilation effects in multiparty electoral competition.

Our analysis ultimately aimed to explore the causal determinants of assimilation and contrast. We find much more evidence for the lack of, than for the significance of, causal and contextual effects. By and large projection effects appear to be unsystematic and context-independent rather than systematic and context-dependent. In subsequent research, our descriptive and causal inferences may be utilized to develop rescaling techniques which correct for the distortion of idiosyncratic party placements by assimilation and contrast.

In the realm of practical politics, projection effects may easily affect an individual's vote choice and facilitate a spillover from non-policy to policy utilities. Whenever voters like a specific candidate or party due to non-policy considerations, these convictions may help to artificially fabricate more favourable policy utilities as well. As a result, the overall utility function which consists of policy and non-policy utility terms (cf. Adams et al., 2005) may favour that candidate or party even more, increase the PtV for that party, and help to change the voter's choice.

While projection effects are an interesting phenomenon per se, 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 overestimated and the impact of alternative models of spatial voting and of non-policy motives underestimated (Macdonald et al., 1991, 1998, 2001). The bias implied by projection effects potentially leads to biased inferences on the determinants of electoral choice.

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Notes

1. Rabinowitz and Macdonald refer to this as 'rationalization'. However, we will stick with 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 earlier works in cognitive psychology cited above (cf. Heider, 1958; Sherif and Hovland, 1961; Wedell et al., 2007).
2. Regarding the limited perspective of this article, we cannot present a thorough review of the political psychology literature. Instead, Jon Krosnick (2002) provides an excellent overview of classical contributions to cognition theory and their application to the study of voter perceptions and projection effects.
3. While cross-sectional analyses often corroborate the existence of projection effects, the empirical evidence is also consistent with a whole gamut of alternative explanations, for example '(1) perspective effects, (2) policy-based evaluation and persuasion, (3) variation in candidate's issue statements (Rovny, 2012), and (4) the agreement principle' (Krosnick, 2002, 121–122).
4. There is an extensive debate concerning the merits and setbacks of various measures such as the analysis of party manifestos, computerized text analysis, expert surveys on party locations, or roll-call data. Due to space constraints, we cannot adequately summarize these controversies. A good starting point for this literature includes Marks (2007) and other articles in a special issue of *Electoral Studies* 1/2007.
5. Of course, no operationalization of 'objective' party positions fully captures the underlying latent concept. However, we like to check that separately for each measure and feel a little uneasy by estimating latent variables from divergent data sources. It is very difficult to understand the position scores produced by such a procedure, to assess options and limitations of these data, and to meaningfully apply these scores to real-world political analysis. We simply do not know enough about the properties of position scores that are extracted from a variety of different issues. Such a task would need to be addressed in additional publications.
6. At this point we hasten to add one additional caveat: there are a number of cases where the voter does not only pull a party towards her own position, but also reverses the ordering of party and voter positions ('leapfrogging'). Although the results do not significantly differ, we decided to remove all cases from our sample where the party position did not remain on the same 'side' either on the left–right and/or the European integration dimension. The extent of 'leapfrogging' amounts to roughly 16 percent of all respondents on the left–right dimension and approximately 23 percent on the European integration dimension.

7. Further details about the aims, the study components such as the voter and candidate surveys or the media and manifesto studies, and the methodological foundations of the PIREDEU project can be accessed on the internet: http://www.piredeu.eu.
8. 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. Thus, our logged scale may take on values from ln 1 to ln 11.
9. For example, we substituted a number of alternative external proxies as yardsticks for 'true' party positions such as manifesto data and alternative expert surveys. These results are available via the web appendix.
10. Random intercept models (not shown here) are rejected in favour of random slope models. The statistically significant test statistics are $\chi^2 = 658.81$ for left–right and $\chi^2 = 406.28$ for the European integration dimension.

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