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Abstract	Recent publications have recognized bias in voter and party placements such as “differential item functioning” (in a broader sense) or “projection effects” (in a narrower sense). This paper is concerned with the latter, and we suggest both a measurement model and a re-scaling approach that corrects for projection bias in voter-specific party placements. Assessments of spatial voting models are systematically distorted when voters tend to pull parties they prefer closer to their ideal points (“assimilation”) while pushing parties they dislike farther away (“contrast”). These projection effects tend to contaminate voter perceptions of spatial positions with non-spatial considerations and thus introduce bias to empirical evaluations of alternative models of vote choice. The paper proceeds in two consecutive steps: In the first part, we utilize a large, cumulative dataset compiled from the “Comparative Study of Electoral Systems” (CSES) survey series to demonstrate and measure the presence, magnitude, and contextual variation of projection effects, i.e., of assimilation and contrast. Building on these empirical findings, the second part suggests a re-scaling technique that corrects for systematically biased party placements. We apply these techniques to a subset of the cumulative CSES data to highlight the practical added value of obtaining rescaled and unbiased party positions.

Keywords (separated by '-')	Spatial model - Political psychology - Vote choice - Projection effects - Scaling techniques

Projection Effects: Coping with Assimilation and Contrast

Guido Tiemann

1 Introduction

The spatial model of voting is often considered *the* workhorse of modern electoral studies and for decades belongs to the standard toolbox of empirical election studies (cf. Downs 1957; Davis et al. 1970; Enelow and Hinich 1984). In principle, any spatial voting model claims two things: (i) there is a meaningful relationship between the ideal points of voters and the programmatic positions of political parties in some one- or multidimensional political space, and (ii) these relations matter for (models of) party evaluation and vote choice.

Therefore, the validity of empirical research depends on voters' ability to meaningfully locate parties within a political space. Notable contributions have shown that there are limits to this and raised some more general concerns about "differential item functioning". Provided that issue scales in survey questionnaires are usually merely labeled at their end or extreme points, respondents may understand scales and scale points in very different ways. Even preserving the general ordering of candidates or parties along a dimension, some voters may be willing to use the entire scale, but the placements of others may be more centrist and confined to moderate positions. Empirical research has also demonstrated that respondents tend to place themselves, candidates, or parties they like at rather centrist positions. In contrast, voters tend to locate parties they cogently oppose much farther out.

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The electoral studies literature has repeatedly addressed these issues: notably, a recent strand of literature has recurred to a scaling procedure suggested by Aldrich and McKelvey (1977) to provide corrected, rescaled party placements (Hare et al. 2014; Lo et al. 2014). Other contributions have focused on the more specific concern that idiosyncratic party placements may be biased due to alleged projection effects. 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, farther away ("contrast"). Subsequent empirical analyses have compiled valid and robust evidence for the presence of projection effects (Granberg et al. 1988; Grand and Tiemann 2013; Judd et al. 1983; Krosnick 1990; Miller et al. 1986; Rahn et al. 1994).

Whether concerns about bias and distortion in unscaled idiosyncratic party placements are justified crucially depends upon the angle from which spatial party positions are conceptualized and evaluated. From a subjectivist perspective, there is no need to correct or rescale idiosyncratic placements of candidates and/ or parties. Voters are only able to apply information they are personally aware of, parties are located where voters think they stand, and unified, objective party placements are either fictitious or unobservable. From an objectivist perspective, idiosyncratic party placements are systematically distorted perceptions of some latent, objective party location. Biased party placements therefore need to be addressed to ensure correct, unbiased inferences about electoral choice. Candidates and parties may (at least) be attributed some latent, true positions, and voters may either correctly or incorrectly perceive these locations, and they may do so with unsystematic error or with systematic bias.

This paper explores the specific implications of projection effects, evaluates their presence, measures their magnitude, and studies the implications of assimilation and contrast for empirical and statistical models of electoral choice. Systematically distorted perceptions of party positions are not only a problem per se. Biased party placements may also modify electoral behavior and lead to distorted and wrong inferences by electoral researchers. Empirical evidence for projection effects thus calls into question the key elements of the spatial voting framework.

This paper is particularly concerned with three inter-related aspects: i) establishing the presence and measuring the magnitude of assimilation and contrast across diverse, heterogeneous contexts, ii) providing a procedure for deriving unbiased party placements, iii) establishing the consequences of systematic projection bias for the estimation of electoral choice models. We address these issues in three consecutive, inter-connected steps: i) We begin with the key arguments, develop a formal definition of assimilation and contrast, and propose a

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measurement model for the differences between subjective and objective party placements. The measurement strategy builds upon a Bayesian hierarchical model and provides descriptive evidence of the presence and the magnitude of projection bias across diverse contexts. ii) Because our empirical analysis provides robust evidence on systematic projection bias, we build upon the previous inferences and suggest a technique to correct and rescale idiosyncratic party placements. iii) That said, we cannot simply assume that the presence of projection bias also carries over to estimation bias in models of vote choice, i.e., that assimilation and contrast make us systematically overestimate the salience of spatial proximity terms and underestimate the salience of alternative specifications of spatial models or non-spatial utility components. We therefore compare the impact of subjective, idiosyncratic party placements, objective mean party positions, and re-scaled, corrected party placements in empirical models of vote choice.

2 Defining Projection Effects

Explanations for projection effects build on consistency perspectives which posit that individuals try to overcome and work against cognitive dissonance. Predominant concepts in psychology 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 the underlying issues. The dualism of assimilation and contrast is an established building block in the social psychology and cognition theory research traditions.

These classical approaches have been adopted by electoral studies and utilized to study voter perceptions of party ideologies and positions. Applied to individual-specific party placements, voters may achieve psychological consistency by either shifting their personal ideal points or by manipulating the political parties' spatial positions. To clarify some confusion in the imminent literature, we start by applying key notions 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 to bring consistency back in. From the angle of Downsian proximity voting,

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a) she might pull positions of political parties she likes for non-spatial reasons closer to her unchanged spatial ideal point ("assimilation"), or
b) she might push parties she opposes for non-spatial reasons farther away from her unchanged ideal point ("contrast").

The inherent causal mechanisms are established with reference to classical contributions to political psychology. Firstly, following Heider's balance theory, the individual need for establishing cognitive consistency depends on the existence of "unit relations" with the respective candidate or party, i.e., the stronger the attachment to a specific candidate or party, the higher the individual pressure to eradicate cognitive dissonance. Secondly, 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. Thirdly, not only electoral preferences and choices but the importance attributed to specific issues determine how sensitive an individual is to cognitive inconsistencies. The salience of an issue dimension therefore governs the presence and magnitude 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. Notably, assimilation and contrast label and refer to causal effects that cannot be directly observed (cf. Krosnick 1990, 2002). Conceptually, political scientists are thus often 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) argues that cross-sectional data alone is per se insufficient for any clear differentiation between persuasion and projection effects.While cross-sectional data analyses may often corroborate the existence of projection effects, the empirical evidence is also consistent with a whole gamut of alternative explanations, e.g. "(1) perspective effects, (2) policy-based evaluation and persuasion, (3) variation in candidate's issue statements, and (4) the agreement principle" (Krosnick 2002, S. 121–122). Instead, dynamic panel models potentially facilitate the isolation of causal factors due to the temporal sequencing of events. Still, panel data is often not available and comes with problems of its own.

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 "latent", "objective", or "unified" party placements constitute a necessary but not sufficient condition for the presence and detection 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.

2.1 Objective Party Positions

A crucial point for the measurement of projection effects is whether we need to assume some yardstick of objective party positions and, if so, how this reference 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. Measurement strategies suggested by political scientists are often ambiguous. Established measures of party ideology or preferences frequently start with incompatible assumptions, are usually designed for different purposes, and differ in their empirical assessments.

In empirical terms, the studies by Granberg and Holmberg (1986), Granberg et al. (1988), Merrill et al. (2001), and Adams et al. (2005) reach very 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 U.S. presidential and congressional races. Beyond the United States, in multiparty systems, the assimilation of preferred parties seems to have a much more significant effect than the contrast of disliked ones. This has often been called the asymmetry of projection effects, which is governed by the alleged dominance of assimilation over contrast effects (Granberg and Holmberg 1986; Granberg et al. 1988; Krosnick 2002; Merrill et al. 2001).

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2.2 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 measurement model may be re-phrased and focused on the difference of the two utility specifications U and $U*$:

1. Subjective distances/utilities ΔU are given by the distance of the voter's self-placement (v_i) and subjective, voter-specific party placements p_{ij} ($U = -|v_i - p_{i,j}|$).
2. objective distances/utilities $U*$ are defined by the negative distance of the voter's self-placement and objective, unified party positions $p*$ ($U* = -|v_i - p_j*|$).
3. the difference of these distances, i.e., the difference of subjective and objective placement distances ΔU, is, in turn, given by

$$\Delta U = U - U* = -\left|v_i - p_{ij}\right| + |v_i - p_j*|$$

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

1. $\Delta U = 0$: if ΔU 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 ΔU 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 ΔU is negative, utilities based on objective placements exceed subjective ones, and this *may* also point to projection bias (contrast).

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 even pulls her idiosyncratically perceived party position *beyond* her personal ideal point, thereby reversing the ordering of party and voter positions ("leapfrogging"). For conceptual reasons, we have decided to remove all cases from our sample where

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the party position did not remain on the same 'side' either on the left–right dimension.

There are many potential reasons why voter-specific party placements may differ from objective positions of political parties, and projection bias, be it assimilation or contrast, is only one possible explanation. The formal identification of projection bias requires to relate the placement differences ΔU 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.

$$\begin{aligned} \Delta U &\propto A \\ \Delta U &= \boldsymbol{\beta} A + \beta_0 \end{aligned}$$

If there is projection bias, placement differences ΔP and party attachment A should be positively related: $\beta_1 > 0$: $\Delta U = \beta_1 A_{ij} + \beta_0$. The corresponding marginal effect is given by $\partial \Delta U / \partial A_{ij} = \beta_1$. Projection effects are only present when $\beta_1 > 0$. The intersection of the upward-sloping predicted effects with the zero-line ($\Delta U = 0$, $U = U*$) by definition separates contrast and assimilation. The presence and magnitude of projection effects are thus indicated by the marginal effects of party attachment A on the difference of objective and subjective placement differentials or utilities ΔU. In the subsequent section, we will discuss specific options to measure party attachment, explore the functional form of the effects of party attachment on placement differentials, and suggest a context-sensitive, comparative measurement model.

3 Measuring Projection Bias

The empirical section begins with a brief introduction of the data at hand and a presentation of the key decisions taken to operationalize and measure the key variables. The subsequent presentation of empirical findings focuses on the presence and magnitude of projection effects, critically reviews some specification issues, and addresses both the presence and variability of projection effects. We conclude that assimilation and contrast are clearly visible, statistically significant, and potentially consequential effects, but we also demonstrate that their impacts vary considerably across individual parliamentary elections and across alternative political parties nested in these contexts.

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In this paper, we present a secondary analysis of the "Comparative Study of Electoral Systems" series. CSES is a collaborative research project which is organized by survey teams from a growing number of countries that field common modules of questions in their respective post-election surveys. The CSES project thus aims at providing a unified infrastructure for the comparative and contextual study of electoral politics. To date, the series consists of four complete modules, with each covering some forty to fifty country-election segments.

To date, the parallel election surveys gathered by the CSES project are *the* unique and exhaustive data source for comparative electoral studies. Our statistical models of vote choice build upon the "CSES Integrated Module Dataset" (henceforth: CSES IMD dataset), i.e., upon a cumulation of the first four waves of CSES which covers a heterogeneous set of more than 280,000 interviewees, 174 individual elections, and 55 countries. The cumulative dataset used for the subsequent analyses covers an overall period from 1996 to 2016. For consistency, we exclusively focus on elections to national parliaments, to lower houses in bicameral systems. The dataset compiled for our analyses includes of a subset of 148 post-election surveys from 53 different, heterogeneous polities. Most of the election segments cover interviews with roughly 1000 to 2000 eligible voters, with a minimum of $N = 860$ voters in Hong Kong (2004) and a maximum of $N = 4495$ voters in Canada (2008). (Downloadable data, further details about the aims, the components, and the methodological foundations of the CSES project can be assessed on the internet at: http://www.cses.org/.)

In the next step, we discuss the subset of variables selected for the comparative assessment of projection effects. First, we introduce variables needed to establish the necessary condition for projection effects. The CSES questionnaires explore voter self-placements on the general left–right scale ($v_i \in [0, 10]$) and also require the respondents to place each party competing on the same general left–right dimension ($p_{i,j} \in [0, 10]$). Subjective distances P are based on voter-specific party placements ($U = |v_i - p_{i,j}|$) and objective distances are derived from mean voter-specific party placements ($U* = |v_i - p_j *|$). The placement difference is given by subtracting the objective utilities from the subjective ones: $\Delta U = U - U* = -\left|v_i - p_{i,j}\right| + |v_i - p_j *|$.

Secondly, we turn to an additional variable that enables us to establish sufficient conditions for projection effects. Alongside the key variables indicating the self-reported spatial positions of voters and their perceived party placements, the CSES questionnaires also include a fine-grained thermometer indicator for party evaluation. Respondents are inquired to indicate whether they like a party or not on a scale ranging from 0 ["strongly dislike"] to 10 ["strongly like"]. In the English language questionnaires, the specific wording is: "I'd like to know what you think about each of our political parties. After I read the name of a political party, please rate it on a scale from 0 to 10, where 0 means you strongly dislike that party and 10 means that you strongly like that party". The empirical distribution of thermometer scores is considerably skewed to the left. Significantly, more than forty percent of respondents, when asked whether they would like a specific political party, promptly indicate that they do "strongly dislike" it (with a score at or close to zero).

Applying an exact, graded measure of party attachment provides additional information. It goes beyond preceding studies that persistently employed some binary distinction between voters and non-voters of a specific candidate or party. This gross measure may well be sufficient for the analysis of two-party competition in U.S. presidential and congressional elections. However, in multiparty systems, we believe this oversimplifies the more complex and graduated preference structures. When there are multiple political parties competing, lumping a variety of different voters, who possibly hold very different political preferences, into the broad and diffuse category of "non-supporters" does not yield sufficient analytical accuracy and fails to fully exploit the rich data at hand. This has the potential to introduce bias in our measurement and is likely to decrease the empirical significance of contrast effects.

4 The Magnitude of Assimilation and Contrast

We evaluate the presence and magnitude of projection effects by applying hierarchical linear models which consider the election, the party, and the individual level, and we organize our presentation of the empirical finding in two consecutive steps: (i) The fixed part of the hierarchical models sheds some light on the presence and the magnitude of projection effects. (ii) The random part of the measurement model enables us to gauge the variability of assimilation and contrast across different elections and different parties competing.

Remember that we establish assimilation whenever utilities based on subjective, voter-specific party placements exceed objective utilities, which are calculated with mean party positions ($U > U*$). In turn, there are contrast effects whenever objective utilities exceed subjective utilities ($U* > U$). So as to identify projection effects, we relate these placement differences ΔU to our measure of closeness to a particular political party, being the thermometer scale of party evaluations (LIKE $\in [0, 10]$), higher values of LIKE indicate more favorable evaluations and thus a higher attachment to a political party. We identify projection effects whenever placement mismatch ΔU and closeness to political parties

$\text{LIKE}_{i,j[k]}$ are related positively. The measurement model accounts for placement differences ΔU by hierarchical linear models, which probe variation across different countries and parties. We may formalize and present a Bayesian hierarchical model as follows:

$$\Delta U_{i,j[k]} \sim N(\mathbf{LIKE_{i,j[k]}}\boldsymbol{\beta}_{\mathbf{[k]}}, \sigma^2_{[k]})$$

$$\beta_{[k]} \sim N(\mathbf{z_{j[k]}}\boldsymbol{\gamma}_{\mathbf{k}}, \omega^2_k)$$

There are two alternative ways to estimate the measurement model. $\text{LIKE}_{i,j[k]}$, which is captured by an eleven-point-scale, could either be treated as a categorical or as an interval variable. Treating $\text{LIKE}_{i,j[k]}$ as a discrete variable and introducing a series of dummy variables for the levels of $\text{LIKE}_{i,j[k]}$ yields a somewhat more complex model but avoids some dubious and unverified assumptions concerning the effect of $\text{LIKE}_{i,j[k]}$ on ΔU. Treating $\text{LIKE}_{i,j[k]}$ as a continuous variable is more convenient due to the ease of statistical estimation and the inclusion of interaction terms. However, this strategy involves unverified assumptions about the linearity of parameters that are neither supported by theoretical models nor backed by available empirical evidence.

We first discuss a hierarchical linear model that treats $\text{LIKE}_{i,j[k]}$ as a categorical predictor and employs random effects on the country and party levels. Breaking down the party attachment variable into a series of eleven binary dummies enables us to estimate its effect on assimilation and contrast without assuming any specific (linear) association. This specification has the obvious advantage that it does not assume any specific functional association between the level of closeness to a certain party and the magnitude of assimilation and contrast. The fixed part of the multilevel model is utilized to explore the average magnitude of assimilation and contrast in the stacked CSES dataset. The empirical estimates confirm highly significant effects of $\text{LIKE}_{i,j[k]}$ on placement mismatch and refer to meaningful and substantive projection effects in voter-specific party placements. This (and the following) models are estimated using uninformative priors for $\boldsymbol{\beta}$ and weakly informative priors for σ^2 with mean set equal to the marginal variance of the dependent variable. We use 10,000 iterations of the MCMC algorithm, a burnin of $N = 1000$, one Markov chain and no thinning to derive the posterior distributions of our key parameters ($\boldsymbol{\beta}$ and $\widehat{\Delta U}$). The hierarchical models pass all usual convergence and specification tests, and the Markov chains display quick mixing.

Table 1 summarizes the posterior distributions of the eleven categorical predictors and thus provides an overview of baseline assimilation and contrast effects

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Table 1 Posterior summaries with $\text{LIKE}_{i,j[k]}$ as a categorical predictor

Party Attach	Distribution		Quantiles	
$\text{LIKE}_{i,j[k]}$	$\boldsymbol{\beta}$	$\boldsymbol{\sigma}$	**2.5%**	**97.5%**
0	−1.65	0.02	−1.69	−1.62
1	−1.14	0.02	−1.18	−1.10
2	−0.83	0.02	−0.87	−0.79
3	−0.57	0.02	−0.61	−0.53
4	−0.35	0.02	−0.39	−0.31
5	−0.18	0.02	−0.22	−0.15
6	−0.06	0.02	−0.10	−0.02
7	0.02	0.02	−0.02	0.06
8	0.13	0.02	0.09	0.16
9	0.23	0.02	0.19	0.27
10	0.59	0.02	0.55	0.63
N	Level 1: 713,439 individuals/ Level 2: 148 election studies			

Notes: The Table displays marginal effects over the different categories of $\text{LIKE}_{i,j[k]}$ derived from a Bayesian hierarchical model. The dependent variable captures the difference of utilities based on voter-specific and mean party placements on the left–right dimension (ΔU), i indicates the individual, j indicates the party, and k indexes the election level. The dataset is organized in a two-level structure with 713,439 complete and valid respondents nested within the contexts of exactly 148 elections compiled from the CSES IMD dataset. Random intercepts and random slopes for all categories of $\text{LIKE}_{i,j[k]}$ are included at the election level, but have been omitted in the tabular summary

across the selected country segments of cumulated CSES dataset. The results yield strong evidence on the significance of projection effects and clearly demonstrate that the magnitude of assimilation and contrast clearly increases/decreases with the levels of party attachment captured by the $\text{LIKE}_{i,j[k]}$ indicator. Everything else being equal, a voter tends to pull parties she strongly prefers almost 0.6 scale points toward her personal position ($\text{LIKE}_{i,j[k]} = 10$). On the other hand, she tends to push parties she strongly opposes more than 1.6 scale points away ($\text{LIKE}_{i,j[k]} = 0$).

We next turn to a more parsimonious multilevel regression model that treats $\text{LIKE}_{i,j[k]}$ as a continuous predictor by introducing some additional assumptions regarding the shape of the association between ΔU and LIKE. The previous model indicated non-linearities of projection effects, and considering that contrast effects appear to be much stronger than assimilation, we have decided to use

Table 2 Posterior summaries with $\text{LIKE}_{i,j[k]}$ as a continuous predictor

Party Attach	Distribution		Quantiles	
	β	σ	**2.5%**	**97.5%**
β_1: [lg $\text{LIKE}_{i,j[k]}$]	0.91	0.03	0.85	0.96
β_0: [intercept]	−1.80	0.06	−1.91	−1.68
Random Effects				
$\zeta_{0[k]}/\ \delta[\beta_0]$	0.70	0.04	0.63	0.79
$\zeta_{1[k]}/\ \delta[\beta_1]$	0.35	0.02	0.31	0.39
N	Level 1: 713,439 individuals/ Level 2: 148 election studies			

Notes: The Table displays marginal effects over logged values of the party attachment indicator $\text{LIKE}_{i,j[k]}$ taken from a Bayesian hierarchical model. Random intercepts and a random slope lg $\text{LIKE}_{i,j[k]}$ are included at the election level but have been omitted in the tabular summary

the natural logs of $\text{LIKE}_{i,j[k]}$ as our key independent variable. (Given that the original $\text{LIKE}_{i,j[k]}$ scale ranges from zero to ten and that the logarithm of zero is not defined, we have shifted the scale by adding one point. The logged scale thus may take on values from ln1 to ln11.) The hierarchical measurement model includes random intercepts and random slopes at the election level.

Table 2 presents a hierarchical model that confirms the presence of projection effects across the countries covered in the three CSES waves. The multilevel model rests on rich empirical data provided by 713,439 "complete" observations compiled from 148 post-election surveys covered by the CSES project, which, in turn, are taken from 53 different country contexts. The empirical findings clearly reveal the expected positive effect of logged thermometer scores on the difference of subjective and objective utilities. The obtained random effects, noted in the lower part of the table, also demonstrate that the magnitude of assimilation and contrast varies, i.e., die estimated random intercepts and random slopes, considerably vary across different contexts.

Figure 1 illustrates our inferences from the two alternative measurement models graphically and provides a comparison of the previous specifications, which capture the magnitude of assimilation and contrast and contrast depending on party attachment. We concentrate on the "fixed part" of the models. The left-hand panel displays violin plots of posterior densities based on models which treat party attachment ($\text{LIKE}_{i,j[k]}$) as a categorical variable (cf. Table 1), and the right-hand panel displays similar graphs when $\text{LIKE}_{i,j[k]}$ is included as a logged

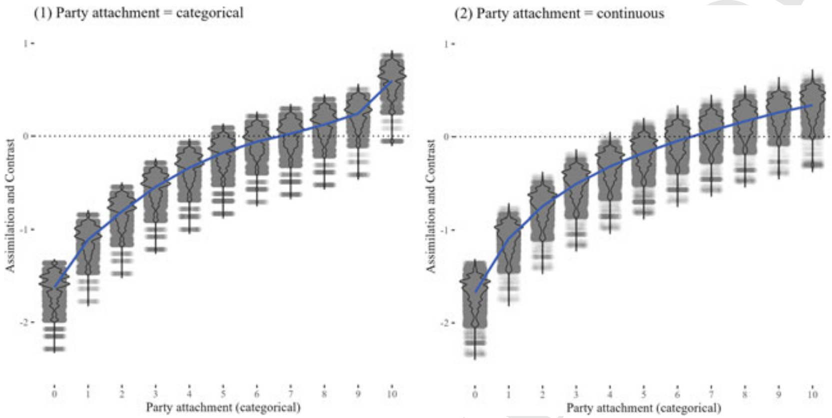

Fig. 1 Comparing Inferences and Models of Projection Effects (Fixed Part) **Notes:** The Figure reproduces the mean trajectories for projection bias on the left–right dimension. 1) The left-hand panel shows predictions of the magnitude of assimilation and/or contrast based on the "categorical" model, 2) the right-hand panel presents similar predictions for the "continuous" model. In either panel, the dashed horizontal line ($\Delta P = 0$) separates contrast (below) from assimilation effects (above)
Source: Own graphic

continuous predictor (cf. Table 2). Since both predictions are almost congruent, our confidence in the descriptive inferences and the specification of *logged* AQ2 LIKE$_{i,j[k]}$ as the key independent variable is soundly corroborated.

Utilizing a more fine-grained measure of party attachment, empirical findings derived from both models refute the established asymmetry hypothesis. In contrast to key works of dissonance (Festinger 1957) or congruity theory (Osgood and Tannenbaum 1995) and also in contrast with previous work concerned with bipartism in the U.S. (Granberg and Holmberg 1986; Granberg et al. 1988; Krosnick 2002), the average consequences of contrast clearly and systematically outweigh the average effects of assimilation. We will return to this modified perspective on the "asymmetry" of projection effects when discussing the implications of assimilation and contrast for (models of) vote choice in more detail.

Note that the overall projection effect $\beta_{1[k]}$ is composed of the fixed (β_1) and the random parts ($\zeta_{1[k]}$) of the hierarchical model. While the previous Tables and Figures have summarized the fixed part of the Bayesian measurement model, we now explore the context-dependency and variation of projection effects across 148 parliamentary elections selected from the first three waves of the CSES project. As indicated, the measurement model captures the contextual variation of assimilation and contrast by the random components on $\text{LIKE}_{i,j[k]}$ across the various electoral contexts. Figure 2 displays caterpillar plots that capture (the variation of) posterior densities of $\zeta_{1[k]}$. Projection effects appear to be particularly strong, for instance, in the U.S. elections of 2004, the South African elections of 2009, and the Taiwanese elections of 2001, while assimilation and contrast are almost absent or very weak in Bulgaria 2001, Chile 2009, Brazil 2006, or the Walloon part of Belgium in 1999.

5 Correcting for Projection Bias

Our theoretical assumptions have been matched by rich empirical evidence, refer to the significance, and illustrate the magnitude of projection effects. Moreover, the universality of the assimilation and contrast logics across the wide range of countries and parliamentary elections illustrates the importance of considering these distortions in models of vote choice. The level and magnitude of assimilation and contrast effects appear to be alarming as well: if a voter on average pulls a party she likes by more than 0.5 scale points towards and pushes a party she dislikes by more than 1.6 scale points away from her personal ideal point, projection effects may not only alter the raw values of distance terms but potentially modify the rank ordering of spatial utility terms.

This section builds upon the previous theoretical and empirical knowledge and systematically explores the consequences of projection bias for party evaluation and vote choice. We first demonstrate how the predictions for the bias of projection effects may be utilized to "correct" and rescale idiosyncratic party placements. Subsequently, we provide comparisons of spatial voting models which build upon i) subjective, unscaled idiosyncratic party placements, ii) objective, mean party placements, and iii) corrected, rescaled idiosyncratic party placements.

5.1 Unbiased Party Placements

The spatial model of voting is often considered the workhorse of modern electoral studies. Downsian proximity models posit that vote choice is determined by ideological and programmatic proximity and distance (cf., for instance, Downs 1957; Westholm 1997). Both voters and parties are thus represented by points

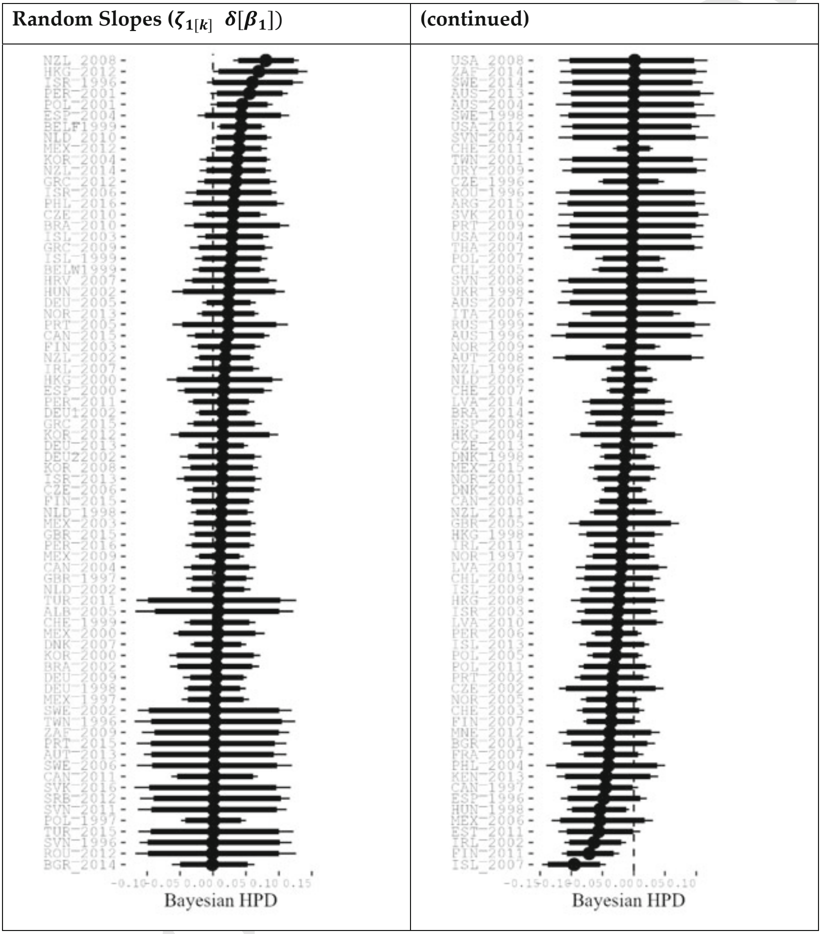

Fig. 2 Projection Effects Across Heterogeneous Electoral Contexts **Notes:** The caterpillar plots present the posterior densities of the election-specific random components $\zeta_{1[k]}$ on lg $\text{LIKE}_{i,j[k]}$. Empirical random effects and their distributions are obtained from the Bayesian measurement model presented in Table 2.
Source: Own graphic

within the political space. Voters evaluate party alternatives by spatial proximity, and thus the candidate or party which is closest to the voter's preferences in an n-dimensional political space yields the highest utility. The principle of utility maximization implies that any voter v_i prefers the electoral platform that offers her the highest expected utility.

We employ a risk-neutral metric for the measurement of spatial utility, i.e., we assess ideological proximity or distance on the left–right scale by the absolute distance of voter ideal points v_i and party placements $p_{i,j}$. Essentially, idiosyncratic utilities are defined by $U_{i,j[k]} = -|v_{i[k]} - p_{i,j[k]}|$, objective utilities are given by $U_{i,j[k]} = -|v_{i[k]} - p{*}_{j[k]}|$, and corrected, rescaled utilities are provided by $U_{i,j[k]} = -|v_{i[k]} - p'_{i,j[k]}|$. From another formal angle, projection effects may also be assessed by the difference of two absolute distances, which may be conveniently rewritten as the difference of subjective and objective utility terms:

$$\begin{aligned} \Delta U_{i,j[k]} &= -|v_{i[k]} - p_{i,j[k]}| - |v_{i[k]} - p^{*}_{j[k]}| \\ &= U_{i,j[k]} - U^{*}_{j[k]} \end{aligned}$$

Scaled, unbiased utilities are now derived by subtracting predicted projection bias $\widehat{\Delta U}$ from unscaled utility terms. If $\widehat{\Delta U} > 0$ the model indicates assimilation, and rescaled utilities are lower than unscaled utilities, if $\widehat{\Delta U} < 0$, the model refers to contrast, and rescaled exceed unscaled utility terms.

Our unified model also includes a vector of non-spatial variables $t_{i,j[k]}$ so that the overall utility $U_{i,j[k]}$ of party $\mathbf{P}$ for voter $\mathbf{V}$ amounts to:

$$U_{i,j[k]} = -||\mathbf{V} - \mathbf{P}|| = \sum_{a[k]=1}^{n} \alpha_{a[k]} U_{i,j[k]} + \boldsymbol{\beta}\mathbf{t_{i,j[k]}}$$

Given that we have presented ample evidence on the genuineness of projection effects in idiosyncratic party placements $p_{i,j[a]}$, the provision of assimilation and contrast may potentially inflate estimates of the "spatial" coefficients α and may potentially depress those of non-spatial predictors β. We address these issues by replacing utility terms based on idiosyncratic party placements $U_{i,j[k]}$ by utility terms based on corrected, unbiased party placements $U'_{i,j[k]}$ derived from the posterior distribution of the measurement model:

$$\begin{aligned} U^{*}_{i,j[k]} &= \alpha_k U'_{i,j[k]} + \boldsymbol{\beta}\mathbf{t_{i,j[k]}} \\ &= \alpha_k \left(U_{i,j[k]} - \widehat{\Delta P} \right) + \boldsymbol{\beta}\mathbf{t_{i,j[k]}} \end{aligned}$$

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$$= \alpha_k \left(|v_{i[k]} - p_{i,j[k]}| - \widehat{\Delta P} \right) + \boldsymbol{\beta} \mathbf{t_{i,j[k]}}$$

5.2 An Application to the Cumulated CSES Data

We now discuss the actual consequences of projection bias for the estimation of policy ($\boldsymbol{\alpha}$) and non-spatial ($\boldsymbol{\beta}$) predictors of vote choice. Our unified models of vote choice represent the spatial component by classical Downsian proximity models, which are either based on i) idiosyncratic, ii) on mean, or iii) on corrected, rescaled party placements. Non-spatial determinants of the vote are represented by a binary variable which indicates party identification, i.e., whether the interviewee declares to be "close to" a specific party alternative or not, and we also include alternative-specific intercepts in order to capture unmodeled utility components (sometimes labeled "valence"). The discrete choice models are estimated separately for each election by conditional logit:

$$\Pr\left[v_{i[k]} = j | u_{i,j[k]}, \mathbf{t_{i,j[k]}}\right] = \frac{e^{u_{i,j[k]}}}{\sum_{j=1}^{J} e^{u_{i,j[k]}}} = \frac{e^{\alpha |v_{i[k]} - p'_{i,j[k]}| + \boldsymbol{\beta} \mathbf{t_{i,j[k]}}}}{\sum_{j=1}^{J} e^{\alpha |v_{i[k]} - p'_{i,j[k]}| + \boldsymbol{\beta} \mathbf{t_{i,j[k]}}}}$$

The models are estimated using post-election survey data from the cumulated CSES IMD dataset. The cumulated CSES IMD dataset provides all necessary items. The dependent variable is reported vote choice. Turning to the independent variables, the respondents are inquired to indicate their ideological self-placements v_i on an eleven-point scale: "where would you place yourself on a scale from 0 to 10 where 0 means the left and 10 means the right". Similarly, all voters are required to place all party alternatives on a similar scale. Eventually, non-spatial considerations $t_{i,j[k]}$ are captured by party identification: "Do you usually think of yourself as close to any particular party?" and, if yes, "Which party do you feel closest to?".

A fundamental interest in the comparison of parameters is to detect whether biased, unscaled party placements effectively introduce an upward bias to spatial ($\boldsymbol{\alpha_k}$) and a downward bias to non-spatial ($\boldsymbol{\beta_k}$) determinants of vote choice. The cumulation of the first four waves of the CSES project provides us with a huge dataset, which has been exploited to assess the presence and magnitude of projection effects. However, our empirical comparison of alternative measures in models of vote choice models can only focus on a subset of the rich CSES data.

The utilization of election-wise conditional logit models implies discarding survey respondents that did not place all party alternatives on the left–right scale. Further, party identification, one of the critical variables that capture non-spatial motives of vote choice, has not been included in many country election studies, and these segments of the CSES data will also be excluded.

We begin our presentation of the results by comparing election-specific conditional logit models based on i) subjective, unscaled and on ii) objective, mean placements of the party alternatives ($p_{i,j[k]}$ and $p*_{j[k]} = \overline{p_{i,j[k]}}$, respectively). Both relying on idiosyncratic and on mean placements of the candidates and parties competing, the coefficients on Downsian proximity utilities are, as expected, positive, precisely estimated and substantially meaningful in the remaining 148 election segments.

Our key interest is to explore whether the presence of substantively meaningful assimilation and contrast effects also introduces systematic bias to the coefficients obtained for both the spatial and non-spatial components of voter utility. To explore this in more detail, Fig. 3 provides a comparison of coefficient estimates, which are obtained from a series of conditional logit models and

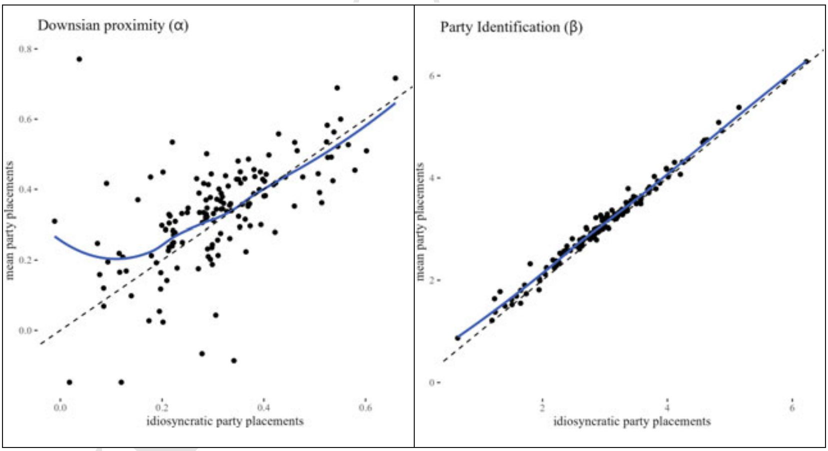

Fig. 3 Unscaled and Mean Placements, Spatial, and Non-Spatial Utilities **Notes:** The left-hand panel compares coefficient estimates on the spatial, the right-hand panel those on the non-spatial impacts on vote choice. In either panel, the association of parameter estimates is indicated by a linear regression line and a LOESS smoother.
Source: Own graphic

which are based upon either idiosyncratic and on mean placements. The left-hand panel displays coefficient estimates on spatial proximity terms (α), the right-hand panel coefficients on party identification (β). In either panel, estimates based on idiosyncratic party placements are displayed on the x-axis, and parallel findings based upon mean party placements are shown on the y-axis.

The left-hand panel reveals that model parameters are affected by choice of either idiosyncratic or mean party placements. Comparing both specifications over the 148 election segments in the dataset, estimates on the coefficients $\alpha_{[k]}$ are associated, but there is also some considerable random noise. For some of the components, for instance the parliamentary elections in Italy (2004), South Africa (2009), and Spain (2006), these differences are large and substantial. The level and magnitude of the coefficients $\alpha_{[k]}$ also indicates the impact and salience of spatial voting for electoral behavior. In contrast to previous assumptions, however, the utilization of idiosyncratic instead of mean party placements does not systematically inflate estimates on the relevance of spatial proximity in the data at hand. Rather, the differences produced by the alternative measurement strategies appear to be unsystematic. Measuring party positions by idiosyncratic instead of objective yardsticks does not systematically inflate the relevance of spatial voting. These findings underline the inferred salience of spatial voting only rarely may be systematically distorted by assimilation and contrast.

The right-hand panel illustrates that these discrepancies do not carry over to the non-spatial predictors $\beta_{[k]}$ in the unified models. Regardless whether party positions are assessed via idiosyncratic or via mean placements, the estimated impact of party identification on vote choice is almost identical and overlaps with only very limited random noise.

Summing this up, the comparison of models based on idiosyncratic and mean placements does not corroborate the expectations of artificially inflated coefficients on spatial proximity and artificially depressed coefficients on non-spatial or valence components of the utility. Instead, empirical findings derived with raw and with mean party placements correlate significantly, while predictors for non-spatial terms are essentially identical.

Figure 4 provides parallel comparisons of coefficient estimates based upon idiosyncratic and corrected, re-scaled party placements. As above, the left-hand panel displays coefficient estimates on spatial proximity terms (α), the right-hand panel coefficients on party identification (β). The left-hand panel reveals that coefficients derived from raw, idiosyncratic and from corrected, rescaled utility terms correlate very strongly. With "raw" estimates shown on the x- and rescaled coefficients shown on the y-axis, we find that all points in are located below the dashed identify line. Thus, coefficients derived from raw party placements are

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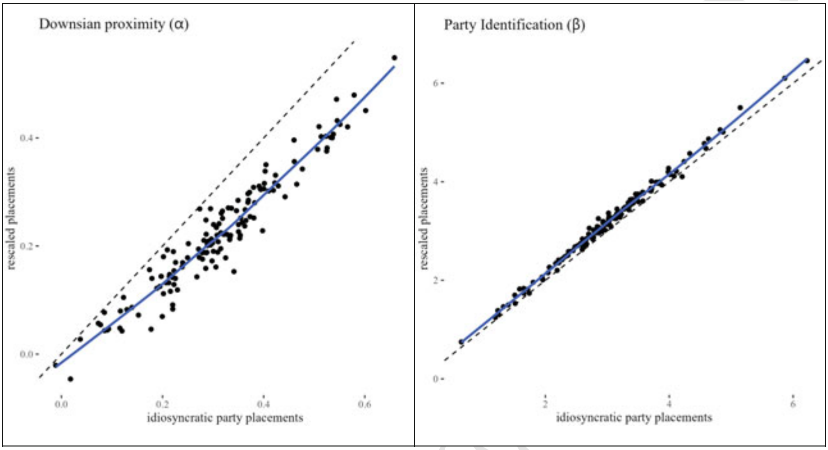

Fig. 4 Unscaled and Scaled Placements, Spatial, and Non-Spatial Utilities **Notes:** The left-hand panel compares coefficient estimates on the spatial, the right-hand panel those on the non-spatial impacts on vote choice. In both panels, i) the association of the parameter estimates is indicated by a linear regression line and a LOESS smoother.
Source: Own graphic

systematically inflated, while coefficients obtained from rescaled placements are consistently lower. In other words: while findings from raw and from rescaled party placements continue to correspond closely and systematically, the graphical representation of our comparative findings clearly reveals systematic bias due to idiosyncratic party placements and projection effects. Ultimately, the right-hand panel of Fig. 4 illustrates that measurement bias in the spatial utility component does not carry over to biased inferences concerning the non-spatial utility of vote choice.

On the one hand, we have gathered empirical evidence for substantial levels of assimilation and contrast in idiosyncratic party placements. On the other hand, we also conclude that measurement bias only partially carries over to estimation bias in empirical models of vote choice. Across the 148 election studies covered by the CSES integrated module dataset, assimilation and contrast tend to systematically inflate the salience parameters attributed to spatial utility components. However, these distortions are not too large and confined to spatial utility terms. Vice versa, inflated spatial utility terms do not yield biased estimates of non-spatial utility.

Part of an explanation may be the detected asymmetry of projection effects, i.e., that the magnitude of contrast (more than 1.6 scale points) across the board appears to be much larger than the magnitude of assimilation effects (more than 0.5 scale points). Given that voters rarely choose candidates or parties which are both distant in spatial terms and unpopular in valence terms, assimilation rather than contrast effects determine and/ or change vote choice. Because these empirical assimilation effects are small, the implications of projection effects on vote choice may, across the board, not be as significant as suggested in some conceptual and theoretical contributions.

6 Findings, Remedies, and Perspectives

The take-home messages of this paper are two-fold. First, in descriptive terms, idiosyncratic spatial party placements are systematically contaminated and distorted by the non-spatial motives of the vote: voters tend to pull candidates or parties they like for non-spatial reasons systematically towards their ideal points, and the same voters tend to push candidate or parties they dislike systematically away from their own positions. Empirical projection effects are of a considerable and meaningful magnitude but also vary substantially over the heterogeneous national election contexts. Projection effects are also asymmetric, in contrast to some previous studies, our analysis clearly underscores that the magnitude of contrast effects outweighs the strength of assimilation effects.

Secondly, while projection effects are an interesting phenomenon per se, there could also be significant implications for models of electoral choice and placement bias could also be reflected in estimation bias regarding key parameters in spatial and in unified models of vote choice. Specifically, many researchers concerned about projection effects and their consequences have suggested that assimilation and contrast may artificially inflate the salience of spatial proximity and artificially depress the importance of alternative utility terms such as directional voting or of non-spatial predictors such as valence (however operationalized) or party identification (MacDonald et al., 1991, 1995, 1998,2001, 2007; Rabinowitz and MacDonald 1989).

We have addressed these issues by developing a rescaling procedure based upon the results of our hierarchical projection effects model. However, a comparison of biased, idiosyncratic utility terms and unbiased, rescaled utility terms did not affirm the above concerns. These different specifications do enable us to detect some systematic bias in models of vote choice which arise due to projection effects. However, these differences are usually modest, projection effects tend to inflate the salience of proximity voting, but do not carry over to assessments of non-spatial utility. Additional robustness checks based on mean party placements did not indicate any systematic upward or downward bias in the obtained coefficients but rather highlights the sensibility of the discrete choice models to the introduction of measurement error by mean party placements.

Further empirical exploration is required to verify these results and to establish why distorted party placements do not mechanically carry over to yield systematically biased assessments of projection effects. We believe that at least part of the explanation lies in the asymmetry of its two components. Contrast effects are relatively small but usually do not matter much for vote choice. However, assimilation effects may impact on or even change electoral choice, but their magnitude is limited and often negligible.

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