A matter of attraction.
Voting behaviour of heterogeneous voters

Lorenzo De Sio
Università di Firenze
lorenzo.desio@unifi.it

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ABSTRACT

Recent literature highlights how political knowledge and involvement matter for most political attitudes. A 2-dimension, empirically oriented, spatial conceptualisation is thus proposed, based on the combination of the ideological positions of citizens and their degree of psychological involvement in politics. In such a space, an empirical logical quantitative model is developed, hypothesizing that both turnout and vote choice are determined not only by spatial positions, but also by different “attraction” forces exerted by different parties based on their relative “mass”, thus accounting for the effect of e.g. resources and valence issues, and allowing a decoupling of long-term political orientations such as party identification from actual vote choices. This logical quantitative model is then applied to data from the American National Election Studies in the 1980-2000 timeframe. Results show that, in such a space, vote share distributions are meaningful, and compatible with spatial assumptions on both dimensions. Model estimation also confirms the relevance of party “mass”, beside spatial considerations, in influencing voting behaviour, especially among voters that are less involved in politics.
Introduction

Spatial models of voting probably represent one of the most enduring and important concepts in the analysis of voting behaviour. The idea of both voters and parties disposed over a single dimension, with the former voting for the closest party and thus determining, in two-party systems, the key “median voter” result (Black 1958; Downs 1957), has had an enduring influence not only among political science scholars using formal modeling tools, but also among empirically-oriented voting behaviour researchers, and often in the public political debate and practice in many countries.

One more merit of such theoretical contribution is undoubtedly that of introducing the idea of a “political space”, where both parties and voters would assume a specific position\(^1\). The simple conceptualization of such space as a single dimension based on economic policy positions did not become a limitation, yet a stimulus for introducing and testing more complex representations of the political space, not necessarily based on utility-maximization-oriented, policy-based party evaluations (Budge, Crewe, and Farlie 1976).

It would be though unreal to overlook the limitations inherent in the use of spatial models of voting choice. First of all, there are at least two important questions that have existed in the voting behaviour literature for a long period of time, and that can not be easily analyzed using the traditional spatial approach.

The first aspect is the interaction between long-term political predispositions and short-term (issue; candidate) aspects in determining the vote choice. This theme is probably one of the core aspects of the key contribution represented by the theory of party identification (Campbell et al. 1960), which was able to highlight, in a dynamic perspective, how actual behaviour could occasionally “deviate” from long-term political predispositions in particular elections, eventually reverting to a “normal vote” predicted by a often very stable individual party attachment. The limitation of the traditional spatial theory in this regard descends from the inherently static nature of most rational choice models, mostly deriving from the revealed preferences assumption (Elster 1993; Sen 1977). Since preferences can only be revealed based on actual choices, the chosen position is always considered as the preferred one, and thus there can be no long-term predisposition different from actual choice. It is no surprise that contributions aiming at integrating ideas of long-term orientations into rational choice voting behaviour models had to conceptualize them in terms of “cumulative evaluations of party performance” (Fiorina 1981).

\(^1\) Strictly speaking, a policy space in Downs’ theory. Also, a single position for every voter and party derives from very specific assumptions about their preference structure.
A second long-standing argument which is not very easy to fit into a spatial, rational choice approach is the idea of the coexistence of both *position* and *valence* aspects into voting choice (Stokes 1963; Stokes 1992). While (spatial) position is the main workhorse of the spatial model, the idea of *valence*, that is, that candidate/party evaluations may exist, that are not necessarily connected to policy position evaluations, seems once again not a simple fit into the utility maximization framework usually connected with spatial models.

So far confronting the traditional spatial model with alternative approaches that have existed in the literature for a long time. But further problems arise as we might want to examine issues that have been emerging more recently.

The first of such problems arises when we focus on whether a voter will cast a ballot, instead of who is she going to vote for. There are at least three reasons why we should focus on turnout. The first is that turnout rates, especially in advanced Western democracies, are in some cases lower than what could be expected or required, from a normative point of view, for an effective and responsive democracy; the second is that such rates are not only lower than expected, but often also *declining* over time (Wattenberg 2002); the third is that, especially in Western Europe, we find an increasingly common pattern of two-bloc electoral competition, where the two main party blocs are usually quite close in vote shares. This highlights the potential importance of partisan-unbalanced turnout: different degrees of mobilization for the two main blocs could actually have a decisive effect on the electoral outcome².

Downs’ original formulation already included models where the possibility of abstention was introduced, but once again this was related to *positional* issues, that is, to the fact that, on the single policy dimension, all parties were too far from the voter’s position. This could account for abstention only at the extremes of the political spectrum³.

One last “recent” issue that poses several problems to (not only) spatial models is the possible presence of *heterogeneity* in the behaviour of different voters. It has been common for many years to propose voting behaviour models, and to imagine that all voters would more or less behave according to the model, with no varying degrees of conformance to it. Yet there is a growing literature that highlights how voters with varying degrees of education, political sophistication, political information or uncertainty of such information may behave in ways that are significantly different among each other (Delli Carpini and Keeter 1996; Luskin 1987; Sniderman, Brody, and Tetlock 1991; Zaller 1992). It is not by chance that recent contributions are increasingly

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² Not to mention the U.S. and the U.K., whose electoral systems’ inherently majoritarian features may give “asymmetric turnout” an even stronger role.

³ Or at the center, in case of “extreme” parties. But also in this case, turnout is still rigidly connected to positional considerations.
trying to integrate such considerations also into rational choice models (Alvarez 1997; Basinger and Lavine 2005; Macdonald, Rabinowitz, and Listhaug 1995; Rivers 1988).

The inventory of such problems must not, though, make us overlook one of the most important qualities of the traditional spatial model: its extreme simplicity, and the ability to use dimensions and concepts that are at the same time easy, understandable by both scholars and political actors, and, to a large extent, widely shared among both political actors and voters.

This leads us directly to the goal of this paper. How can voting (and non-voting) behaviour be modeled and interpreted in a political world where abstention and heterogeneity have an increasing importance? Does the simplicity of the spatial model have to be necessarily abandoned, in order to make room for valence issues and long-term predispositions?

The answer to such questions is left to the last of the four remaining sections. The first section will introduce a representation of the political space based on two heterogeneous dimensions, while the second section will present the main model of how voters and parties could interact in such a space. The third section will present results of the application of the model to empirical data regarding presidential vote choice from the American National Election Studies. Conclusions will follow.

**A 2-dimension space**

As mentioned before, it is needless to point out the importance of the original contribution by Anthony Downs (1957) in introducing the idea of a political space where voters and parties assume identifiable positions. The original proposal by Downs featured one single policy dimension that was supposed to be summarizing most conflicts in a political system on a single issue. This eventually proved to be no serious limitation, since the spatial model was successfully modified to deal with multiple dimensions of conflict⁴ (Enelow and Hinich 1984; Riker and Ordeshook 1973). In fact, moving from one to many dimensions posed no need to deny the basic assumptions of the model. This is true because, if we take a closer look at the problem, we clearly see that the many dimensions introduced in multiple-dimension spatial models are usually absolutely homogeneous, that is, they all represent policy issues. The idea is simply that one particular polity may be characterized by two or maybe three main political issues, that thus structure a more complex political conflict: yet they still are all political issues. This development can be connected to the

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⁴ Even though it must be reported that extending the spatial model to multiple dimensions poses to rational choice theorists the fundamental problem of introducing cycles, thus removing the automatic existence of an equilibrium and leading to one of the fundamental problems of modern spatial voting theory.
parallel development in empirical survey research, where efforts to extract relevant dimensions of conflict from individual issue positions clearly showed cases where one dimension was not enough.

Yet such multidimensionality reproduces the principles of the spatial model. A space where all voters assume well-defined positions on two or three issues is still a space where all potential voters will cast a ballot. And even when moving to variable-turnout models, turnout will still be determined by policy positions. Thus there is no room for heterogeneity in voting behaviour, information uncertainty, or policy-independent abstention. This is no surprise, since the multiple dimensions introduced are reciprocally homogeneous, and are actually simply meant to unfold a single conflict into multiple more defined conflicts.

This is the very reason why what is proposed here is a model based on two dimensions that are inherently heterogeneous.

The first dimension proposed is an ideological dimension which again, as in Downs’ model, is supposed to be summarizing the most part of political conflict in a polity. Yet there is a big difference with Downs’ economic model: there will be no reference to a single policy regarding the amount or nature of redistribution, thus connecting to utility maximization as pursued by individuals; such dimension is instead meant to summarize the ideological position of both voters and parties. In this regard, it can be assimilated to (and will be operationalized with) the usual left-right (or liberal-conservative) dimension measured in virtually all mass surveys, a dimension where, at least in Western democracies, a large share of respondents still accept to assume a defined position. What must be clarified, is that not only we do not expect to deal with a single policy positions, but we neither require such self-positionings to be policy-oriented. No utility maximization is presumed, and ideological self-positioning should in this case be interpreted, as in a large part of empirical survey research, as being connected to a general system of values and beliefs that is also connected to the role of parties in defining the individual’s self-identity, as e.g. in the case of party identification feelings.

The main problem arises of course with the second dimension. Here, in the opposite direction of traditional multiple-dimension models, a choice of maximum heterogeneity with the first dimension is made. If we want to account for phenomena that emerge at the margins of the polity (such as abstention, uncertainty, heterogeneity), we must look for a dimension that 1) connects conceptually to such phenomena, and not to particular policies; 2) is, at best, as unrelated as possible to ideology.

What can then be a conceptual dimension for tackling heterogeneity in phenomena such as propensity to abstention, amount of political knowledge, uncertainty of political information, degree of influenceability by the media? The dimension that we propose is that of political involvement.
Mary Margaret Conway’s definition is particularly helpful in clarifying how political involvement can be defined and the way it can connect to the phenomena we are interested in:

*Psychological involvement* refers to the possession of a complex structure of attitudes, beliefs, and values with respect to some object. It is a plausible expectation that those who have a greater psychological involvement in politics will be more active politically. Among the components of psychological involvement in politics are a perceived obligation to participate (civic duty), interest in politics, interest in a current or impending political campaign, sense of personal political effectiveness (political efficacy), and identification with a political party. (2000,42)

Thus the proposal presented here is that a useful conceptualization of the political space can be built by combining an ideological dimension, summarizing the main political conflict, with an orthogonal dimension based on the voter’s degree of psychological involvement in politics.

In such a space it is clear how voters’ positions are easy to determine, since, once we choose an appropriate operationalization, both ideology and involvement can be measured on any survey respondent\(^5\). What is less clear is how *party* positions could be measured. To be honest, it is not really even clear what could be the meaning of a *party*’s psychological involvement in politics.

The key point here is what to take into account. While it makes no sense conceptually to measure attitudes on an institution, it would add only little sense to interview members of such institution about their psychological involvement in politics. We could also expect all of them to answer that they are extremely interested (it is their job, after all). But what we are mainly interested in is the party’s dimensional position *vis-à-vis the electorate*, that is, when parties are compared during campaigns, and in the evaluation by the general public. In other words, we are interested in the position of the party as it is perceived by voters.

Such distinction probably seems to clarify only little more. But it probably becomes clearer if we clarify how such position could be measured. The position of the party (and this applies to the ideological dimension as well) will be in fact determined by measuring the position of the peak of votes to that particular party. Given a hypothetic crosstabulation of two variables corresponding to the two dimensions proposed, the party’s “center” will lie in the cell where the highest internal (within-cell) vote share is observed.

This brief incursion into operative considerations is only needed to clarify the meaning of a party’s position on the political involvement dimension. A party whose votes are collected mainly among very involved voters will score high on the involvement dimension, whereas a party whose success is due to support gained among the less interested and involved will score low on the

\(^5\) A problem arises with the usual high number of non-respondents on the ideological self-positioning question. Alternative indices could be built, based e.g. on values, given that they are strongly correlated to the basic dimension which has the advantage of being meaningful to voters, parties, and scholars.
political involvement dimension. This in turn suggests what the interpretation of such position can be, regarding parties (it is already clear regarding voters). We probably expect most parties to gain most support among very involved voters. But this could not be true for all parties. It may regularly apply to parties that do not systematically question the legitimacy or the overall structure of the political debate. This must be taken into account since, after all, the psychological involvement we are measuring is always directed towards a specific political debate and conflict structure, which in turn is defined by specific political parties. There can be the case that a relevant area of voters considers the mainstream political debate and its parties as illegitimate or useless. Such voters would probably direct their vote to other kind of parties (e.g. regional minority parties; populistic; “flash”, single-issue parties). We expect then these latter parties to possibly gain most support among less involved voters. This would determine their low position on the political involvement dimension.

We have then defined a political space based on two dimensions, where the first is an ideological dimension, similar to the common left-right (liberal-conservative) scheme, and the second is based on the voters’ degree of psychological involvement in politics. We have seen how voters’ positions can be determined in such a space, and also how voters’ perceptions can be used to determine party positions in the same space. We thus have a complete definition of a political space, which still has relevant analogies to the traditional (uni- or multi-dimensional) vision of spatial models. What we have to introduce now is a model of how parties and voters would interact in such a space.

The attraction model

It would not be too much simplification to say that attraction is for the model presented here the fundamental quantity that distance is for current spatial models. In the latter, a voter’s choice is generally determined by the Euclidean distance that separates her policy position from every party’s one: the closest party will be one that she will vote for.

Attraction is in some ways related to distance. Yet it performs a fundamental task that differentiates the model presented here from “traditional” proximity spatial models: it decouples vote choice from spatial position. Let us see briefly why.

In spatial models, properties are the same for voters and parties. They both only have a spatial, policy position: once the positions of the former and the latter are known, vote choices are determined. The basic idea here is instead that parties must be modeled differently from voters. They have one more property: a degree of attractiveness, which, for the sake of brevity, we will call

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6. That is, the position that maximizes utility. As hinted before, this requires single-peaked preferences.
synthetically mass. The very important point is not only that parties have a mass that synthesizes their ability to attract voters, but that different parties can have different masses, and thus exert different degrees of attractiveness on the electorate as a whole.

Such overall attractiveness can be imagined as connecting to a heterogeneous set of variables: from the availability of financial, media, and organizational resources; to the leader’s personal appeal and communication skills; to the ability to control the campaign agenda and to focus it on “owned” issues; to the reputation a party or candidate enjoys among the general public (thus the connection to valence politics). In general, all these factors have a role in a campaign: the idea is to model such role as constituting the general mass of a party or candidate.

But while mass expresses how attractive a party is on the electorate as a whole, the actual attraction force it exerts on a particular voter, lying in a particular spatial position, is still partly influenced by the traditional spatial distance. We will hypothesize that –given the party’s mass– the attraction force it exerts on a voter is inversely proportional to the distance that separates them, in a way that is in part similar to traditional spatial models.

How will vote choices then be determined in such a framework? The idea is quite simple. Every voter occupies a defined position in the 2-dimension space. Depending on the spatial position of all parties and on their mass, that voter will then be attracted by several forces –each pointing to a different party– that act with different intensities in that particular point. The hypotheses presented here are 1) that the overall attraction (that is, the sum of all forces exerted by all parties on a voter lying in a particular point) will influence the voter’s decision to turn out to vote (the higher the overall attraction, the higher the probability to vote); 2) regarding actual party choice, that the probabilities of voting for different parties will be directly related to the relative strength of the forces exerted by such parties in that particular point.

The importance of the introduction of the idea of mass –that is, of a variable that breaks the automatic translation of spatial positions into votes– can be seen in the fact that it allows the model to account for the two long-standing issues briefly sketched before: the presence of valence issues; the interaction of long- and short-term factors in influencing vote choices. In this regard, the notion of mass (that is to say, overall attractiveness on the whole electorate) is definitely akin to the role of valence issues, in that it precisely express the fact that, regardless of one citizen’s ideological position, one of the parties/candidates enjoys a higher reputation than the other(s). The reasons why this can happen are not to be confronted systematically here, and can range from the availability of

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7 A further specification needs to be added, which will be clearer when the mathematical form of the model is presented. It can be hypothesized that attraction is not homogeneous in both dimensions considered: we must account for parties with “elliptical” rather than “circular” attraction areas. Thus we will introduce a further term which will account for this effect.
more media and financial resources to the leader’s perceived competence, or to the ability of a party to focus the campaign on a particular issue, and so on. This in turns points to the interaction between long- and short-term political orientations: the attraction model allows us to explain voters that occasionally deviate from their “normal vote”, that is, that vote for a party or candidate that is not necessarily the closest to their long-term political orientations.

**A modeling strategy**

Once the model has been presented in terms of concepts and hypothesized relationships, the next step is to test it with empirical data, since this work is not meant in the field of axiomatic, rational-choice political theory and thus has not as its main goal the development of a formal model and the theoretical discussion of its properties and features.

What can be the best strategy to translate the considerations seen so far into empirically-testable hypotheses?

Using a standard quantitative approach would lead us to simply identify theoretically the set of relevant variables, then select the appropriate generic statistical model (OLS regression, logistic regression, etc.) based almost only on the characteristics of the data (Hedström 2004).

This approach is though not the only feasible approach to model development and testing. Goldthorpe’s (2000) analysis of different traditions in causal analysis suggests how, beside the mainstream “causation as robust dependence approach” (Blalock 1964; Lazarsfeld 1955), at least two other relevant traditions are present. The first is what can be identified as “causation as consequential manipulation” and connected to experimental or quasi-experimental designs (see Freedman 1999). But still a third approach deserves attention. It is what Goldthorpe calls “causation as generative process”.

The basic idea behind this third approach is that relationships among variables should only be ascertained in empirical data after a complete model has been built of how the empirical outcomes should be produced, or generated, by some process. The focus is then shifted on the process, rather than on the final outcome. Without going into further details, it is worth mentioning that such analysis strategy, which presents important analogies with the work of qualitative analysts applying “process-tracing” techniques to sketch detailed explanations of observed outcomes, also connects to an important tradition of research in analytical sociology (Coleman 1964; Hedström and Swedberg 1998; Sørensen 1998) and to the mainstream of modeling strategies in natural sciences. The introduction of such modeling approach into political science is mainly due to the work of Rein Taagepera (Laakso and Taagepera 1979; Taagepera 2005a; Taagepera 2005b; Taagepera and
Shugart 1989; Taagepera and Shugart 1993), which also introduced the term “logical quantitative models” (Taagepera 2005a). It is to this recent formulation that we will mainly refer from now on.

From a model building standpoint, the main difference between a standard robust-dependence model and a logical-quantitative model is that not only the relevant variables must be identified, but also the decision on the mathematical form of the various relationships that connect them is explicitly delegated to the researcher. This additional task proves useful in that we are not anymore constrained to connect variables using a standard linear-additive connection for all regressors, but can specify any kind of relation that we deem appropriate, employing the full power offered by the mathematical language to express our theoretical constructs, instead of being forced to use only one possible relation.\(^8\)

Such power proves particularly useful regarding the model presented here, since we already have quasi-mathematical formulations for all key concepts and relations. Thus, first the mathematical expressions for all hypotheses will be presented; and then such expressions will be connected into empirically-testable forms.

Let us begin by introducing basic quantities.

In general, we assume that both parties and voters have a defined position in the 2-dimension space defined by ideological position and political involvement. For the sake of convenience, we will posit \(x\) as ideological position and \(y\) as political involvement. So, every voter \(v\) will have a spatial position \(P_v(x_v; y_v)\), and every party \(p\) will have a spatial position \(P_p(x_p; y_p)\). A basic Euclidean distance between a party \(p\) and a voter \(v\) would be:

\[
d_{pv} = \sqrt{(x_p - x_v)^2 + (y_p - y_v)^2}
\]

Which will be simply modified in order to account for “elliptical” effects, where a party is more (or less) attractive on one dimension than on the other. The possibility of such asymmetrical effect is introduced as a “shape” parameter \(S_p\) which alters distances on both dimensions, by multiplying the basic \(x\) distance and dividing the basic \(y\) distance. Values of \(S_p\) above 1 mean that the party is more able to attract less involved voters of the same ideological orientation than it is able to attract equally involved voters with a different ideological position. Thus, such “potentially elliptical” distance becomes:

\[\text{An example would be to model human survival possibilities (S) based on the availability of food (F) and air (A). A robust-dependence approach would combine the regressors using linear addition: S = F + A. A more correct model would be instead S = F*A, since plenty of food is useless without air. For a systematic presentation of logical quantitative models compared to the robust-dependence approach see Taagepera (2005a,b).}\]
We hypothesized that a voter is attracted by a party with a force that is directly proportional to the party’s overall mass, and inversely proportional to the distance between party and voter. Thus:

\[
F_{p,v} = \frac{M_p}{d_{p,v}}
\]

Now we have to express the relation between force and the probability of choosing a particular party.

We hypothesized previously that the higher the force exerted by that party on a voter, the higher the probability of voting for that party. Assuming that a force can assume any positive value, we need to map a force range \((0;+\infty)\) to a probability range \((0;1)\). For such mapping we can use a slightly modified version of the logistic function \(\Lambda(\eta)\). As a result, if we define the force exerted by party \(p\) on voter \(v\) as \(F_{p,v}\), we will have that:

\[
\pi_{p,v} = 2\Lambda(F_{p,v}) - 1
\]

that is, that the probability that the voter \(v\) will vote for party \(p\) is 0 if the party exerts a null attraction force, and 1 if the party exerts a very high force (actually, above 16, given the limits of the logistic function).

Such model is then empirically testable. Survey data will likely allow us to observe only spatial positions (on both dimensions) and voting probabilities. From the data we will want to estimate, for every party, its “gravity center” position \((x_p; y_p)\), its mass \(M_p\), and its shape \(S_p\). The estimation can be obtained by performing a ML-based non-linear regression of the empirically-testable model in the previous equation, which, after substituting all quantities with their explicit form, becomes:

\[
\text{The logistic function, defined as } \Lambda(\eta) = \frac{e^\eta}{1 + e^\eta}, \text{ is used, as an example, in binary logistic regression to map from a regressor range } (-\infty;+\infty) \text{ to a probability range } (0;1). \text{ Our transformation is actually } t(\eta) = 2\Lambda(\eta) - 1, \text{ in order to yield a probability of 0 for a force of zero intensity, and a probability of 1 for a force of very high intensity.}
\]
\[ \pi_{ pv } = 2 \Lambda \left( \frac{ M_p }{ \left[ S_p (x_p - x_v) \right]^2 + \left( \frac{ y_p - y_v }{ S_p } \right)^2 } \right) - 1 \]

where \( \pi_{ pv }, x_v \) and \( y_v \) are observed, and \( x_p, y_p, M_p \) and \( S_p \) are parameters to estimate.

The accuracy of the attraction model in predicting party choices will be assessed by computing R-squared coefficients for every party’s model.

Regarding turnout, we hypothesize that the probability of turning out to vote is also a function of the forces exerted by the various parties. In particular we will assume that the higher the forces that all parties exert on a voter, the higher the probability of turning out to vote. To map such sum of forces to a probability, we will once again use the same modified logistic function seen before. Thus the turnout predicted probability will be:

\[ \pi_v = 2 \Lambda \sum_p \left( \frac{ M_p }{ \left[ S_p (x_p - x_v) \right]^2 + \left( \frac{ y_p - y_v }{ S_p } \right)^2 } \right) - 1 \]

The accuracy of the turnout prediction model will be in turn assessed by computing the relevant R-squared coefficient.

**Empirical applications**

The crucial point now is to assess if and how much the model presented is able to fit empirical data, since this work, as already said, is not meant as a formal modeling effort. In order to provide a first assessment of the accuracy and conceptual usefulness of the model, an empirical application is proposed, based on presidential vote data as reported in the American National Election Studies (NES). Data is presented from six post-election surveys conducted in presidential election years during the 1980-2000 period.

Operationalization of the two dimensions proposed was performed in the most simple way, to facilitate a substantial interpretation of the results, and to provide a first test of the model with simple operationalizations.
Regarding the “ideological” dimension, the traditional ideological self-positioning question was used, which in the NES case is available as a 7-point, liberal-conservative scale.

Regarding involvement, the choice was to build a “political involvement index” based on both political interest and political knowledge, by combining the standard political interest question with an index of house candidate names recall.

The empirical analysis strategy is as follows. First the usefulness of the 2-dimension spatial representation is assessed, by presenting 2-dimensional “spatial maps” of presidential vote choice, in order to evaluate whether such key variable presents understandable distributions in such a space. Secondly, the actual models are estimated, in order to assess whether (and how much) the proposed model fits the actual data.

**U.S. Presidential vote 1980-2000**

The example of the U.S. give us a useful testbed for our conceptualization and model, in that the U.S. party system, put apart the special case it represents in terms of both institutional and political culture features, provides an example of an almost prototypical two-party system with a high degree of stability, when compared to e.g. European multi-party systems resulting from the layering of several historical cleavages. This, combined with the rich availability of cross-time comparable data from the NES surveys, and to the stability of the indicators used, made the choice of such datasets ideal for model testing.

The first step is to examine patterns of presidential vote choice in the proposed 2-dimension space. This leads us to the introduction of what we could call a “spatial map”.

Such a map has the following structure. It can be thought as a mix between a crosstabulation and a vertical view of a 3-d diagram. It actually consists of a square, where the horizontal dimension represents the ideological position of voters, and the vertical dimension their degree of political involvement. Such square is gridded, where every cell of the grid thus corresponds to a specific region characterized by an ideological position and a degree of political involvement. In each cell we can then compute the value of our variable of interest (based on respondents located in that region) and then assign a different shade of gray to the cell, so as to obtain a clear visual representation. Regarding the variable of interest, it must be summarized for every cell. This means, for example, that for a cardinal variable, such as e.g. self-reported party choice probability, we could simply compute the mean; whereas for dychotomies (such as voting choice for a candidate vs. all other possible choices) we have to compute percentages within cells.
The key question here is whether variables in such a space present meaningful distributions. This would at least show us that the choice of dimensions is conceptually appropriate.\(^{10}\)

Let us then start by mapping the vote to the main presidential candidates in the six presidential elections from 1980 to 2000. Table 1 shows the maps for elections 1980 to 1988; Table 2 regards elections from 1992 to 2000.

\(^{10}\) Actually, this would also tell us that the indicators chosen yield a proper operationalization of the dimension. A first index was initially built by also including frequency of political discussion. Yet such operationalization proved problematic and led to less meaningful distributions, partly because of a formulation which leads to some categories with only few cases (respondents are asked to state how many days every week they discuss politics). Such variable was then removed from the index. Regarding the two remaining components of the U.S. political involvement index, a Cronbach’s alpha test yields values that are not really satisfactory (about 0.4), but the choice was made mainly because of the meaningfulness of the resulting observed distributions. On the relation among indicators of political interest, frequency of political discussion and political involvement see Van Deth and Elff (2000).
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<th>Year</th>
<th>Democratic candidate</th>
<th>Republican candidate</th>
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<tr>
<td>1984 (Mondale vs. Reagan)</td>
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<td><img src="image4" alt="Diagram for 1984" /></td>
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<td>1988 (Dukakis vs. Bush I)</td>
<td><img src="image5" alt="Diagram for 1988" /></td>
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Tab. 2- Spatial maps for presidential vote 1980-1988

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<th>Year</th>
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<th>Republican candidate</th>
<th>Independent candidate</th>
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</tbody>
</table>
Each map is designed as follows: the X dimension corresponds to the ideological dimension (liberal-conservative), whereas the Y dimension corresponds to the degree of political involvement. Both axes are oriented as in a standard plot, with the origin in the lower left corner corresponding to most liberal orientation and least degree of involvement. The decimal number in every cell is the cell share of voters choosing the candidate. A value of 1 means that all respondents belonging to that cell declared voting for the candidate, while a value of 0 means that none of them did so. It is important to point out that such shares are computed on a basis that includes non voters. This means that the sum of shares to the main candidates (thus, in the same cell across different maps in the same election) does not necessarily yield 1.

A quick look at all the maps presented suggests at least three basic considerations.

1) All the spatial maps regarding the two main presidential candidates present a good degree of compatibility with a spatial model of voting on both dimensions. What is meant is that, when assuming that a criterion for compatibility with a spatial model is unimodality of the voting distribution\(^{11}\), we see that the trend is almost always unimodal not only on the ideological dimension –something which we would normally expect– but also on the involvement dimension. Thus, distances on both dimensions can be combined to compose a single measure of distance. Yet there are important remarks to make. The first is that there is an amount of “random noise” due to the number of respondents in each cell, which is not uniform and sometimes quite low, leading to unstable results and “outlying” cells\(^{12}\). The second remark is that there is an important exception to the “spatiality” of distribution patterns: the distribution of votes to Ross Perot in both 1992 and 1996, which is widely spread across the whole map without any intelligible spatial pattern. But this is useful in highlighting the assumptions of the model, which include a political discussion structured mainly along a single dimension that expresses most of the political conflict. The case of a third candidate which explicitly denies the relevance of such dimension and appeals to all categories of voters could be somewhat expected to have a voting pattern such as the one observed. The R-squared statistic for Ross Perot will anyway undoubtedly show the non-spatialness of his consensus, without the need for graphical diagnostics.

2) Given that the spatial distribution of votes defines a sort of “spatial range” for each candidate, such range is not always the same both for the same party across time and for different party candidates in the same election. A clear example is for example the comparison of Reagan in 1984 and Dole in 1996, or of, again, Dole in 1996 and his opponent Clinton in the same election.

\(^{11}\) Such criterion is intimately connected with the assumption of single-peaked preferences.

\(^{12}\) The average cell numerosity in 1980, 1984, 1988, 1992, 1996 and 2000 is respectively 21, 33, 30, 36, 28, 14. But the distribution of numerosity is obviously not uniform: in particular, the first and last row (maximum and minimum involvement) systematically present a lower number of cases.
Thus we have graphical evidence of the possibility of different degrees of an overall attraction on the whole electorate, which we previously linked to the concept of mass. This directly connects to the hypothesis, included in the model, that the same party might have different masses across time, and that different parties in the same election may have different masses.

3) A final consideration regards the “center” or “peak” of candidate votes, which we could identify as his perceived position. In all maps (except for Ross Perot which clearly does not conform to the model) we observe that such observed position is almost perfectly opposite for the two main parties on the ideological dimension, but that in both cases it lies in the area of very high political involvement. Why does this happen?

A first explanation could be connected to turnout, by claiming that more involved citizens have higher turnout rates, thus raising valid vote shares vs. abstention. But the data clearly show that this is not the case: if we roughly sum vote shares obtained by both candidates in the high involvement and in the low involvement rows, we see that turnout does not change so dramatically with the degree of involvement. So, this cannot be a satisfactory explanation.

Another explanation could be that, generally speaking, more involved citizens can be expected to have a more structured system of attitudes and beliefs, and thus a higher degree of coherence between long-term ideological positions and actual vote choices, leading to a 100% share of votes to a party in case of coincidence with its perceived position. A simple model based on these assumptions was tested successfully with Italian data from the ITANES 2001 survey (De Sio 2006), confirming that ideological self-positioning is much more relevant for predicting vote choice among strongly involved citizens than among weakly involved. Nevertheless, even if not observed in U.S. presidential vote, we can still suppose that a party can exist, that gathers most of its votes among non-involved citizens. We will come back later on this.

Thus we can think so far of having a first result about the conceptualization of a 2-dimension space based on ideology and involvement, and about a first rough assessment of the correctness of the hypotheses that constitute the “attraction model”. The next step is then to proceed to the actual estimation of the model, by determining its parameters of interest and by assessing its goodness of fit, regarding all datasets seen so far.

Let us briefly recall from the previous section that, for every candidate, we are going to estimate a model with four parameters of interest: mass $M_p$; “centre of gravity” (that is, his perceived position) expressed as coordinates $X_p$ and $Y_p$ on the two dimensions proposed; a shape parameter $S_p$, which introduces the possibility of a candidate being more attractive on a dimension than on the other.
Regarding the variables involved, they are three. The two “independent” variables are the spatial coordinates of the voter on the two dimensions. The “dependent” variable is probability of voting for a particular candidate, or, for the turnout model, probability of turning out to vote.

It must be noted that in the datasets presented, we will not rely on individual probability self-evaluations. We will rather use “observed probabilities” by counting different vote choices in each cell, as plotted in the spatial maps presented before. This means that the actual ML estimate will be performed not on the original data file, with respondents as cases, but on a data file where cases are individual spatial cells, each with its spatial position and its observed probability of both turnout and party choice.

This said, model estimation yields the results presented in Table 3.

<table>
<thead>
<tr>
<th>Year</th>
<th>Democratic candidate</th>
<th>Republican candidate</th>
<th>Independent candidate</th>
<th>Turnout prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M X Y S R-sq</td>
<td>M X Y S R-sq</td>
<td>M X Y S R-sq</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>param. 0.42 0.11 1.00 1.66 0.56</td>
<td>0.33 0.87 0.81 1.30 0.79</td>
<td>0.03 0.03 0.05 0.18</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>std. error 0.10 0.05 0.19 0.38</td>
<td>0.03 0.03 0.05 0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>0.32 0.16 0.73 1.34 0.62</td>
<td>0.42 0.85 0.83 1.41 0.77</td>
<td>0.06 0.03 0.09 0.21</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>0.03 0.02 0.05 0.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>0.41 0.21 0.93 1.52 0.81</td>
<td>0.36 0.84 0.81 1.61 0.82</td>
<td>0.04 0.02 0.08 0.22</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>0.05 0.02 0.11 0.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>0.45 0.16 0.87 1.63 0.77</td>
<td>0.26 0.86 0.83 1.68 0.83</td>
<td>0.12 1.00 1.00 0.86 neg.</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>0.08 0.02 0.15 0.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>0.35 0.26 0.80 1.42 0.68</td>
<td>0.27 0.86 0.81 1.49 0.83</td>
<td>0.05 0.00 0.66 0.97 0.21</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>0.04 0.02 0.07 0.22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>0.46 0.23 0.89 1.66 0.73</td>
<td>0.37 0.86 0.69 1.66 0.77</td>
<td>0.05 0.02 0.09 0.28</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>0.11 0.03 0.21 0.37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* All R-squares for turnout prediction are significant at the 0.01 level.
** All R-squares reported are corrected for N, which is 42 for all years except 2000, where it is 39.

The results of the estimation suggest several considerations, both of methodological and substantial scope. The first is a preliminary one, regarding the general performance of the attraction model in explaining both turnout and vote choice. From this point of view, results seem pretty satisfactory. Values of R-squared are generally high, averaging 0.8 for Republican candidate choice

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13 Logical quantitative models are, unlike most regression models, inherently symmetrical, not requiring to specify theoretically the causal direction. This means that, in such an approach, variables in the estimation procedure are not assigned a special status for being “dependent” or “independent”. This is also true for “symmetric” linear regression, which unfortunately is seldom used. Regarding symmetric linear regression see Taagepera (forthcoming 2006).
and 0.7 for both Democratic candidate choice and turnout prediction. This is, in my opinion, particularly interesting given the parsimony of the model, that estimates all parameters based on only three variables. It must be noted, though, that such result must not be interpreted as an explanation in the same meaning used in robust dependence approaches, where using the same mathematical form for all variables helps highlighting which ones are relevant, once controlled for the others. In the logical quantitative modeling approach, we focus on relationships between variables that may be very close in the causal chain (such as ideological position and vote): but our aim is to try to describe as precisely as possible the relation, using a particular mathematical form that we can derive from guessing the underlying processes that produce such outcomes. In this regard, the goodness of fit could be interpreted more as descriptive than explanatory power. And this also requires us to have high values of R-squared, instead of the lower ones that can be accepted to highlight a variable in robust dependence approaches. Nevertheless, it must not be overlooked that the mathematical form of the model conveys a lot of theoretical information. This is the reason why voting patterns to Ross Perot in both 1992 and 1996 are poorly explained by the model, as was already clear in the previous spatial maps. This is a strong confirmation that results are not tautological: they confirm that the choice of dimensions is in large part appropriate, and that the hypotheses about distance, force and mass make sense with “traditional” party candidates, and that other kinds of description are needed when dealing with “non-traditional” candidates such as Ross Perot. A final consideration concerns turnout. The attraction model seems to succeed in providing a single model for both turnout and voting choice, since the fit with real data seems to be as good for turnout as it is for candidate choice. This in turn suggests that a single-stage micro decision model, based on attractiveness of parties and candidates, could be an appropriate candidate model for explaining both turnout and vote decisions.

Beside these methodological considerations, focus should be now on substantial issues, since the usefulness of a model must also be evaluated in terms of how much it is able to allow us to learn something more from the data we analyze. In this regard, at least three substantial points emerge from the data presented in Table 3, regarding different properties of candidates. Before examining them, one last feature of logical quantitative models must be though highlighted: the substantial meaning of estimated parameters. Unlike robust-dependence models, where estimated parameters often have little substantial meaning and are hard to compare across analyses and data sets, logical quantitative models feature parameters that are designed by the researcher to have a

14 Given the simplicity of the linear additive form, parameters in most regression models are much more sensitive to the data than in logical quantitative models, where the mathematical form already conveys much more information, thus somewhat containing the role that data can have in changing parameter values, and allowing for easier comparability among datasets (Taagepera 2005b).
specific substantial meaning, and thus are directly interpretable and easily comparable. This allows us to discuss the estimated parameters in substantial terms.

1) **Candidate perceived positions.** When comparing the estimated perceived positions of all candidates (that is, their “center of gravity”), one interesting point emerges: there is a marked difference between Republican and Democratic candidates. If we look at $X$ parameters, defining ideological position, we see that Republican candidates show an impressive regularity in the position of their vote peak, ranging from 0.84 to 0.87, with a variation that is probably also statistically non-significant. This means that, remembering that we are using a scale where 0 is most liberal and 1 most conservative, Republican candidates have always maintained an ideological position which is very clearly conservative. The same cannot be said for Democratic candidates, that range from a leftmost position of 0.11 (Carter in 1980) to a quite more centrist position of 0.26 (Clinton in 1996). This already shows a marked difference in competition strategies, which will appear clearer when we deal later with mass. But an equally interesting point regards candidate vote peaks on the $Y$ (involvement) dimension. Again, we see something similar to what happened regarding ideology: in a scale where 0 is the lowest and 1 the highest degree of involvement, Republican candidates have regularly collected most votes among voters that are highly but not totally involved (0.81 to 0.83), while Democratic candidates again show greater variance, ranging from 1.00 (Carter in 1980) to 0.73 (Mondale in 1984). But the most interesting example is that of George W. Bush in 2000, whose “gravity center” lies at 0.69 on the involvement dimension, meaning that his consensus received an important contribution from less involved voters.

2) **Candidate attraction “shape”**. With this parameter we referred to the hypothesized different attraction force of a candidate on a dimension compared to the other. Results show that this seems not to be a difference neither across parties nor across candidates: values range from 1.30 (Reagan in 1980) to 1.68 (Bush I in 1992). The most likely interpretation could be that of a sort of “tuning” parameter of the model, interpreting the relationship between the two dimensions that compose the proposed space, and also between their actual operationalizations. It could be expected that such values would change slightly when using different indicators to operationalize the two basic dimensions. A possible substantial interpretation could connect to the degree of mobilization of the campaigns, since values seem to be similar for both candidates in the same election, but different across elections. A higher mobilization would increase the ability to reach less involved voters and thus yield a higher value of $S$.

3) **Candidate mass.** This is probably the core feature, along with the use of political involvement as a second dimension, that differentiates the attraction model from other spatial
models. Values estimated report an interesting variance for both parties, with Democratic candidates ranging from a low of 0.32 (Mondale in 1984) to a high of 0.45 and 0.46 (Clinton in 1992 and Gore in 2000), and Republicans ranging from a low of 0.26 (Bush I in 1992) to a high of 0.42 (Reagan in 1984). As introduced before, the mass parameter defines how generally attractive is the party (or candidate) on the whole electorate, since attraction perceived by an individual voter is a function of both distance (as in spatial models) and mass. Thus, values of mass should assess the general attractiveness of a candidate for all voters, and should be probably correlated with his personal appeal, with the momentum of issues and policy positions he advocates, and with general valence evaluations, such as the perception of his competence and ability to confront the most important problems in the country, or the evaluation of past performance, in case of incumbency. But an important consideration must be made: higher attraction must not be rigidly connected to winning elections. This is because an important variable intervenes between the spatial maps plotted earlier and the actual vote count: spatial distribution of the electorate. Such distribution is seldom homogeneous: it is quite likely that voters are not always evenly distributed across the whole ideological (and involvement) spectrum, but are sometimes “clustered” around specific ideological positions. To give an idea of the importance of such variable, spatial maps like those presented before, but this time describing the spatial distribution of voters, are presented in Table 4.

Tab. 4 - Spatial maps for survey respondents distribution 1980-2000 (percentages over the whole sample)
Table 4 shows precisely such heterogeneity. Voters are far from uniformly distributed across the whole ideological (and involvement) spectrum: there are regions of such 2-dimension space that are much more densely populated than others, and thus much more rewarding in terms of votes. This means that a candidate “sitting” on a densely populated position may even ignore not being as spatially attractive as his opponent, since a lower spatial attraction is compensated by the fact that the “home region” of the candidate is more rewarding anyway.

This in turn clarifies what mass and attraction are about. Having a higher mass does not necessarily mean to win elections; nevertheless, a higher mass (that is, being very attractive towards the whole electorate) is absolutely needed, if a candidate is not sitting on a densely populated spatial position.

A specific example of the combination of attraction and position can be seen regarding the specific case of the 2000 Gore vs. Bush presidential competition. From a popular vote point of
view, such competition was an almost complete tie: this is also shown in the NES sample, whose weighted vote intentions report valid vote percentages of 50.8% for Gore and 49.2% for Bush. How does such competition look in terms of the attraction model? Figure 1 expresses graphically the model estimations presented in Table 3, regarding only the 2000 election. Turnout probability, which is determined by the attraction forces of both candidates, is plotted. This also allows to show at the same time the different attraction forces exerted by the two candidates, in terms of peaks and valleys.

Figure 1, confronted with the spatial distribution of voters shown in Table 4, clarifies why Gore, with a higher mass and thus a slightly wider area of attraction, actually had almost the same number of votes in the survey sample. Bush is rewarded by a better position, since, even though he has a slightly narrower area of attraction than his opponent, such area is more densely populated (as seen in Table 4), and thus quite rewarding in terms of votes.
But the visualization of the estimated model also shows that positional strategies not only concern ideology, but also involvement. One important aspect of Bush’s spatial position in 2000 is that his gravity center is significantly lower than Gore’s on the involvement dimension (0.69 vs. 0.89). This is particularly interesting when we look at Table 4, and see that in all the six elections examined, the most densely populated region is almost always that of “middle” involvement. In this regard, Bush’s position can be interpreted as the ability to being perceived as closer by citizens that are less involved in politics. In this regard, for example, communication style choices that can be considered awkward could actually be interpreted as deliberate efforts to “tune in” with the taste of sectors of the electorate which are only partially involved in politics. This involves paying the price of potentially losing consensus among the most involved, but the spatial distributions seen in Table 4 seem to suggest that such choice could prove rewarding.

On the other hand, Gore represents an example of an opposite strategy. His position is not particularly liberal, especially when confronted with the positions estimated for other Democratic candidates in previous elections. Nevertheless, his strategy could be hardly different from that of being an “overally attractive”, acceptable candidate, not focusing on distinctive and divisive issues, which could hardly prove very rewarding in a spatial area not densely populated. But probably a different result could be achieved if Gore had been able to reach a lower position on the involvement dimension, thus moving his gravity center towards a more densely populated area, and exerting a stronger attraction on the most populated regions: those of ideologically “centrist” voters with a medium-low degree of political involvement.

Conclusion

In the beginning of this paper several concerns were outlined, regarding spatial models of voting. In order to account for phenomena that include valence issues; contradiction between long-term orientations and actual vote choices; abstention and behaviour heterogeneity, a new conceptualisation was proposed, based on two key points: a) the idea of a 2-dimension space based on ideology and psychological involvement in politics; b) the conceptualisation of parties and candidates as objects that exert a psychological “attraction” on voters, dependent on the traditional notion of distance, combined with the new concept of mass.

Such concepts may look fascinating or inherently rough from a theoretical point of view. But the main questions regarding the proposed approach are different. The first question is of methodological scope: does such model fit real data? An answer to such question is empirical and
can be assessed using (almost) standard statistical tools. The second question is more substantial: does such model allows us to learn anything more from the data we are examining? And this question can not be answered with data alone.

After reviewing the empirical examples reported above, we could say that the answer to both questions could be partly affirmative.

Regarding the ability of the model to fit the data, we find results that could be regarded as encouraging. Even without assessing R-squared coefficients for the datasets presented, the much simpler spatial maps show clearly enough that vote distributions for all major U.S. presidential candidates in the selected timeframe are compatible with 1) a spatial conceptualisation based on the two dimensions proposed; 2) a model where attraction depends on both positional considerations (distance) and on specific non-positional party/candidate properties (mass). The impressions deriving from a quick look at the spatial maps are then confirmed by the R-squared coefficients, which show how the model is able to quite correctly describe both turnout and vote choice in all the datasets considered. But a further confirmation comes paradoxically to the model from its extremely poor performance in describing voting patterns for the major independent candidate Ross Perot in both 1992 and 1996. Such performance, as can be seen from the relevant spatial maps, is due to the inherent non-spatiality of Ross Perot vote. This is a good case to show that every model has clear assumptions, and that this applies to the involvement/attraction model as well. Once the assumptions of a single, shared political conflict do not apply, the model is not working anymore. And this indeed is a partial confirmation that the good fit observed for other candidates is not the product of chance alone.

Coming to substantial considerations, could we say that we can learn anything more from the data, using the conceptualization and model proposed here? In my opinion, the answer to such question could also be partially positive. The main new concepts proposed in this contribution are two: involvement as a dimension, and mass as a party/candidate property. Results show that such dimensions seem to matter, and that adding them in a spatial conceptualization and in a voting model can give a more comprehensive yet still coherent understanding of different dynamics involved in voting behaviour. The relevance of involvement is shown with little doubt by the voting patterns observed: as we move away from voters that read and talk often about politics, patterns show less differentiation between the two main candidates along the ideological spectrum, with choices becoming almost evenly distributed between the two main candidates on the whole ideological spectrum, in a region where candidates’ attraction forces are less strong. In such a space, the data partly highlight that the involvement dimension can also be exploited for positional strategies, with candidates seeking to catch the consensus of less involved voters, even at the price
of losing support among the most interested and involved. Regarding mass, this also seems to be a concept whose relevance is partly confirmed by the data. Candidates with a favourable position may lose; others with an unfavourable position may win, depending on their ability to attract the whole electorate regardless of spatial position, based on the financial, media, and organizational resources they have; on their personal appeal and communication skills; on their ability to control the campaign agenda and to focus it on issues they “own”; on the reputation they enjoy among the general public. In this regard, the involvement/attraction model could prove useful in bringing back “real-life” political issues such as the role of resources and of political sophistication into a sometimes abstract framework such as that of spatial models of voting.

References


