Political Choices in One Dimension: Applications*

Bernard Grofman
School of Social Sciences
University of California, Irvine

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*I am deeply indebted to my many collaborators over the years whose work is cited here and whose insights and analyses have shaped my understanding of the spatial model of politics. But above all my debt is to the pioneering and seminal work of Duncan Black and Anthony Downs.

I . Introduction

This essay is intended to be a companion to the previous chapter where the theory of politics in one dimension is introduced. Definitions of terms are found in that chapter. As noted in that essay:

> There are many situations, both governmental and private, where choices are made by a small (or not so small) group of people who are picking outcome from a set of alternatives, and where each voter can be characterized as having a most preferred outcome from this set and a preference among pairs (or subsets) of alternatives. In many such situations these alternatives can be characterized as points in some multidimensional issue or policy space. We will refer to decisions made in such contexts as involving *spatial voting*. In most such models, voters are identified by what has been called their *ideal point*, a.k.a., *bliss point*, i.e., the position in the multidimensional space that the voter most prefers.

In this chapter, we examine in more detail how deterministic proximity models of voting, especially those operating within the context of unidimensional politics, operate under three rather different politically important institutional settings: *agenda setting*, *party competition*, and *coalition formation*.[1]

Agenda setting

In *agenda settings* there are a series of votes on alternatives in a finite agenda, sequentially eliminating one or more of them from contention and usually culminating in a final vote against the status quo; or there is an agenda which is not (fully) specified in advance and the process comes to an end through a vote for cloture which, if carried, will lead to an up or down vote on the currently winning alternative. This agenda may either be predetermined (e.g., by an agenda setter)[2] or arise as voters propose alternatives to be pitted against the reigning status quo. In *party competition settings*, the actors make choices among a small set of alternatives that

[1] Recall from the earlier discussion on jury verdicts in a situation of multi-option choice that these are not the only domains in which choice over a single dimension may be important.

[2] An *agenda setter* is a term used for the actor (or set of actors) who determine the rule under which voting will take place and the exact sequence of (conditional) votes that will take place (Romer and Rosenthal*,* 1978*)* .

reflect the candidates/platforms proposed by two or more political parties. In *coalition settings*, the actors bargain among themselves to arrive at a winning coalition (i.e., one containing at least a majority of the voters), and the coalition normally reaches an agreement as what outcome will be chose, i.e., where in the policy or issue space the coalition platform will be located.[3] There is a vast literature on each of these three types of settings but, remarkably, very little that compares the three or considers the degree to which similar models or "solution concepts" apply in each.

A special case of agenda setting is the form of *direct democracy* in which there are one or more propositions before the entire electorate, perhaps placed there by some initiative petition process, or by government mandated referendum,[4] and each is voted up or down (Bowler, Donovan, and Tolbert, 1998). We have seen the importance of such referenda processes in votes about the European Union, most recently in the Brexit (British exit from the European Union) decision in 2016.[5]

All three settings have in common that we can often sensibly represent voter choices in that setting as one involving options that can be viewed as points in a multidimensional space. But there are also key differences among them. Party competition and coalition formation to form a governing coalition have in common the central role of political parties as elements of choice. That distinguishes the nature of the alternatives in these settings from what we observe with agendas reflecting choices among, say, policy options. However, there is a similarity between choice among alternatives on some types of agenda and two party competition that is perhaps even more important. When agendas are structured as a binary trees under what is called *standard amendment procedure* (SAP), the *terminal fork* on such trees involves a pairwise

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[3] In such models there may or may not be binding agreements possible.

[4] In U.S. terminology, an *initiative* is a ballot proposition placed there by petition; a *referendum* is a ballot proposition placed there by action of the legislature, or one constitutionally mandated for a certain type of decision, such as a decision to implement particular types of tax increases.

[5] The term *indirect democracy* refers to a situation in which the electorate do not directly make policy choices; rather they elect a set of representatives who make those choices for them. An indirect democracy is also sometimes referred to as a *representative democracy*. A party competition setting can be thought of as one form of *indirect democracy*

choice. For unidimensional preferences, that choice is similar in nature to the choice voters make in two party competition with deterministic proximity voting in that, in both instances, we can specify choices in terms of a separating line at the midpoint between the two alternatives such that voters to the left of the midpoint vote for one alternative and voters to the right of the midpoint vote for the other. See Figure 7.

<<Figure 7 about here>>

Standard amendment procedure was labeled that by Black (1958) because it is the most common form of legislative voting rule within the English-speaking world. For three alternatives, it can be represented by the binary tree structure shown in Figure 8. Each fork narrows down the set of still feasible alternatives. Figure 8 shows the three possible versions of SAP for the case of three alternatives {A, B, C}. In the first fork of Figure 8(a), voters must choose between two sets, {A, B} and (A,C}. Because A appears in both sets, it might seem that voters should between the two subsets based simply on their preference between B and C. However, if the left-hand fork is chosen, then the "real" choice (that at the final fork) is between A and B; while if the right-hand fork is chosen, then the "real" choice is between A and C. If voters can anticipate what the outcomes will be on these "real" choices at the final (terminal) decision nodes, then they may do better than acting as if the choice facing them at the first node was simply between B and C. If a voter prefers C to B to A, but anticipates that A will defeat C in pairwise contest at an A versus C fork, but that B would defeat A in pairwise contest between B and A, that voter is better off voting in a strategic fashion by looking down the tree to these final forks and voting for B at the first fork with the expectation that she will get her second choice rather than her last choice. Such a *backward folding* induction-based strategy is referred to by Farquharson (1970) as *sophisticated voting*.

<<Figure 8 about here>>

Once we allow for alternatives to spatially embedded in a single dimensional continuum, i.e., on a line, then we can readily demonstrate that, since there must be a majority winner in this situation, that majority winner will always be chosen under SAP.

THEOREM: Under SAP, when voting is deterministic, proximity based, and unidimensional, the majority winner will always be chosen.

PROOF: We will demonstrate this result for the situation with three voters. There are two cases. Case I; the majority winner is found in both the right hand and left hand initial fork. If so, then the final fork must involve the majority winner and it will be victorious in the pairwise vote. Case II: the majority winner is not found in both the right hand and left hand initial fork. Now the initial perceived choice will be a pairwise choice between the majority winner and another alternative, thus the fork with the majority winner will be chosen and it will go on to win in the final actual pairwise choice. Alternatively, if voters look down the voting tree to determine outcomes at final forks and vote strategically accordingly, since a majority of voters prefer the majority winner in pairwise contest to any other alternative, again the fork that includes the majority winner will initially be chosen, leading to the victory of the majority winner on the final fork. q.e.d.

This result does not apply for most other agenda voting processes, such as *sequential elimination procedure* (SEP), a binary voting procedure whose voting tree we show in Figure 9. Consider five voters with preferences ABC, ABC, BCA, CBA, CBA. Here preferences are single-peaked and so there is a median voter whose preferences, with B the majority winner. At the first fork, voters whose first choice is A or C might choose to vote for the fork containing their first preference, However, for any binary voting procedure, including SEP we have the following useful result about the implications of unidimensionality —at theorem which is a special case of a well-known result about sophisticated voting on binary trees.

<<Figure 9 about here>>

THEOREM: Under any binary voting procedure, when voting is deterministic, proximity based, and unidimensional, and there is common knowledge about voter preferences, the majority winner will always be chosen when all voters vote in a sophisticated fashion in the sense of Farquharson (1970).

In the example shown for SEP, if the right hand fork is chosen on the first vote, then the final vote (the "real" vote) is between A and C, and C will win. Thus, the "sophisticated" choice on the first fork is really between B and C, so all voters who prefer B to C should, if they vote in a sophisticated (looking down the tree) fashion, choose the leftmost fork initially, even though their first choice, C may be located on the right hand fork. Because B is the majority winner, viewing choices through this lens of sophistication guarantees that B will be chosen.

In addition to the obvious examples of voting processes in legislatures that can be modeled in unidimensional terms, one important example of situations where agenda matters is where a jury is voting on a sentencing decision in which they are choosing among two or more verdict options that can be seen as falling on a severity scale, say from first degree murder, to manslaughter, to involuntary manslaughter, to acquittal. In such a case, the implication of the single-peakcdncss model is that some jurors may refuse to vote for conviction if the verdict's attached punishment is seen as too harsh, even though the defendant is perceived by the juror to be guilty of committing the crime (Grofman, 1985a). Here, exactly which/how many alternatives are made available to the jury can matter a great deal.

Party competition

In the party competition context, the most famous result about voting along a single dimension has to do with the dynamics of two party competition.

THEOREM (Downs, 1957): If voters engage in deterministic proximity voting, and if there is a single dimension along which both parties and voters can be located, and parties seek to be vote-maximizing, and various other assumptions are met (see below) then two party competition under plurality voting rules will lead the parties to converge to the ideal point (most preferred policy location) of the median voter on the dimension.

When we look at elections under plurality in the U.S. we sometimes see quite conservative Republican candidates running against quite liberal Democratic candidates. Because the two major parties in U.S. politics do not in fact converge to identical policy positions, some authors (e.g., Green and Shapiro, 1994) have argued that spatial models of party competition are of little value. This is to throw out the baby with the bath water. Downs has very usefully identified reasons why parties might be expected to converge, but there are also many reasons why parties would tend to diverge. In particular, rather than seeking to "find the center" it may be the case that parties instead seek to "mobilize their base." A variety of factors can exacerbate this tendency, including the role of party activists and the use of party primaries. We show as Table 1 a chart taken from Grofman (2004) identifying the fifteen assumptions that are required to get the Downsian convergence result. Violating almost any of these results will make the complete convergence result go away, though in unidimensional competition, there will still be pressures to push parties toward the center.

<<Table 1 about here>>

The end result of a balancing of centripetal pressures against centrifugal (polarizing) ones in unidimensional competition can often result in what Adams, Merrill and Grofman (2005) refer to as “moderate convergence.” However, as McCarty (1997) and McCarty, Poole, and Rosenthal (2016) point out, the relative importance of centripetal and centrifugal forces can vary over time and we can have cyclic patterns where parties come together, and then come apart ideologically.[6] We show such a pattern for voting in the U.S. House, 1856-2006 in Figure 10 below, with the data showing the first dimension of Poole-Rosenthal D-NOMINATE scores based on congressional roll call data.

<<Figure 10 about here>>

We can also apply the spatial model to situations in which there is a two stage process of a primary election among the supporters of a given party and a general election. With unidimensional political competition and two party politics, we expect to get policy proposals by candidates in the general election that are intermediate between the location of the median voter in the constituency and the median voter in a given party’s support group (Aranson and Ordeshook, 1972; Coleman, 1972, cf. Owen and Grofman, 2006).

Coalition structure in one-dimensional choice

DEFINITION (Axelrod, 1970): A coalition is said to be *connected wrt to a single dimension* if the membership in that coalition of voters i and r, implies that all voters who are on the line between i and r are also in the coalition.

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[6] Merrill, Brunell and Grofman, (2014) and Brunell, Grofman and Merrill (forthcoming) propose a way to understand this cyclic variation in party polarization in terms of an endogenously determined dynamic model where feasible party platforms for candidates at the constituency level influence and are influenced by the degree of national legislative polarization.

For any choice process, there is an adjoint coalition process. When, in the unidimensional context, we are choosing among exactly two alternatives, based upon proximity, the resultant coalitions (one preferring each alternative) have a very distinct structure. For agenda voting among pairs of distinct alternatives, or two candidate or two party political competition, when alternatives and voters are spatially embedded in a single dimension we showed we can specify separating lines that define the coalitions supporting each of the two alternatives/candidates/parties.[7] In such settings, there are additional important implications of such a partition for coalition structure.

THEOREM: In deterministic proximity voting among alternatives arrayed in a single dimension (a line), in choosing between two alternatives, the coalition supporting each is a *connected coalition*.

COROLLARY: In deterministic proximity voting among alternatives arrayed in a single dimension (a line), the median voter is a member of all winning coalitions.

COROLLARY: In deterministic proximity voting among alternatives arrayed in a single dimension (a line), if choosing between two alternatives the only way to arrive at a unanimous coalition is for one of the alternatives to be located at a more extreme position on the line than any of the voter ideal points.

COROLLARY: In deterministic proximity voting among alternatives arrayed in a single dimension (a line), if choosing between two alternatives, the only feasible winning coalition is an *extremist coalition*, i.e., a coalition that includes either the rightmost voter or the leftmost voter, along with the median voter and perhaps some others.

That expected coalitions in unidimensional voting situations are expected to contain the median voter is an intriguing finding, though of course, as a theorem, it holds for certain only under the restrictive assumptions on which the result is based. Still, this result suggests that,

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[7] For multiparty or multicandidate competition where voters have but a single vote, median lines or median hyperplanes are also relevant. In this situation they can be used to partition the space into zones specifying the first place preference of voters whose ideal points are located within the zone. (Zones can also be distinguished in terms of the rank-ordered preferences of voters with ideal points in the zone. This is especially relevant if voters have more than one vote to cast, or can cast a rank-ordered ballot.)

when voting is along ideological lines in a single dimension or involving other types of choices that can generate single peaked curves, the median voter is very important. This result about coalitions provides an alternative formulation of the more familiar Downsian median voter theorem (Downs, 1957) we reported earlier.

That expected coalitions in unidimensional voting situations involving pairwise choice are, under the specific assumptions, expected to be *extremist* is perhaps a more intriguing result, since it is more counterintuitive. Nonetheless, that prediction seems to provide a reasonably good fit to data on legislative voting in the U.S. Congress and also to fit voting on the U.S. Supreme Court. In the former case we can take the implicit pairing to be with the status quo. In the case of legal decision-making we can also think of outcomes as involving changes in precedent such that there will be a status quo point against which the announced decision can be compared. In legal decisions, of course, in there will be the decision reverse or affirm, but also more detailed findings that show how the decision will apply as precedent to cases with other case facts. In this way we can think of any Supreme Court decision as lying along a continuum. For example, imagine that a decision is a rule specifying what is constitutional, where a further point along the decision extends the rule to exclude a wider class of actions as unconstitutional. Now, each justice can be seen as having an ideal point that indicates how far along the continuum that justice wishes to push the rule. However, elaborating on the implications of this kind of constitutional geometry would take us beyond the scope of the present essay and into the domain of rule-making and jurisprudence.

If, however, we focus only on the votes to affirm or deny a lower court ruling, and neglect the precedential implications of a decision, we can build up from pairwise votes to locate Supreme Court Justices along a continuum – which we may think of as ideological in much the same way that legislative voting has an ideological basis (Segal and Spaeth, 2002).[8] If voting with one's fellow Justices can be aligned in unidimensional terms, then the pattern we will see in pairwise votes is what is now called a *Guttman scale* (Guttman, 1950)

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[8] If we have a more idealist view of the law, we can think of points on this continuum as reflecting underlying jurisprudential philosophies rather than ideology, but this dispute about meaning is irrelevant for the empirical scaling of coalition patterns.

If there is an underlying Guttman scale, with each cell being either a 1 or a 0, depending upon whether or not the jurist agreed with the majority, it will be possible to rearrange the votes (as rows) and the jurists (as columns) so that each row has only zeros to left of certain point and only 1s to the right of that point. However, to do so may require changing the coding of some decisions, by converting a 0 to a 1 to match the ideological direction of the majority vote, i.e., whether it shifts the status quo to the right or to the left. While we would next expect a perfect Guttman scale from real world data, if there is strong underlying unidimensionality, we would expect that most rows would satisfy the condition described above, which always gives us two opposing extremist coalitions, but where the coalitions vary in their size.

We illustrate with voting on major cases in the U.S. Supreme Court in 2002-3. We see from the data in Figure 11(a) that Justice O'Connor is the closest we have to a median justice in that she is in 18 of 20 winning coalitions. On the other hand, Justices Stevens and Ginsburg, on one side, and Justice Thomas on the other side, might appear to be anchoring the poles of a left right scale. Figure 11(b) which reorders first Justices and then bills, in accord with their agreement with Justice Thomas, provides supporting evidence for (very strong but not perfect) unidimensionality. The shaded votes in the figure are the only ones that violate the Guttman scalability condition We see from Figure 11 that Justice O'Connor is indeed, the median justice wrt to the posited continuum and that Justice Thomas and Justices Steven and Ginsburg,are the pole-defining justices.

<<Figure 11 about here>>

Another way to think about the data shown in Figure 11 is in terms of applying a multidimensional scaling algorithm to ascertain whether or not the data is usefully regarded as (approximately) unidimensional. When we do, using the ALSCAL method in SPSS, we get a stress value of .105 and an R^2 of .96.

While pairwise voting in legislatures and courts would seem to require division of the voters into two disparate extremist coalitions, each of which is connected, if we look at governing coalitions in the cabinets of major democracies, not all of these, or even most of these, are extremist coalitions. Rather, many are what we will call *centrist coalitions*, i.e., they include the median party and parties to the right and the left of that party, or both a center right and a center left party, when one of these is the median, but NOT either the most extreme party of the left or the most extreme party of the right (see various essays in Müller and Strom, 2003). We have provided an explanation of why pairwise voting in a single dimension (with the status quo as a reversion point if the bill fails) might be expected to give rise to extremist coalitions. Why might governing coalitions often be centrist?

The simple answer to this puzzle is that centrist coalitions can survive challenge by making it extremely unlikely that the median voter would defect to an extreme coalition, thus making it very unlikely that any winning extreme coalition can be formed. I will not provide a formal proof of this claim but rather an example that should make the claim intuitively reasonable. Imagine that we have five equally sized parties with ideological locations as shown in Figure 12 below, and posit that coalitions choose policies that reflect the mean or median ideological position of the coalition's members.

<<Figure 12 about here>>

If the coalition is {B, C, D} we expect that coalition to locate its policies close to the preferences of C, since C is the median voter within the coalition, and also C can "play off" the preferences of B to its left against those of D to its right. Now, imagine that C is confronted with the choice between the coalition {B, C, D} and, say, the coalition {C, D, E}. If we assume that coalition policies represent a compromise among the ideological locations of the coalition members, then the coalition {C, D, E} will be (considerably) leftward of the coalition {B, C, D} and thus the former coalition will be closer to C's ideal point than the latter. If, in one dimension, we expect a connected coalition, then we should expect that coalition to be centrist.

There are two situations which might complicate this seemingly straightforward expectation. The first is one in which the centrist party is very small. Now, it may be conceivable to create a coalition which does not include it. The second situation is one in which there is essentially no centrist party, but only a center right party and parties to its right and a center left party and parties to its left, with a considerable ideological gap between the center right and the center left parties. Now we might imagine that the two blocs will square off against one another, with the larger of the two blocs forming the winning coalition, but probably with the most centrist of the parties in the bloc exerting disproportionate influence due to its potential threat of allying with its centrist counterpart in the other bloc. Grofman and Kline (2012) formalize the second of these two intuitions by making use of a clustering algorithm developed by Grofman (1982) for party coalition formation as a sequential process involving iterated pairwise proto-coalition formation. This algorithm can be used to predict cabinet coalitions based on the relative ideological proximity of the various political parties. For one-dimensional politics, the mathematician Philip Straffin (Straffin and Grofman, 1984) has proved that the Grofman (1982) algorithm must lead to connected coalitions.

III. Discussion

We have seen that the spatial model can be applied in a multiplicity of contexts, not just that of party competition in elections. Moreover, while we have distinguished among several different types of processes involving unidimensional (or multidimensional) voting, these processes can also be combined. For example, a party competition model can be combined with an agenda model in a two-stage process in which the voters in a constituency choose the candidate of a party to represent them, and the party representatives in a legislature than vote on policy outcomes using some agenda procedure.[9] We may also think of legislative choice as involving a three-stage process in which the voters in a constituency choose the candidate of a party to represent them, and the parties that are represented in the legislature then seek to form a majority *governing coalition*, and then that coalition proposes alternatives to the legislature, perhaps in the form of up or down votes. Or we may add yet an additional layer, by interposing a primary process with only supporters of a given party involved in that party's choice of candidate.

[9] Representatives can also be chosen on a purely individual basis, with no party labels on the ballot, in what is called in the United States a *non-partisan election*. However, in non-partisan elections for local office, even though the party affiliations of candidates are not identified on the ballot, knowledgeable voters can infer them from platforms and campaign advertisements and endorsements.

Figure 7: Pairwise Choice Between A and B with Voters with Ideal Points to the Right of the $\overline{AB}$ Midpoint (such as r and k) Choosing B and Voters with Ideal Points to the Left of the $\overline{AB}$ Midpoint (such as l and j) Choosing A

_____l___A   j____$\overline{AB}/2$________k   B___r__

Figure 8: Three Instantiations of Standard Amendment Procedure (SAP) for the Case of Three Alternatives {A, B, C}

(a)

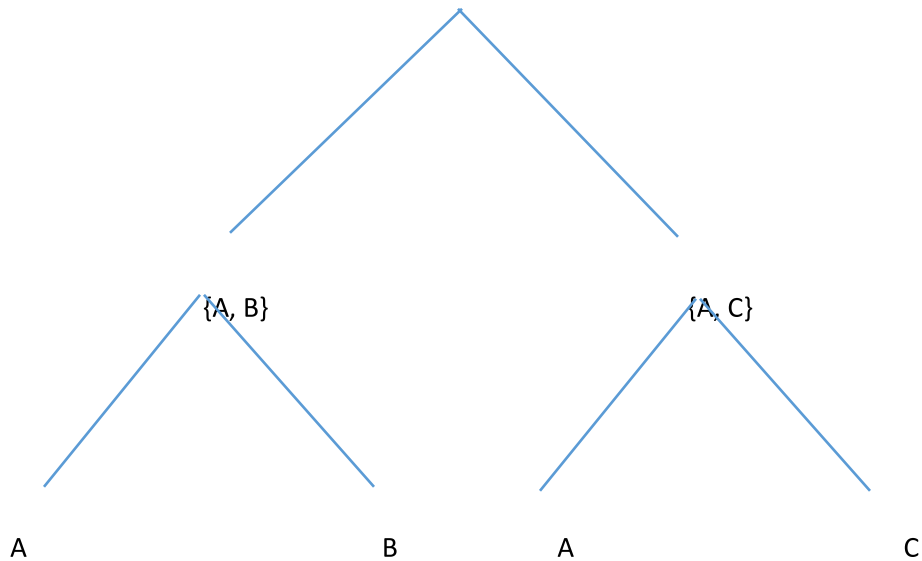

Figure 8: Three Instantiations of Standard Amendment Procedure (SAP) for the Case of Three Alternatives {A, B, C} (cont.)

(b)

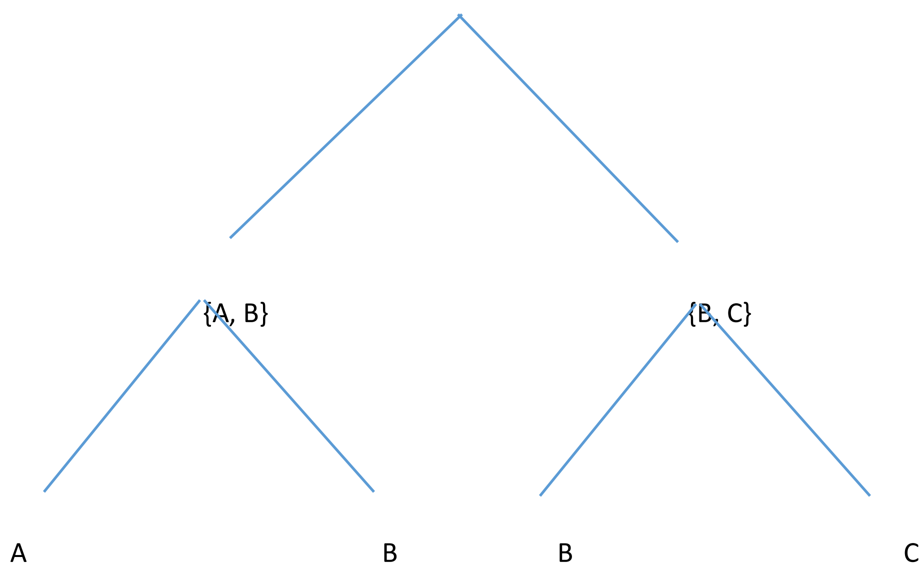

Figure 8: Three Instantiations of Standard Amendment Procedure (SAP) for the Case of Three Alternatives {A, B, C} (cont.)

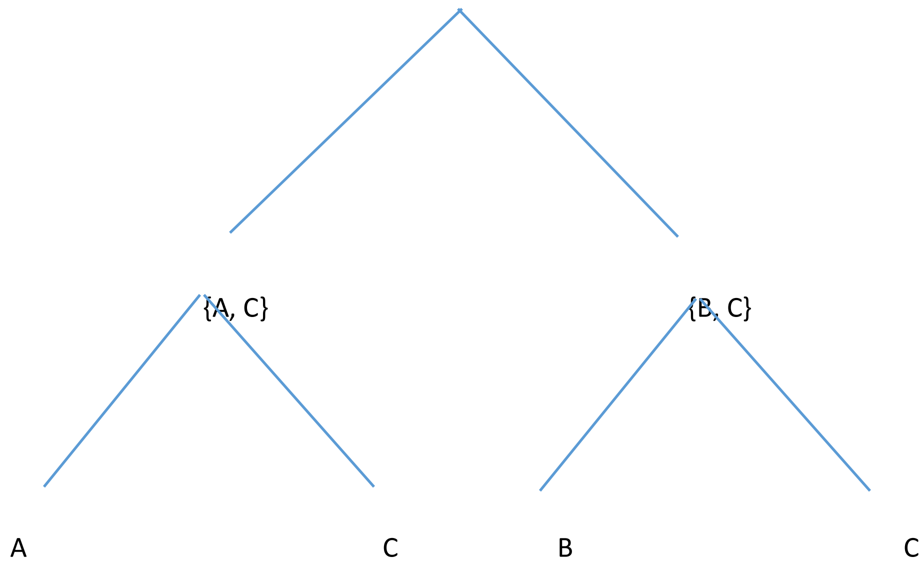

Figure 9: An Instantiations of Sequential Elimination Procedure (SEP) for the Case of Three Alternatives {A, B, C}, with A as the Initial Option.

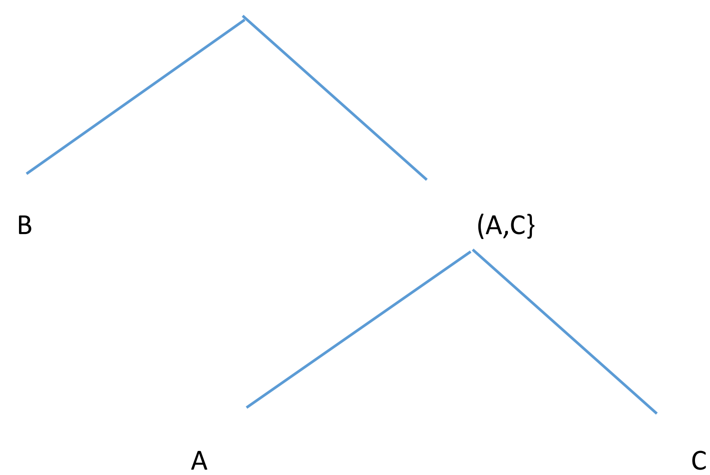

Figure 10.

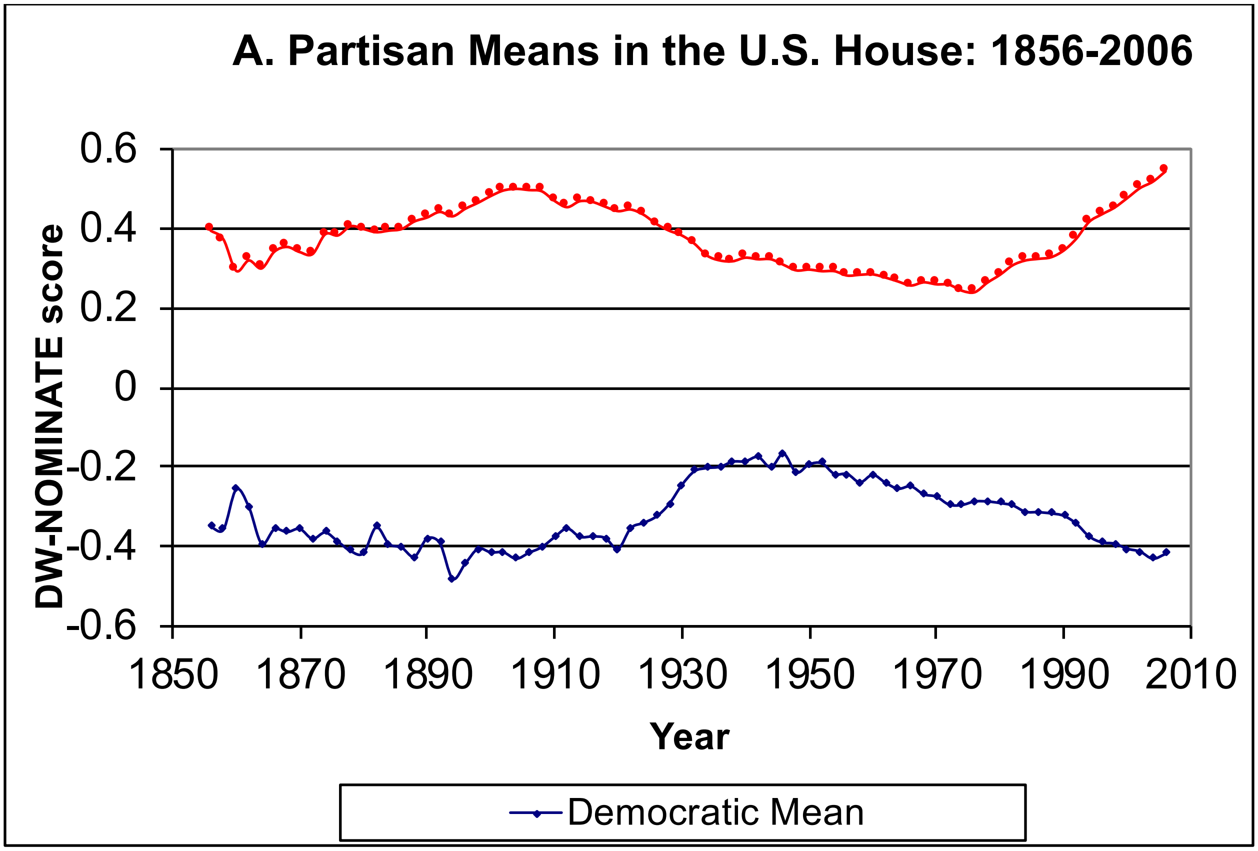
A. Partisan Means in the U.S. House: 1856-2006
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
DW-NOMINATE score
1850
1870
1890
1910
1930
1950
1970
1990
2010
Year
Democratic Mean

Figure 11

(a) Major Supreme Court Cases, 2003-4 Term: Neither Justices nor Cases Arranged in any Particular Order

Major Rulings of the 2002-2003 Supreme Court Term									
Case	Rehnquist	Stevens	O'Connor	Scalia	Kennedy	Souter	Thomas	Ginsburg	Breyer
Lawrence v Texas	0	1	1	0	1	1	0	1	1
Grutter v. Bolinger	0	1	1	0	0	1	0	1	1
Gratz v. Bollinger	1	0	1	1	1	0	1	0	1
Lockyer v. Andrade/Ewing v California	1	0	1	1	1	0	1	0	0
Smith v. Doe	1	0	1	1	1	1	1	0	0
Connecticut Dep.t of Public Safety v. Doe	1	1	1	1	1	1	1	1	1
Scheidler v. National Organization of Women	1	0	1	1	1	1	1	1	1
Miller-El v. Cockrell	1	1	1	1	1	1	0	1	1
Sell v. U.S.	1	1	0	0	1	1	0	1	1
Wiggins v. Smith	1	1	1	0	1	1	0	1	1
Delmore v. Kim	1	0	1	1	1	0	1	0	0
Virginia v. Black	1	1	1	1	0	0	1	0	1
U.S. v. American Library Association	1	0	1	1	1	0	1	0	1
Nevada Dept. of Human Resources v. Hibbs	1	1	1	0	0	1	0	1	1
Desert Palace v. Costa	1	1	1	1	1	1	1	1	1
Kentucky Assn of Health Plans v. Miller	1	1	1	1	1	1	1	1	1
Pharmaceutical Research & Mfg of America v. Walsh	0	1	0	1	0	1	1	1	1
State Farm Mutual Auto v. Campbell	1	1	1	0	1	1	0	0	1
Eldred v. Ashcroft	1	0	1	1	1	1	1	1	0
Madigan v. Telemarketing Associates	1	1	1	1	1	1	1	1	1
1 = Voted with Majority	**17**	**13**	**18**	**14**	**16**	**15**	**13**	**13**	**16**

Case	Thomas	Scalia	Rehnquist	Kennedy	O'Connor	Breyer	Souter	Ginsburg	Stevens
Miller-El v. Cockrell	1	0	0	0	0	0	0	0	0
Wiggins v. Smith	1	1	0	0	0	0	0	0	0
Lawrence v Texas	1	1	1	0	0	0	0	0	0
Sell v. U.S.	1	1	0	0	1	0	0	0	0
Nevada Dept of Human Resources v. Hibbs	1	1	0	1	0	0	0	0	0
State Farm Mutual Auto v. Campbell	1	1	0	0	0	0	0	1	1
Grutter v. Bolinger	1	1	1	1	0	0	0	0	0
Lockyer v. Andrade/Ewing v California	1	1	1	1	1	0	0	0	0
Delmore v. Kim	1	1	1	1	1	0	0	0	0
Virginia v. Black	1	1	1	0	1	1	0	0	0
Pharmaceutical Research & Mfg of America v. Walsh	1	1	0	0	0	1	1	1	0
Smith v. Doe	1	1	1	1	1	0	1	0	0
U.S. v. American Library Association	1	1	1	1	1	1	0	0	0
Gratz v. Bollinger	1	1	1	1	1	1	0	0	1
Eldred v. Ashcroft	1	1	1	1	1	0	1	1	1
Desert Palace v. Costa	1	1	1	1	1	1	1	1	0
Kentucky Assn of Health Plans v. Miller	1	1	1	1	1	1	1	1	0
Scheidler v. NationalOrganization of Women	1	1	1	1	1	1	1	1	1
Connecticut Dept of Public Safety v. Doe	1	1	1	1	1	1	1	1	1
Madigan v. Telemarketing Associates	1	1	1	1	1	1	1	1	1
sum	**20**	**19**	**14**	**13**	**13**	**9**	**8**	**8**	**6**

Figure 11 (cont.)

(b) Major Supreme Court Cases, 2003-4 Term: Cases and Justices Arrayed on a Putative Left-Right Ordering Based on Agreement with Justice Thomas

A B C D E

Figure 12: Five Political Parties on a LIne

Table 1: Fifteen Assumptions Underlying the Downsian Convergence Result (SOURCE: Grofman, 2004)

1. There are only two political parties
2. There is a single round election for any office
3. The election chooses a single candidate.
4. Elections take place within a single constituency.
5. The election is decided by a plurality vote.
6. Policies can be located along a single (left-right) dimension.
7. Candidate policy positions are well defined.
8. Candidate policy positions are accurately estimated by each voter.
9. Voters care only about the next election.
10. Eligible voters go to the polls if the expected benefits of their vote's contribution to the election of the candidate for whom they would choose to vote exceed the "costs" of voting.

11(a) Voters care only about which candidate/party will enact policies closest to the preferences of the voter and vote for the candidate closest to their own location

11(b) If there are no policy differences among the candidates/parties, then voters will be equally likely to support each of the candidates/parties.

12. Parties/candidates care only about winning.
13. Parties/candidates care only about the next election.
14. Candidates/parties accurately estimate the policy preferences of voters, or at minimum, they are at least able to identify the location of the median voter overall and the media voter in each party.
15. Candidates are part of a unified party team.

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