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In the case of *Vieth v. Jubilirer* (2004) the United States Supreme Court found that districting plans could not be challenged on the grounds that they were political gerrymanders. That is to say, districting plans cannot be overturned because they advantage one party over another. The reason given by the five Justices who concurred with the decision was that there did not exist a standard to decide such cases that could be derived from the Constitution and practically applied. Justice Scalia, and the three Justices who joined in his opinion, argued that in principle no such standard existed. Justice Kennedy accepted that no such standard currently existed, but was unwilling to foreclose the possibility that one might be found.

It may seem incongruous that it is a constitutional violation to advantage some over others by making districts contain different number of people; but that achieving the same effect by drawing districts in ingenious ways is no violation. Crude electoral engineering infringes constitutional rights, but sufficiently subtle, but equally effective, engineering does not. Certainly political gerrymandering can be effective, and as Justice Scalia points out, has a long history. An editorial in The Economist newspaper (2012, 23) sardonically advises dictator seeking to rig election to use gerrymandering and "If in doubt, look at how it is done in America." Nevertheless, in order for a court to invalidate a districting plan, there clearly have to be standard that can determine whether a political gerrymander is present.

Whether there is a standard for determining the existence of a political gerrymander is at least as much a matter of social science as of law. Furthermore, the argument made by Justice Scalia that there are no such standards that are judicially applicable relies on several social scientific assumptions. This paper questions these assumptions.

There are four points of intersection between social science and constitutional law that concern us here. Firstly, Justice Scalia argues that the proposed standard that a majority of voters should be able to elect a majority of Representative fails because it relies on a group right to representation; the Constitution, however, only grants the right to equal protection to individuals, not social groups. However, this objection would be overcome if it were possible to derive the right of a majority to elect a majority purely from individual equality. There are results from social choice theory that appear to do precisely this.

Secondly, Justice Scalia argues that groups of partisans are to be treated essentially like any other group of voters, such as religious of ethnic groups. However, it can be argued that elections in the US have a partisan character in a way that does not depend on partisans as a social group. Indeed it could be argued that the partisan nature of elections are an institutional fact – elections and the Congress are as a matter of fact organized along party lines. This finding is important because it is necessary to justify the argument that voters have a right to equal

protection in determining the partisan character of Congress, which is necessary to make any use of the social choice results discussed above.

Thirdly, there is the question of the mode of representation in Congress. Is the House of Representatives supposed to represent the people as a whole, or is a citizens only supposed to be represented by their district representative. The relevance of this question of political philosophy is whether equal protection can apply to the overall composition of the House or just to individual districts. All the Justices who heard *Vieth v. Jubilirer*, except Justice Breyer, took the latter position. This makes challenging a political gerrymander far more difficult. However, taking this privatized or district based view of representation, as opposed to consider representation by Congress as a whole, is to take a particular position in political philosophy. We need to consider whether this position is justified.

Finally, there is the practical question of whether it is possible to implement a standard, assuming that there exist a standard that can be justified on constitutional grounds. The suggestion that it is not possible to distinguish a political gerrymander or practically implement a standard should strike social scientists as a challenge. We have formidable statistical, computational and mathematical tools, as well a great deal of theory and empirics on the working of electoral systems. It is conceivable that the task is beyond us, but we certainly not give up without a fight. I will demonstrate that if we give up a few unfortunate assumptions, the problem appears far from intractable.

Indeed *Vieth v. Jubilirer* as a whole can be seen a challenge to social scientists. Justice Scalia's opinion argues that certain things cannot be done; it is not possible to find a standard for political gerrymandering that is manageable and constitutionally justified. The only way to test whether such a standard exists is to search for it.

The Vieth vs. Jubilirer Decision

The case concerned the redrawing of Congressional districts in the state of Pennsylvania in 2002. A group of Pennsylvania voters who were registered Democrats filed suit in District Court alleging that the new districts were both malapportioned and constituted a political gerrymander. The District Court found in favor of the plaintiffs on the complaint of malapportionment, but dismissed the gerrymandering complaint. The Districts were redrawn. The plaintiffs filed suit again on the same grounds, and the District Court ruled that the new districts were not malapportioned and rejected the political gerrymandering complaint. The Supreme Court, by a five to four vote, decided that the political gerrymandering complaint should not be adjudicated.

Although the Court agreed to dismiss the case and not overturn the District Court's ruling, the majority of the Court was divided on the reasons why. The District Court had rejected the political gerrymandering complaint on grounds that it did not satisfy the criteria set out by the plurality opinion in *Davis v. Bandemer* (1986). The plurality opinion in *Vieth v. Jubilirer* (2004), written by Justice Scalia, and joined by Chief Justice Rehnquist and Justices O'Connor and Thomas argued that political gerrymandering claims were fundamentally nonjudiciable – that is, they argued the question of whether a districting plan represented a political gerrymander was not a question that could be decided by the courts, but was rather a political issue. These Justices would have overturned the previous decision *Davis v. Bandemer* (1986) that had held that claims of political gerrymandering were in principle judiciable, but had failed to reach a majority decision on the appropriate standards. Justice Kennedy concurred with the decision, but wrote a

separate opinion. While agreeing that no suitable standard for adjudicating such cases currently existed, he did not want to foreclose the possibility that such a standard could be found. Therefore he wished to maintain the position in *Davis v. Bandemer* (1986) that political gerrymandering cases are in principle judiciable. Justice Stevens, Justice Souter (joined by Justice Ginsberg) and Justice Breyer wrote dissenting opinions.

The argument that political gerrymandering violates the Constitutions rests on the Equal Protection clause of the 14th Amendment and Article 1, §2 and §4. While the majority of the Court in the case of *Davis v. Bandemer* (1986) agreed that such claims were in principle judiciable, but did not agree on what the appropriate standards. The plurality opinion, authored by Justice White argued that a plaintiff would have to show "both intentional discrimination against an identifiable political group and an actual discriminatory effect on that group." To show that there was actually a discriminatory effect, it would be necessary to show that the group had been "denied its chance to effectively influence the political process." (I cite the sections of *Davis v. Bandemer* (1986) referred in Justice Scalia's plurality opinion for *Vieth v. Jubilirer* (2004).) This depends not just on direct influence, but also on indirect influence through the party nomination process. The plaintiffs in *Vieth v. Jubilirer* (2004) actually propose their own standards for adjudication. They take the basic intent / effects framework, but propose slightly different standards for establishing these. To satisfy intent, it would be necessary to "show that the mapmakers acted with a *predominant intent* to achieve partisan advantage". This could be shown directly or by circumstantial evidence that traditional criteria (such as contiguity, compactness, local government boundaries) had been sacrificed for partisan advantage. To satisfy a discriminatory effect it would be necessary that "(1) the plaintiffs show that the districts systematically 'pack' and 'crack' the rival party's voters, *and* (2) the court's examination of the 'totality of circumstances' confirms that the map can thwart the plaintiff's ability to translate a majority of votes into a majority of seats."

Justice Scalia (541 US 277) defines a question as "nonjudiciable" or "a political question" if it is the case that "the law is that the judicial department has no business entertaining the claim of unlawfulness – because the question is entrusted to one of the political branches or involves no judicially." Justice Scalia cites six criteria laid out in *Baker v. Carr* 369 US 186 (1962) and declares that it is the second that is of issue in this case, that is, "the lack of a judicially discoverable and manageable standard". (It is notable that the first criterion is that there is a constitutional commitment of the issue to another branch of government, and the other four criteria deal with relations between the different branches of government. While providing background to the case, Justice Scalia notes that that Article 1§4 of the Constitution provides relief in the case of gerrymandering by allowing Congressional intervention, and notes various laws that Congress has made placing restriction on how States can drawn districts (541 US 275). However, Justice Scalia does not base the argument for nonjudiciability on the criterion that the Constitution explicitly assigns the issue to another branch. Presumably such an argument would be hard to reconcile with the fact that the Court has intervened in Congressional districting in cases of malapportionment and racial gerrymandering. Instead Justice Scalia's argument is based on the lack of a discoverable and manageable standard.)

Justice Scalia, in the plurality opinion in *Vieth v. Jubilirer* (2004) argues that the *Davis v. Bandemer* (1986) plurality opinion has proved indeterminate and unworkable, appealing both to academic sources and to the fact that no districting plans had been overturned for violating the standard. Furthermore he argues that the plaintiffs do not appeal to these standards. Therefore

Justice Scalia focuses on the plaintiffs' standards as he argues that there are no viable standards for adjudication.

Justice Scalia argues that the plaintiff's proposed criteria fail to provide a judicially discoverable standard with regard to the effects of political gerrymandering. That is, the plaintiffs the standards the plaintiff propose do not have a basis in the violation of any constitutional right. The "effects prong" of the plaintiff's proposed standard is that voters have been "packed and cracked" in districts, and that this prevents a majority of voters from electing a majority of representatives. Justice Scalia argues that, contrary to the assertions of the plaintiffs, the right of a majority of voters to elect a majority of representatives necessarily rests on a right to proportional representation (541 US 288). No such right exists in the US Constitution – equal protection is guaranteed only for persons, not equally sized groups. (Justice Scalia also expresses skepticism of the "intent prong" of the plaintiff's standard, arguing that the use of the "predominant intent" test from racial gerrymandering cases does not necessarily show that there is a judicially discoverable standard for political gerrymandering cases 541 US 285.)

Even if the plaintiff's standards were judicially discoverable, Justice Scalia argues that they would not be manageable (541 US 288). This is because there is no way of establishing that a group of partisans is a majority in a state. Justice Scalia rejects using the results of elections to statewide offices on grounds that these results vary – in Pennsylvania in the last election period, some offices were won by Democrats and some by Republicans. He cites a law review article arguing "There is no statewide vote in the country for the House of Representatives or the state legislature. Rather, there are separate elections between separate candidates in separate districts, and that is all there is" (Lowenstein & Steinberg, The Quest for Legislative Districting in the Public Interest: Elusive or Illusory, 33 UCLA L. Rev. 1, 59-60 (1985) cited in 541 US 289). Furthermore he argues that even if we could identify a majority party, it would be impossible to ensure that it won a majority of the representatives while retaining a winner-take-all election system. That is to say, however you draw the districts, it is always possible for the party with the majority of the votes to not win a majority of the seats, as was the case with the Pennsylvania Congressional delegation in 2000.

In his concurring opinion, Justice Kennedy agreed with the plurality that no workable standard for adjudicating political gerrymandering cases existed, but did not want to foreclose the possibility that such a standard may be found. He thus goes beyond simply affirming the District Court decision based on *Davis v. Bandemer* (1986). His position invalidates the standard proposed by the plurality in *Davis v. Bandemer* (1986), but does not overrule the finding that political gerrymandering cases are in principle judiciable. The dissenting opinions of Justice Souter (joined by Justice Ginsberg) and Justice Stevens, while rejecting statewide claims of political gerrymandering, argued that there were workable standards for district based claims, and that the plaintiffs had met those criteria. Only Justice Breyer argued that statewide political gerrymandering could violate the Equal Protection clause, and then only in extreme cases where there was a risk of harm to basic democratic principles.

A Discernable Standard?

The plaintiffs in *Vieth v. Jubilirer* (2004) propose a standard for political gerrymandering that relies on the test that a majority of voters is unable to elect a majority of representatives. Justice Scalia (541 US 288) denies this standard is judicially discoverable because it is based on an

assumed right to proportional representation by groups, and the Constitution grants no such right. I will argue that the standard can in fact be justified purely in terms of the equal protection of individual voters, using social choice theory. This argument, of course, is quite different from that of the plaintiffs in the case.

Justice Scalia (541 US 288), after noting that the standard proposed by the plaintiffs would only invalidate a district plan if is prevents a majority of voters from electing a majority of representatives, argues:

> "... we question whether it is judicially discernible in the sense of being relevant to some constitutional violation. Deny it as appellants may (and do), this standard rests upon the principle that groups (or at least political-action groups) have a right to proportional representation. But the Constitution contains no such principle. It guarantees equal protection of the law to persons, not equal representation in government to equivalently sized groups. It nowhere says that farmers or urban dwellers, Christian fundamentalists or Jews, Republicans or Democrats, must be accorded political strength proportionate to their numbers."

There is no dispute that the Constitution does not contain a right to proportional representation for groups. The question is whether this is required to get to the standard that a majority of voters should be able to elect a majority of representatives. Certainly a right to group proportional representation would imply that a majority would be able to elect a majority of representatives. In fact it implies far more than this – the legislature would have to be a microcosm of the electorate, something political scientists refer to as "descriptive representation" (Pitkin 1967). Justice Scalia, after all, equates political parties with religious and demographic groups. However, it is not clear why a right to group proportional representation is *necessary* to justify a standard based on a majority electing a majority – there may be other grounds for this conclusion. I will argue that other such grounds do indeed exist and that they are based strictly on the equal protection of individual voters.

The formal result that my argument is based on comes from Hout and McGann (2009, 2009). Roughly speaking, this results states that if an electoral system for a legislature treats all voters equally, and treats all candidates equally, and does not penalize a party if voters switch in its favor, then it must have the following property: If one party gets more votes than another party, it must get at least as many representatives. The importance of this result is that it allows us to get from liberal political equality – the equal protection of individuals – directly to the principle that a majority of voters should be able to elect of majority of representatives. In a two-party system, the larger of the two parties must have a majority of the vote, and if it receives more seats than its rival, must have a majority of seats.

This does require two assumptions. Firstly we consider the composition of the legislature as a whole, as opposed to considering just the individual districts. This is not very hard to justify, as the output of the legislature does in fact depend on the action of the legislature *as a whole* and not just on its individual parts. Secondly, we have to consider the partisan balance of the legislature as an important part of *the results* of Congressional elections. This is justified not because we assign rights to partisan groups, any more than we assign rights to demographic or religious groups; this is justified because the US Congress is *as a matter of fact* organizes itself on partisan lines. We turn next to the detailed justification of these two assumptions.

Assumptions

For the argument I propose to go through, it is necessary that voters have right to equal protection in regard to the results of Congressional elections as a whole; and that it is legitimate to consider the partisan balance of power as important part of that result. Let us start with the argument for considering Congress as a whole. I doubt it would be difficult to convince political scientists, political journalists or politicians that the overall balance of power in Congress as a whole matters. After all, it is Congress as a whole (or at least a majority of the Members of each house) that passes legislation. The day after the election, newspaper headline are likely to read "Republicans retake House" or "Democrats retain House". It is not likely (parodying the law review article cited by Justice Scalia) that they will read "There were separate elections between separate candidates in separate districts, and that is all there is!" Contrary to the assertion by the same authors, political parties do not just "compete for specific seats"; they also compete for control of the House. (To be fair to Lowenstein and Steinberg, they are correct in asserting that parties do not compete for statewide vote totals, and that we cannot simply infer a party's statewide support by adding up the district totals.)

The Supreme Court has, however, denied that results of Congressional elections *as a whole* can be used as evidence that voters have not been accorded equal protection. The plurality opinion in *Vieth v. Jubilirer* (2004) is particularly assertive about this. However, all the dissenting opinions other than that of Justice Breyer also accept this point. In fact the plurality in *Davis .v Bandemer* (1986) comes to the same conclusion. To establish a violation of the Equal Protection clause, it is necessary to produce a district specific claim.

This represents a political theory, one that is both problematic in itself and very questionable in terms of its Constitutional basis. We might call it an "atomistic" or "district based" view of representation. Provided the process by which I elect my Representative passes muster, I have received equal protection. I cannot argue that the overall process by which Congress is elected discriminates against me. It is as if each Representative is treated as a separate, individual magistrate as opposed to a Member of a representative body. The assumption seems to be that because I only get to vote for the Member from my district, that Member and that Member alone represents me, as opposed to the House as whole. We might compare this to Edmund Burke's (1777 / 1963) distinction between a "Congress of Hostile Ambassadors" and a "Deliberative Assembly of one Nation".

This "atomistic" or "district based" approach is problematic because it is the performance of Congress *as a whole* that affects my wellbeing. Congress as a whole deliberates and passes laws, not individual Members. The output of Congress is legislation, and this is intrinsically a collective good. Whether Congress passes laws that protect me or do me harm depends not on me having a personal representative, but rather on the entire Congress. The need to consider the composition of Congress as a whole does not depend on its mode of election, but on the nature of Congress as a collective decision making body.

It is possible for me to have the ability to elect my representative in a fair and proper manner, but for the legislature as a whole to be stacked against me. Consider the following scenario. The districting and election administration of the district in which I live are beyond reproach. However there are serious abuses (whether malapportionment, gerrymandering or outright fraud) in other districts. This results in massive misrepresentation, so that my representative and those of similar opinion are outvoted. Indeed because of the artificial

overwhelming majority in the legislature created by the abuses, my representative and those of similar opinion are irrelevant to policy and law-making. By the standards of all the *Vieth v. Jubilirer* (2004) opinions except that of Justice Breyer, I cannot claim that I have not received equal protection – I am able to elect my representative. Presumably someone in the other districts could claim that their right to equal protection had been violated, unless the abuse was gerrymandering. I, however, cannot because I do not have a district specific case (my district is fine) and I cannot make a case based on the overall composition of Congress. Nevertheless, it appears preposterous to claim that I have received equal protection when the composition of Congress is stacked against me and I can reasonably expect my representative to be completely ignored.

The Constitution certainly does not privilege the "atomistic" or "district based" conception of representation. In fact, elections to Congress are described in collective terms. Article 1§2 states "The House of Representatives shall be composed of Members chosen every second Year by the People of the several States." Interestingly it does not even say "the Peoples of the several States", but rather uses the single collective noun "People" – that is, the People of the United States. No doubt it was assumed that elections would be by district – national proportional representation had not yet been invented – but there is nothing here to support the view that an individual voter is only represented by their representative and thus does not have a stake in the composition of Congress as a whole. Rather the House of Representative *as a whole* is to be chosen by the People *as a whole*. Indeed districts are not even mentioned in Article 1 – Article 1§4 gives States authority over the "Times, Places and Manner" of elections, but gives the United States Congress the power to overrule them.

Next let us turn to why it is legitimate to consider not just the overall composition of Congress, but the partisan composition of Congress. The reason we can consider the partisan composition of Congress as part of the results of a Congressional election is *not* that the electorate is partisan. It is *not* that there is a group of partisans in the electorate that deserves special consideration, as opposed to various religious, ethnic, occupational or demographic groups. Rather it is because the Congress *as a matter of fact* organizes itself on partisan lines. The partisan make-up of Congress may not be only thing that determines what legislation is passed, but it is certainly an important factor. Therefore the partisan composition of Congress is a significant part of the *results* of a Congressional election. If these results are systematically biased against certain individuals, or if certain individuals are not given a fair opportunity to influence these results, then they can reasonably claim that they have been denied equal protection.

The partisan balance of power in the House of Representatives has a number of direct institutional consequences, that voters have a right to be concerned about. Members caucus in the House of Representative on the basis of party. The majority party chooses the Speaker of the House. Which party has a majority will influence the distribution of committee assignments, and in particular committee chairs. The majority party will have a number of procedural advantages, in terms of control of the Rules Committee and the Calendar. In addition, although party discipline in the United States Congress is far from complete, there is significant party line voting. Which party has a majority determines certain significant national posts, and is likely to have a strong influence on the character of legislation passed.

In fact, elections to the House of Representatives would still be partisan even if there were no partisans in the electorate. Imagine that the entire population was independent and no-one had a partisan group identity. Provided that the legislature still organizes itself on partisan

lines, we still ought to care about the partisan balance in Congress. The Democrats or Republicans would not be identifiable groups in the electorate who could demand the right to elect members of their group – everyone decides each election on its merits. However, the partisan balance still matters – it determines how the House of Representatives is organized. The newspapers the morning after the election will still report that the Democrats or Republicans have captured or retained the House.

Thus the partisan composition of Congress is not just one demographic group description amongst others; it is an important and objective part of the election *result*. The candidates have run as partisans, this has been recognized institutionally (party affiliation is printed on the ballots) and they have competed in party primaries to win this privilege. Once elected the Members continue to organize themselves on party lines and there are direct institutional mechanisms leading to important outcomes, such as the leadership of the House. While the partisan balance in Congress does not completely determine legislative output, it is surely an important factor. If someone is denied an equal opportunity to influence the partisan aspect of the result, it is reasonable for them to claim that they do not enjoy the equal protection of the law. The partisan nature of the election and its results comes not from group identities in the electorate but from the objective organization of the elections and the legislature.

Individual Rights and Plurality Ranking

We may now turn to the formal result. Stated intuitively, if we treat every individual voter equally; and we do not discriminate against specific parties or candidates on the basis of their names; and we do not punish parties for winning more votes than they need; then if a party wins more votes than another party, it must win as many seats, if not more. That is to say, in a two party system, the minority party in terms of votes cannot be awarded a "manufactured" legislative majority by the electoral system. In technical language (to be explained below) if a seat allocation system is anonymous, neutral and nonnegatively responsive, then it must satisfy the plurality ranking property. The importance of this result is that the standard that a minority of voters cannot elect a majority of representatives does have to rest on a principle of group representation. Rather it can be justified strictly in terms of equal treatment of individuals.

The result comes from Hout and McGann (2009, 2009). It is Proposition 1 in both of these articles. It is based on an earlier result Hout Swart and Veer (2006). The Hout and McGann articles go further than we need, introducing further assumptions to produce a justification of proportional representation based on a *liberal* conception of individual equality. We do not need or rely upon these additional assumptions for the argument in this paper. The relationship between these results, proportional representation and this paper is discussed in the next section.

The result does require that we think of the election result in terms of a *seat allocation function*. A seat allocation functions is just an abstraction that takes the vote of each individual voter and returns an allocation of seats to each party. How it does this is left open. For example, it could divide the voters into districts and award a party a seat for each district in which it has the largest number of votes. This, of course, is how the current electoral system in the United States works. Alternatively it could count up all the votes and award seats proportionally. Or it could combine the two or do something completely different. The idea of a seat allocation function can accommodate the details on any electoral system. However, it does consider the election result *as a whole* and considers it in terms of seat allocations to parties. This is why it

was necessary to argue that it is justified to view the election result in this way. It should be noted that a seat allocation rule does not capture everything that an electoral system may do. For example district elections do not just determine how many seats each party gets, but also who gets to fill those seats. However, as was argued in the last section, the partisan balance is surely an important – perhaps the most important – aspect of these results. On those grounds it is possible to make the argument that if someone is denied an equal role in determining this aspect of the result, they have been denied equal protection.

We can now turn to the axioms required by the result. The idea of political equality is captured by two axioms, anonymity and neutrality. If a seat allocation function is to treat all voters equally it must be anonymous. This means that it does not discriminate between voters based on their names. If we change the names of the voters this does not change the results. An obvious example of a seat allocation system that is not anonymous is a system that gives some people more votes than others. However, there are many more subtle ways that electoral systems can discriminate between voters and thus violate anonymity.

Neutrality means that an seat allocation rule does not discriminate between candidates or parties on the basis of their names. If we exchange the name of two parties then we must also exchange their seat allocations. Alternatively, if all the people who voted for party A suddenly change their votes to party B, and all the party B voters vote for party A; then party A must win the seats that party B previously won and vice versa. Neutrality is a minimal requirement of any democratic electoral rule. It is satisfied by the electoral systems of all liberal democracies, including the United States. It does not prevent certain parties being advantaged in terms of where their support comes from. It only prevents the explicit advantaging of certain parties purely in terms of their identities. For example neutrality would be violated in the following scenario: In an election all the Democratic candidates changed their affiliation to Republican and vice versa, but everyone voted for same candidates as before; the electoral system, however, did not return the same candidates, but advantaged the ones that had taken one party label, even though the exact same votes had been cast for each candidate as before.

The final axiom we need is a technical one – nonnegative responsiveness. This means that a party cannot be penalized for winning extra votes when it retains all its previous support and nothing else changes. Suppose that a party wins the votes of certain voters and is awarded certain seats. Suppose then that the same party retains the support of all those voters, and no-one else changes their vote except for some voters who switch their vote to the party we are considering. Then nonnegative responsiveness means that the party must get at least as many seats as before. A stronger axiom is positive responsiveness: This requires that if a party wins over extra voters and everything else stays the same, then the party must get more seats than before. This stronger quality does not really concern us because no existing electoral system meets it – there are a discrete number of seats to allocate, so if a party wins just one extra vote it is usually not possible to give it an extra seat. It should be noted that negative responsiveness does not mean that a party with more votes than another party necessarily gets at least as many seats. It only prevents the perverse outcome where a party is punished for adding voters when nothing else changes. This is a minimal requirement that is met by every reasonable single vote electoral system, including the first-past-the-post system used in the United States.[1]

If an electoral system satisfies the requirements of political equality (anonymity and neutrality) and the common sense requirement of nonnegative responsiveness, then it can be shown that it must satisfy the weak plurality ranking property. The weak plurality ranking property means that if one party wins more votes than another party, it must receive at least as

many seats. In a two party system this means that the minority party cannot be awarded a majority of the seats. (The strong plurality ranking property requires that if a party receives more votes than another party it must receive more seats. This property is less interesting to us because in addition to anonymity, neutrality, we need positive responsiveness (not just nonnegative responsiveness) to necessitate this condition. I have already explained why positive responsiveness is not something we can reasonably demand.)

The proof that anonymity, neutrality and nonnegative responsiveness imply the plurality ranking property is given in Hout and McGann (2009, Propositiion 1; 2009). Here we can consider the intuition behind the formal proof. We proceed in two steps. First I demonstrate why anonymity and neutrality imply something called the cancellation property. Then I show that if we add nonnegative responsiveness to this we get the weak plurality ranking property. The cancellation property is the property that if two parties have the same vote total they be allocated the same number of seats. Let us see why anonymity and neutrality imply this property. Consider the voter profile in Table 1. This list each voter and places an X under the party this voter votes for. Thus voter 1 votes for Party A, voter 2 for Party B, voter 7 for Party C and voter 8 abstains. There may be any number of voters, but in this example we only consider the first eight. First let us consider a situation,, as in Table 1, where two parties have the same number of votes. Let us suppose that the cancellation property is not true, and that one party gets more seats than the other (let us assume A gets more seats, for the sake of argument). We can show that this is impossible if anonymity and neutrality are respected.

Table 1

	Party A	Party B	Party C
Voter 1	X		
Voter 2		X	
Voter 3	X		
Voter 4		X	
Voter 5	X		
Voter 6		X	
Voter 7			X
Voter 8			
Etc.			

Firstly let us change the names of all the voters who vote for Party A and Party B. Each voter who votes for Party A gets the name of a voter who voted for Party B and each voter who voted for Party B gets the name of a someone who voted for Party A. Thus voter 1 is renamed voter 2 and voter 2 is renamed voter 1. Alternatively we could think of this as each voter who voted for Party A now voting for Party B and each voter who voted for Party B now voting for Party A. (Given that the number of voters for each party is assumed equal, the voters match up one-to-one.) This gives the voting profile in Table 2. If the electoral system respects anonymity, this changing around of the voters can make no difference to the result. Therefore Party A must still be allocated more seats than Party B.

Table 2

	Party A	Party B	Party C
Voter 2	X		
Voter 1		X	
Voter 4	X		
Voter 3		X	
Voter 6	X		
Voter 5		X	
Voter 7			X
Voter 8			
Etc.			

Next let us change the names of the parties. Let Party A now be called Party B and Party B now be called Party A. This gives us the voting profile in Table 3. By neutrality, if we change the names of the parties this is not allowed to change the allocation of seats. The party previously known as Party A (now known as Party B) must win more seats than the Party now known as Party A (previously Party B). That is to say, if Party B gets the support of all the voters who previously supported Party A, by neutrality, Party B must get all the seats that were previously allocated to A. Thus Party B must now receive more seats than Party A.

Table 3

	Party B	Party A	Party C
Voter 2	X		
Voter 1		X	
Voter 4	X		
Voter 3		X	
Voter 6	X		
Voter 5		X	
Voter 7			X
Voter 8			
Etc.			

The problem is that if we look at Table 3, we see that it is identical to Table 1, except that order of the rows and columns is different. If we rearrange the rows and columns of Table 3 without changing who votes for whom, we end up with a voter profile identical to Table 1 (voter 1 votes for Party A, voter 2 votes for Party B, etc.). By anonymity and neutrality, with the votes in Table 3 Party B must get more seats than Party A. But Table 3 is identical to Table 1, and we started by assuming that in Table 1 Party A gets more seats than Party B. What we have shown is that if Party A gets more seats than Party B despite having the same number of votes, then Party B must also get more seats than Party A. This is obviously impossible. The only way out of this contradiction is assign the same number of seats to parties with the same number of votes. This is the cancellation property.

By adding the requirement of nonnegative responsiveness we can go from the cancellation property to the weak plurality ranking property. The weak plurality ranking property requires that if one party wins more votes than another party, it must get at least as many seats as

it. Suppose we have a voting profile where Party A gets more votes than Party B. Now suppose that some of Party A's voters abstain, so that the vote totals for Party A and Party B are identical. By the cancellation property (which we have already shown can be derived from anonymity and neutrality) the two parties must receive an equal number of seats. Now let the abstaining voters go back to supporting Party A. By nonnegative responsiveness, Party A cannot be disadvantaged by this, it still must have at least as many seats as Party B. This is the weak plurality ranking property.

The significance of this result is that it produces a standard for electoral districting (that the party that receives a majority of the vote should receive at least half the seats in a two party system) that is derived solely from the principle of the equal protection of individual voters. It does not depend on the principle that equally sized groups are entitled to equal representation, a principle that is not to be found in the Constitution. Rather it is based on the requirement that individual voters receive equal protection in determining the overall result of the election. Given that the Congress at its elections are both institutionally partisan, this provides a standard of electoral justice that is discernable from the equal protection clause of the 14th Amendment.

Relation to Proportionality

Given that Justice Scalia brings up proportionality while rejecting as non-discoverable the standard that a majority of voters should be able to elect a majority of representatives, it is necessary to discuss the relationship between proportionality and the plurality ranking property. The standard that a party that wins a majority of the votes should get at least half the seats in a two party system is a far weaker standard than proportionality. However proportionality can be justified in terms similar to those used here, and can be justified solely in terms of equal treatment of individuals as opposed to groups (See Hout and McGann 2009). This, however, requires additional assumptions. The plurality ranking standard also has the advantage of being not just a violation of equal treatment in principle, but of involving a violation of equal treatment that produces a definite and identifiable harm – a different party controlling the national legislature.

The plurality ranking property does not in itself imply proportional representation. In fact, the plurality ranking property is (unsurprisingly) satisfied by the plurality rule, which simply gives all the seats to the largest party. This, however, is the opposite of proportional representation. Of course, proportional representation is one electoral system that guarantees that the plurality ranking property is satisfied. It does this even if we insist that the plurality ranking property applies at the national as opposed to the state level. If we insist that the electoral system satisfy the plurality ranking property no matter how people vote, then the number of electoral systems we can choose is more limited, bout would include proportional representation and national winner-take-all plurality. If, however, we only demand that the plurality ranking property is satisfied most of the time, then many more systems are possible, including first-past-the-post district systems with suitably drawn districts.

In order to derive proportional representation from the requirements of individual political equality, an additional axiom is required in addition to anonymity, neutrality and nonnegative responsiveness (Hout and McGann 2009, 2009). This is coalition neutrality. This requires that a group of parties or candidates receives the same allocation of seats whether it merges or fractures or forms a coalition. This amounts to saying that the electoral system may

not discriminate between large and small parties or alliance of them. The justification for this is that the voters alone should decide whether there are a large number of small parties or a small number of large parties; the electoral system has no business imposing this decision on the people. Hout and McGann are, of course, considering primarily countries with multi-party systems in which control of government is determined by the relative size of coalitions. With this additional assumption, Hout and McGann argue that *liberal* – that is, individual – political equality logically implies proportional representation. They also argue that proportional representation (or at least proportional representation with large districts) has the important democratic advantage of making it easy for new parties to form and win representation, preventing existing parties from forming a privileged cartel. It is interesting that there are countries, such as Austria where the constitutional court has interpreted the constitutional requirement of political equality to imply electoral proportionality (Müller 1996). However, even if the extended argument for proportional representation is unacceptable, the argument for the plurality ranking property stands in own right.

Another approach would be to apply the requirement of anonymity directly to the electoral system. As Christiano (1996) and Rogowski (1981) argue, any district based system violates anonymity in a strict sense. The very nature of districts is to treat voters from different districts differently. Therefore changing voters around can certainly change the result with certain patterns of voting. It should be noted that this is the case even if the plurality ranking property is not violated. If some districts are safe and some districts are competitive, then some voters are able to influence the outcome while other are irrelevant, placed in districts where only one candidate can realistically win. Under this framework districting to protect incumbents is just as problematic as gerrymandering for partisan advantage. The only way to satisfy anonymity strictly is to do away with districts and use a national allocation of seats, whether by a proportional formula or something else.

The plurality ranking property is a far weaker requirement than strict anonymity. If we accept strict anonymity, then the plurality ranking property follows automatically. However, we could have an electoral system that is not strictly anonymous, but which manages to satisfy the plurality ranking property, at least most of the time. If we insist of strict anonymity applied to the electoral system, then we are rejecting any electoral system that could violate political equality in the case of some voter profile. If the plurality ranking property is violated, however, we know that political equality has been violated in a way that causes identifiable harm. It is not just that the system is theoretically unequal; this inequality has overturned the result. In a first best world, a strong case can be made for proportionality and anonymity on ground of political equality. The plurality ranking property, however, is a far more modest requirement needed to ensure the equal protection of voters.

A Manageable Standard?

I have argued that we can justify the requirement that majority of voters should be able to elect at least half the representative can be derived from Constitutional rights. However, Scalia argued that even if this standard was judicially discernable, it was not judicially manageable. That is, even if this standard is in principle justified, there is no practical way for a court to apply it. I will argue that, given our knowledge of social science, it is indeed possible to apply the standard developed in the last section. After all, those drawing the districts seem to have some idea of the

likely consequence. This does, however, require us to rethink some assumptions. It is not a question of showing that a particular districting plan fails to allow a majority of voters to elect a majority of representatives. After all, the districting plan will be challenged before any elections have been held under it. Rather it is a question of showing that under reasonable scenarios it is highly likely that a districting plan will award a majority to a minority party. I will also argue for assigning less importance to the "intent prong" – a districting plan violates the equal protection of voter because of its effects, even if these were unintentional.

Justice Scalia gives two reasons why the plaintiff's proposed standard is not judicially manageable, even if it were judicially discernable. Firstly he argues that it is not possible to identify a partisan majority. If you cannot show that a party has the support of the majority of the voters, you cannot show that the majority has been unable to elect a majority of representatives. It is not possible, argues Justice Scalia, to identify a majority because there are no statewide House elections, but simply a variety of district elections, all of which depend to some degree on local or candidate specific factors. Secondly, Justice Scalia argues that there is no possibility of relief, short of completely overhauling the US electoral system. This is because any district based system can in certain circumstances award a majority of seats to a minority, as was indeed the case with the House elections in Pennsylvania in 2000, before the redistricting that was challenged in *Vieth v. Jubilirer*.

The second objection assumes that relief has to be to implement a system that makes it impossible to violate the standard of a majority being able to elect a majority. However, there is surely a difference between a districting plan that may give a minority a majority of the seats given a very improbable distribution of votes, but which generally performs properly; and a districting plan that we can expect to systematically and regularly to reward a minority with a majority of the seats. The fact that no districting plan can perform perfectly does not mean that some cannot be far worse than others. If a districting plan produces a "wrong" result once every hundred years, perhaps we do not need to as concerned as if it produced this result every other election. The example of Pennsylvania in 2000 is indeed the kind of "error" we need not be too concerned about. The Democrats won 50.6% of the vote, but only received 10 seats out of 11. The election was essentially a tie in terms of votes cast, and the seat allocation to both parties was as close to even as possible. Justice Scalia is indeed correct that outcomes like this will sometimes happen in the most fairly drawn districts. However, this does not mean that we necessarily have to tolerate districts that (say) give two thirds of the seats to the minority, or overturn larger majorities, or which systematically advantage one party on a regular basis.

Turning to the first objection, Justice Scalia is correct in arguing that there is no simple direct way to identify which party has majority support. However, we do not need this to show that the districts are biased in favor of one party and are likely to give a particular party a majority even if it fails to have majority support. Because districts are challenged before any elections are challenged, we do not know how people will vote. However, we can look at the relative patterns of support for the parties in the past. Suppose that we assume that the relative pattern of support between districts remains the same. Then let us assume that the overall probability of a voter voting Party A is 50%. Then we could calculate the Party A percentage in each district required to maintain the relative pattern of support and the overall probability of 50%. From this we could calculate how many seats Party A would win. We could repeat this exercise with different probabilities of voting Party A. Thus we are showing that in hypothetical elections where one party wins a majority of the vote but support is distributed between districts as it has been in the recent past, the other party is awarded a majority of the seats.

While we will not have election results for the new districts, we can reconstruct these from existing data. We can take the polling station results from previous elections and map these onto the census blocks of the new districts. From this we can calculate the relative patterns of support across different districts. This data is, of course, already available to those drawing the districts, and combined with geographic information system (GIS) software, makes it easy to calculate the political consequences of district changes to a considerable degree of precision.

Let us consider an example of these calculations. There are various assumptions we can make about holding relative patterns of support constant. Indeed one indicator that the districts are seriously biased will be that they produce problematic results under a wide range of assumptions. The example here is a very simple one. For each district we can calculate the odds of voting for Party A as opposed to Party B, by simply dividing Party A's vote by Party B, ignoring minor candidates. (Thus a score of 1 means even odds, while 1.5 would mean that the odds were 3-2 in favor of Party A.) Let us assume that the ratios between these odds are fixed. Thus if we increase the odds of voting Party A in a one district from 1:1 to 2:1, then in a district where we started with odds of 2:1, we need to increase them to 4:1. Thus we can increase or decrease the odds of voting for Party A, but we need to increase them or decrease them across all districts so the pattern of support stays the same. If we want the probability of a randomly selected voter supporting Party A to be 50%, we can choose an appropriate scaling factor that will achieve this with the pattern of support we are assuming. From this we can calculate the percentage support for Party A in each district, and thus how many seats it will win. We can repeat this process with any level of support for Party A.

Table 4 – 2010 Two Party House of Representatives Results

District	Democratic	Republican	Odds Democratic	% Democratic
1	149,944	0	9.00	90.0
2	182,800	21,907	8.34	89.3
3	88,924	111,909	0.79	44.3
4	120,827	116,958	1.03	50.8
5	52,375	127,427	0.41	29.1
6	100,493	133,770	0.75	42.9
7	110,314	137,825	0.80	44.5
8	113,547	130,759	0.87	46.5
9	52,322	141,904	0.37	26.9
10	89,846	110,599	0.81	44.8
11	84,618	102,179	0.83	45.3
12	94,056	91,170	1.03	50.8
13	118,710	91,987	1.29	56.3
14	122,073	49,997	2.44	70.9
15	79,766	109,534	0.73	42.1
16	70,994	134,113	0.53	34.6
17	118,486	95,000	1.25	55.5
18	78,558	161,888	0.49	32.7
19	53,549	165,219	0.32	24.5

We can implement this using the 2010 House results from Pennsylvania, as shown in Table 4 (I have assigned odds of 9-1 to District 1, which was uncontested. This is approximately in line with the previous elections in this district.) This produces the simulated results in Figure 1.

The results of the simulations are quite striking. If the probability of voting Democratic is 50%, the Democrats win 7 seats to the Republicans 12. In fact this result holds even if the probability of voting Democrat increases to 51%. Even if there is a 53%-47% split in voting, the Republican still win 10 seats to the Democrat's 9. A similar split in the votes in the other direction would reduce the Democrats to only 5 seats. However, if the probability of voting Democratic reaches 54%, then they win 12 seats. An outcome like this has indeed happened in Pennsylvania – in 2008 the Democrats won over 54% of the vote and received 11 seats. However, the combination of these districts and this pattern of support definitely appears to have a systematic tendency to produce Republican majorities, even when the Republican Party does not win a majority of the votes.

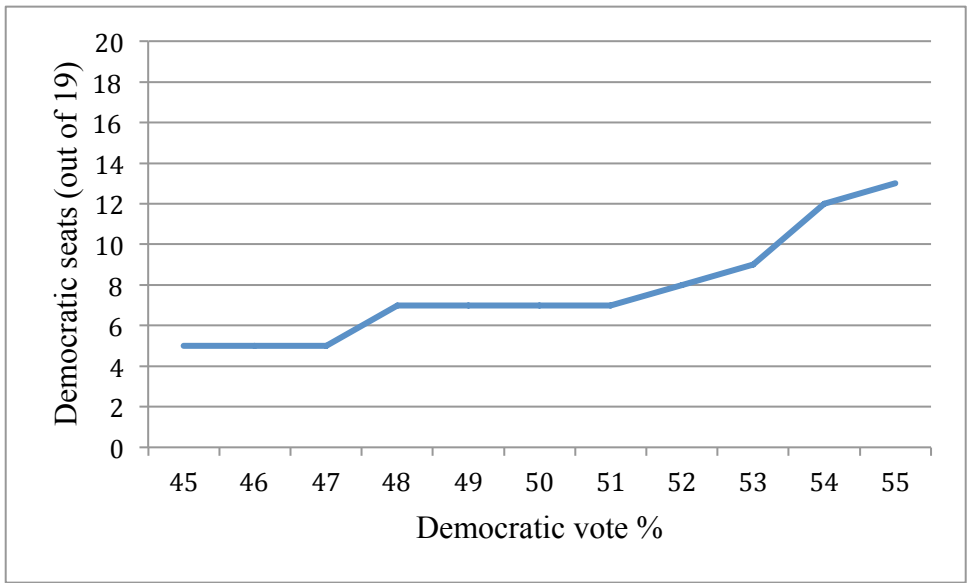

Figure 4 – Simulated number of Democratic seats by Democratic vote percentage with 2010 relative voting patterns

The tendency to make a statewide minority into a majority is not the only outcome we need to be worried about. It is possible to always give a majority of seats in a state to the party that has a majority in votes and still contribute to national outcomes where a minority elects a majority of seats. Suppose we have a state with 10 districts. Suppose we are able to draw the districts so that when the parties are evenly balanced, they win 5 seats each; in a good year for the Republicans, they win 6 seats to the Democrats 4; but in a good years for the Democrats they win 8 seats out of 10. Over time there is definitely an advantage to the Democrats, and this may contribute to the Democrats winning national majorities without winning a majority of the national vote. Friedman and Holden (2008) show how it is possible to draw districts to get this effect by matching the strong supporters of your party with strong supporters of the opposition.

Of course the national partisan balance of the House of Representative has far more effect on outcomes than the partisan balance of the state delegations.

In addition to looking at simulated election outcomes, it is also helpful to consider the distribution of support across districts. Figure 2 plots the Cook Partisan Voting Index (the average of vote in the last two presidential elections relative to the national vote) of each Pennsylvania House district (See The Cook Political Report 2009). This helps to explain the simulation results. There are two districts (the 1st and the 2nd) that are overwhelmingly Democratic, with Cook PVI scores of 35 and 38 respectively. The Democratic candidates in these districts have regularly won nearly 90% of the vote. This, of course, is the "packing" of Democratic support that the plaintiffs complained of. Apart from these districts, there are only two other districts with a Cook PVI of more than 5% in the Democratic direction. The other five seats that lean Democratic have a Cook PVI of less than 5%, and are thus very competitive. On the Republican side, however, there are no less than six districts that are moderately safe (Cook PVI between 5% and 10%), but only two between 0 and 5%. The result is that all but the few extremely safe Democratic seats are vulnerable even in a moderately good year for the Republicans. It is far harder for the Democrats to take the bulk of the Republican seats, although not impossible. Consistent with our simulations, if the Democrats win more than 54% of the vote, many Republican seats become vulnerable.

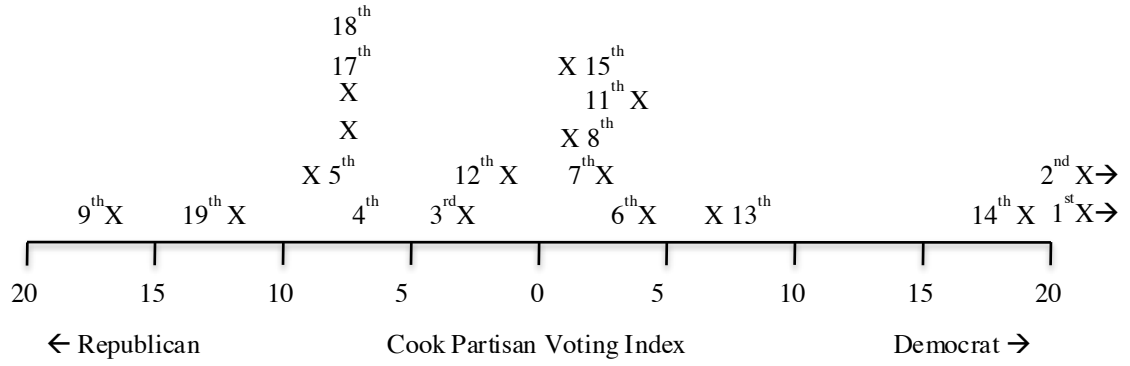

Figure 2 – Pennsylvania 2002 Districts by Cook Partisan Voting Index

In terms of assessing whether these districts are likely to bias the results in a partisan sense and award a majority of seats to a party with a minority of votes, the crucial thing is the asymmetry of the distribution of districts. It is very difficult to give one party an advantage when every strong Democratic district is matched with a similarly strong Republican district, and every marginal Republican district is matched with a Democratic marginal. This is, of course, far from what we see here. From the point of view of representing changes in public opinion, it is even better if there is a even distribution of different levels of support for the two parties, as opposed to the extremely lumpy distribution we see. This would allow any significant change in public opinion to result in a change in the number of seats a party wins, as opposed to many seats flipping at a particular level of support.

I have argued so far that a districting plan can violate equal protection purely because of its effects, and that a standard for deciding this is both judicially discernable and manageable. The standards proposed by the plaintiffs in *Vieth v. Jubilirer* (2004), as well as by the plurality in *Davis v. Bandemer* (1986) comprise both an "effect prong" and an "intent prong". That is, it is

necessary to show that the gerrymander is intentional. I would like to argue that the "intent prong" is not strictly necessary. If a districting scheme denies some people equal protection in terms of the right to determine the partisan composition of Congress, it denies them equal protection just as much if the effect was unintentional. This is not to say, that showing intent does not have its uses. If it can be shown that the framers of a districting plan deliberately sought to deny some people equal protection, then this is surely an aggravating circumstance. The standards generally used to decide whether there was intent put some restraint on potential gerrymanders. Although there is no explicit constitutional or statutory requirement that districts be contiguous, compact or respect local communities and jurisdictions, these constraints are usually respected.

Conclusion

I have argued that the standard that a majority of voters should receive a majority of the representatives can be constitutionally justified in terms of the equal protection of individual rights. This relies on a result in social choice theory that was not available at the time *Vieth v. Jubilirer*. I have also argued that it is possible to implement this standard in a manageable way, given the current knowledge and technology of social science.

It initially seems strange that political gerrymandering is not considered judiciable, while other forms of district drawing (for example malapportionment) are considered constitutional violations. It is not permissible to advantage some people over others by making some districts more populous than others, but it is permissible to achieve exactly the same effect by cleverly manipulating the shapes of districts. There is a difference between the two cases, and this is the ability of social science to give an objective measure of whether a violation has taken place. In the case of malapportionment, it is trivial to say what the correct size of a district should be – it is simply state population divided by the number of districts. In the case of the shape of districts things are far more complex. There is no such thing as objectively correct district boundaries. Inevitably the boundary drawers are balancing different goals. Justice Scalia is surely correct in arguing that this process is inevitably to some degree political.

However, the fact that there are no objectively "correct" districts does not mean that we cannot apply standards to judge different district maps. The fact that there are no perfect districts does not mean that some districting plans can be far worse than others. When we consider employment law, we do not presume to tell employers the correct way to decide how to hire. However, certain hiring practices are outlawed as discriminatory. Similarly we can apply tests to district maps, which can determine whether the map is one of the large set of possible maps that may be acceptable. This, of course, requires that we are able to generate and justify suitable standards.

The standard that a majority of voters should be able to elect a majority of representatives can be recommended for two reasons. Firstly it can be derived directly from the equal protection of individual voters. Of course, Justice Scalia argued that this was not the case because it necessarily relied on a right to equal group representation, which is not a right that is granted by the Constitution. However, a recent result in social choice theory (Hout and McGann 2009, 2009) shows that this test can be derived strictly from individual equality. Admittedly this approach does require that we consider the results of the election in terms of the entire composition of the House of Representatives, and that this composition be considered in partisan

terms. This in turn requires us to justify the assumption that the Congress is intended to be a representative body of the people as a whole, and that its partisan character is an institutional fact.

The second required quality of a proposed test is that it can be practically implemented. Justice Scalia argues that the standard that a majority of voters should be able to elect a majority of representatives is not judicially manageable because it is impossible to determine what the partisan preferences of a majority of voters are, and because any district system could violate the proposed standard. The social sciences give us the tools to overcome both these objections. It is certainly the case that any district system in principle could turn a majority of votes into a minority of seats, given a sufficiently improbable distribution of votes. However, some districting plan are far more likely to do this than others, and are more likely to do it with the distribution of votes we expect to see based on past experience. Neither do we need to show that a majority supports a particular party. We only need to show that if a majority supported a particular party, and the pattern of support stays plausibly close to what it has been, then a majority of votes is turned into a minority of seats. Social scientists are quite able to perform these kinds of counterfactual calculations.

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Endnotes

[1] It is not, however, an obvious requirement for multiple vote systems. In fact multiple vote systems such as plurality run-off and single transferable vote violate nonnegative responsiveness in some cases. This is because it is possible for a party to increase its support and cause another party to be eliminated round than otherwise would be the case. As a result, the party faces a stronger competitor in a later round and loses a seat.