CURRENT ISSUES IN REAPPORTIONMENT

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In Baker v. Carr (1962), the U.S. Supreme Court affirmed that judicial redress could be sought to compel a state to reapportion its legislature in accord with new census data. In a number of subsequent cases, the Court addressed itself to the issue of voter representation and the constitutional acceptability of various apportionment and voting schemes. Most of those cases involved an explication of the meaning of the Fourteenth Amendment equal protection clause as it applied to congressional, state, and local apportionment issues. The notion of equal protection suggests various criteria that we might wish any electoral scheme to satisfy. At minimum, of course, we would wish to guarantee each citizen the right to exercise his or her vote. However, once we move beyond this basic right, the question of what equal protection requires (or rather, disallows) becomes a very difficult one.

In Wesberry v. Sanders (1964), a case that struck down as unconstitutional gross population disparities among Georgia congressional districts, the U.S. Supreme Court held that "one man's vote . . . is to be worth . . . as much as another's" (Wesberry v. Sanders, 1964: 8). In Reynolds v. Sims (1964) and its companion cases, the court extended this "one person, one vote"

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doctrine to state legislatures holding, in different but equivalent language, that "an individual's right to vote for state legislators is unconstitutionally impaired when its weight is in a substantial fashion diluted when compared with votes of citizens living in other parts of the state" (Reynolds v. Sims, 1964, 568). In Avery v. Midland County (1968), the Court extended the scope of its rulings down to the local level for units with "general responsibility." All these cases involved plurality elections with single-member districts in which there were large differences in the district populations. In these cases, the Court asserted that each individual who votes should have his or her vote count "equally" with the vote cast by each other individual, i.e., given "one person, one vote" we wish "one vote, one value" (Auerbach, 1964). The difficulty came in operationalizing such a criterion.

In Reynolds v. Sims (1964) the Court asserted that the "equal protection" clause of the U.S. Constitution did not require precise numerical equality but "honest and good faith effort to construct districts . . . as nearly of equal population as is practicable." The Reynolds decision also acknowledged the possibility of considerations other than strict population equality entering into apportionment decisions.

> So long as the divergences from a strict population standard are based on legitimate considerations incident to the effectuation of a rational state policy, some deviations from the equal population principle are constitutionally permissible [Reynolds v. Sims, 1969: 579].

However, while Reynolds (1969: 578) identified some areas in which states might wish to act, e.g., "to maintain the integrity of various political subdivisions, insofar as possible, and provide for compact districts of contiguous territory," the Court was "quick

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(cosponsored by the National Science Foundation and the American Bar Association), for helpful discussion of many of the issues considered in this article. We also have drawn freely upon the invaluable review of court cases published by the National Conference of State Legislatures, Reapportionment, Law and Technology, *edited by Andrea J. Wollock and upon our own previous work.*

to limit the range of acceptable justifications for deviations from the equal population rule" (Tribe, 1978: 746-747). In subsequent decisions the Court has reiterated the need for very strict population equality in Congressional districting decisions (see especially Kirkpatrick v. Preisler, 1969: 526, in which the Court rejected as unconstitutional a districting with an average deviation of .745% from strict equality. In that case, the largest district exceeded the ideal of perfect district population equality by 2.43%; the smallest district was below the ideal by 1.7% for a "range" of 4.13%. The Court, however, has allowed for greater flexibility in state districting decisions and even greater flexibility in local districting decisions (see especially Mahan v. Howell, 1973, and Abate v. Mundt, 1971, where ranges of 16.4% and 11.9%, respectively, were permitted).

When the Supreme Court entered the reapportionment "thicket" in Baker v. Carr (1961), Justice Frankfurter warned that "what is actually asked of the Court in this case is to choose among competing bases of representation—ultimately, really among competing bases of representation." Looking back on that warning, with the benefit of over fifteen years of hindsight, we can see that, while the road from Baker v. Carr (in which a state legislature was merely required to fulfill its own constitutional requirement for periodic reapportionment) to the strict equal population guidelines of Kirkpatrick v. Preisler (1969) was not a straight one, the Court's task along the way was aided immeasurably by the existence of the clear statistical measures through which the *amount* of deviation from population equality in different legislatures (or the same legislature at different periods) could be compared. These statistical measures (e.g., standard deviation, average deviation, electoral percentage; see especially the admirable discussion in Wollock, 1980: 5-9) allowed the court to set out *clear* guidelines as to what level of deviation from strict population equality would be allowed for each type of governmental unit (federal, state, and local).

The principal focus of most reapportionment cases in the 1960s through the mid-1970s was in specifying standards for population equality of districts and mathematical formulas to assess compliance with these standards (see Wollock, 1980: 5-20, or Tribe,

1978, for further details of these cases). While the Court majority in its historic decision in Reynolds asserted that the goal of the Court was the achievement of "fair and effective representation," in fact, however, most of the Court's energies in the apportionment area until the mid-1970s were devoted to the elucidation of the standards of population equality across districts which would govern in each type of governmental jurisdiction. However, by defining equality of citizen representation in terms of equally populated districts, the Supreme Court was able to avoid, in most of the early reapportionment cases, ever really coming to grips with the deeper issues of the philosophy of representation. In many of the key apportionment cases (e.g., Wesberry v. Sanders, 1964: 18; Reynolds v. Sims, 1964 559-560), the Court's terminology, if not its reasoning, is sloppy in claiming equal representation for equal numbers of people as its goal, and then equating equal population with equal representation[1] (see Dixon, 1969: 227-228).[1]Only a little reflection is required to see the very severe limitations of defining equality of citizen representation solely in terms of equally populated distircts. As Dixon (1979: 227) quite strongly (and we believe quite accurately) put it:

> There is no such thing as "equal representation" in a district system of electing legislators. There may be "equal population" districts, which is an objectively verifiable concept. But with a district basis there can never be "equal representation" because all districting discriminates by discounting utterly the votes of the minority voters.

Let us envisage two citizens: one lives in a highly competitive district, where every vote counts—so to speak—and another lives in a district that always goes for the same party each year by a 4 to 1 or 5 to 1 margin. One citizen always has a chance to determine his or her district's electoral outcome; the other never has.[2] It is far from obvious that these two citizens are equally well represented. Indeed, Dixon (1969: 228) argued that

> a goal of "equal representation" can be approximated only through abolishing single member districts and using proportional

> representation, such as the party list form used in Europe, or some version of the Hare system. . . . "Equal representation" is generically a proportional representation concept.

In the 1960s the principle was clearly established that courts could intervene in the political process to protect citizen rights to effective representation defined in terms of equally populated and periodically reapportioned districts. It is hard, in retrospect, to appreciate how threatening this court involvement in the reapportionment process was then seen to be. What was controversial then is taken for granted now, and the doctrine of "one person, one vote" has been elevated to the status of moral platitude. In the 1970s the Supreme Court was forced to begin to confront the subtler and far more complex issues of "fair and effective representation" in terms of the constitutionality of election mechanisms other than single-member districting and, for equipopulous single-member districting, in terms of determining when the drawing of district lines constitutes unconstitutional racial or partisan gerrymandering. In later sections of this article we shall discuss election mechanisms other than single-member districts and "sophisticated" gerrymandering, in greater detail, since they will be the representation questions with which the key court cases of the 1980s can be expected to deal.

WHAT HATH APPORTIONMENT WROUGHT?

Because malapportionment of state legislatures was for many years the subject of critical comment by political scientists, it was to be expected that once court-ordered reapportionment occurred, analysts would set about trying to measure its impact. It soon became apparent, however, that the question of impact was not easily to be answered, and Bicker (1971), in his review of the early literature, is surely correct in concluding that, in the initial "rush to judgment," social scientists were unduly negative in their conclusions about the effects of reapportionment. Three difficulties may be identified.

First, by expecting to find measurable policy differences without first inquiring into the more immediate first-order and second-order consequences in terms of group and party representation and effective influence in the legislature, social scientists chose a sure formula for finding that reapportionment had little or no impact. Indeed, if these early studies had found that there *had* been a change in public policy after reapportionment yet found that there had been *no* change in patterns of party and interest representation (in particular, urban versus rural), the discovered relationships between reapportionment and policy change would probably have been spurious (see discussion of this point in Bicker, 1971, and Uslaner and Weber, 1979; see also O'Rourke, 1980).

Second, reapportionment took place at a time when social scientists had become fascinated by the use of cross-sectional analysis to show the influence of political variables on policy outcomes such as expenditure patterns, and this methodology was immediately applied to test for the effects of reapportionment. The assumption made in all these studies, however, seems to have been that we should expect all states to have identical patterns of expenditures. As Uslaner and Weber (1979: 9) forcefully point out, "Mississippi is not likely to become similar in its policy decisions to Massachusetts even if the apportionment systems of the two states are made as idential as cartographers and politicians might be able to accomplish. Yet, cross-section designs require just such assumptions."

Finally, for some states, in measuring the impact of reapportionment one has to be careful in defining the alternative to which the reapportioned state legislature is to be compared. In a state such as New York, which had always followed its constitutional mandate to reapportion the legislature every ten years and which had a precise formula for doing so, the question must be what differences stemmed from the state's following federal court mandates of equal population districts rather than following the formula in its own state constitution. In New York, the tack taken by a number of scholars—comparing the 1950s apportionment pattern with the post-Reynolds pattern and its attendant conse-

quences—reveals at least as much about the consequences of population movements within the state as it does about the effect of Supreme Court intervention in the apportionment process.

Given the methodological difficulties that beset most early studies of reapportionment impact and the virtual absence of any later, more methodically sophisticated studies, the question of reapportionment impact is little better understood today than it was ten years ago (see Saffell, 1981).

CRITERIA FOR SINGLE MEMBER DISTRICTING

Conflicting Criteria

We inventory in Table 1 nearly two dozen criteria for evaluating the fairness of apportionment schemes. Inspection of this table makes it apparent that there are multiple and conflicting "reasonable" goals that have been advocated for reapportionment decision making. Moreover, those criteria are not just inventions of academic researchers with time on their hands—a large number of them have been enshrined into statute. Indeed, reformers of the Common Cause mode, anxious to keep "politics" out of the reapportionment arena in the 1980s, have advocated tying the hands of those doing the reapportioning by saddling these decision makers with an extensive inventory of statutorily mandated criteria for "fair" districting. In principle, the idea is to put so many constraints on the process that there's only one plan (or at most a handful of plans) that satisfies the enumerated criteria and to pick the set of criteria so that there's no ambiguity about how they're meant to apply.[3]

This seemingly reasonable idea fails at three crucial points. First, enough of the proposed criteria for single-member districting (e.g., compactness, avoidance of breakup of "natural communities," avoidance of dilution of the voting strength of racial or linguistic minorities) are in fact left so ill defined as to still leave open a *great* deal of flexibility. Indeed, in most cases there would at minimum be hundreds of plans that arguably statisfy all the specified guidelines.

TABLE 1
Inventory of Criteria for Judging "Fair" Representation

decision rule criteria	districting criteria	district boundary criteria	intent criteria	ex ante and ex post election outcome criteria
0. equal suffrage				
1a. majoritarianism	1. district representation proportional to district population[b]	1. compact[f] districts	1a. no intent to bias districting in favor of particular political party	1a. no bias in seats-votes relationship in favor of particular political party[g]
1b. ability of a majority of the voters in any district to decide election outcomes in that district.[a]			1b. no intent to bias districting in favor of a particular racial or linguistic group	1b. no bias in seats-vote relationship in favor of particular racial or linguistic group
2. proportional representation	2. equal probability of voter decisiveness on election outcomes[c]	2. contiguous districts	2. no intent to bias districting in favor of a particular incumbent or other candidate	2. responsiveness of electoral system outcomes to changes in electorate preferences[g]
	3. probability of legislator decisiveness on legislation outcomes proportional to district populations[d]	3. districts following local political subunit boundaries		3a. proportionality between vote share of any particular party and its seat share[g,h]
				3b. proportionality between vote share of any particular racial or linguistic group and its seat share
	4. equal probability of voter decisiveness on legislative outcomes[d]	4. politically homogeneous districts		4. existence of political competition at the district level[g]
	5. equal population districts	5. heterogeneous and politically competitive districts		5. access of all groups to the political system[i]
	6. single-member districts			6a. proportionality between vote share of a party and its impact on policy outcomes
				6b. proportionality between vote share of a racial/linguistic group and its impact on policy outcomes
	7. at-large elections[e]			

NOTES FOR TABLE 1:

a. Criterion 1b is considerably weaker than Still's (1981) majoritarianism criterion, which we labeled criterion 1a. That criterion requires that *any* majority coalition of voters be sufficient to determine *all* election outcomes.
b. Identical to Still (1981), equal shares.
c. Identical to Still (1981), equal probability.
d. See Grofman and Scarrow (1981a, 1981b).
e. I have replaced Still's (1981) anonymity condition with a single direct requirement *at-large elections*, so as to more directly contrast it with the often advocated requirement of single-member districting.
f. Compactness is usually measured in terms of geographical distance, but a better approach, in our view, is in terms of a transportation or population concentration derived index of propinquity.
g. See Niemi and Deegan (1978) for details.
h. An important special case of this is the weaker stipulation that no group of legislators representing a population minority should have a voting majority in the legislature. A criterion which is closely related to it is offered by Grofman and Scarrow (1978). "Each voter should have the same probability of casting a ballot which is instrumental in effecting an electoral outcome." This latter criterion is operationalized in Grofman and Scarrow (1978) in terms of the "wasted vote" (Cohan et al., 1974).
i. Access is an imprecise term that can, perhaps, be made more precise. See White v. Regester 412 U.S. at 767.

Second, many of the proposed criteria are incompatible in whole or in part, and the courts are going to face in the 1980s the task of untangling what various sets of criteria really mean and how reapportionment statutes shall be interpreted when statutory provisions include conflicting criteria. For example, to provide certain geographically dispersed minorities with districts in which their voice will not be submerged may require crossing of county/city boundaries and/or require violations of minimal district compactness. All three of these requirements—integrity of political boundaries, compactness, and minority representation—are to be found in California's State Constitution, recently amended by voter referendum (Proposition 6, June 1980), and similar constitutional or statutory provisions exist in at least a dozen other states. Although the California amendment lists criteria in order of importance, it is far from clear from the language of that amendment that the listing is intended to provide a *lexicographic* ordering. In California (and elsewhere) we would anticipate suits alleging that alternative districting plans could

provide large improvements in certain criteria (e.g., minority representation) with only minimal cost to other criteria (e.g., compactness) and thus should be preferred.

Third, in focusing on formal criteria (e.g., compactness), most if not all of the recently proposed (or enacted) sets of criteria disregard the political consequences of redistricting as measured by the relationship between a political party's vote share and its expected seat share. As the late Robert Dixon clearly pointed out (1981), there are several key facts in districting that must be understood. One fact is that there is not just one but hundreds of ways that a computer can draw district lines that will satisfy the court's insistence on population equality (see especially Backstrom et al., 1978). A second key fact is that there are no neutral choices among this great variety of options. "Whether the lines are drawn by a ninth-grade civics class, a board of Ph.D.s, or a computer, every line on a map aligns partisans and interest blocs in a particular way," and election results will vary according to which lines are chosen." A third key fact, which Dixon lamented, is that "the first two facts are not understood by the judges who rule on these (reapportionment) matters, by many journalists who report on these matters, and by members of the general public."

Dixon (1981) argued that we should avoid a districting process that can be characterized by either one of two extremes—the extreme of *partisan lust* (to use an apt phrase due to Mayhew, 1971) or the extreme of *legislative maps drawn by blindfolded cartographers.* Rather, we should see the districting process as one in which we try to realize certain articulated values, recognizing that some of these values are mutually incompatible in whole or in part and that tradeoffs are required. In our view, while partisan lust is clearly impermissible, *conscious* consideration of the probable partisan (and also racial/linguistic) implications of alternative districting schemes is desirable. Of course, drawing the line between permissible and impermissible political considerations in the districting process is not easy. But we should note that the Supreme Court has clearly indicated that taking into account the expected partisan impact of a districting scheme as

one of the factors in choosing among alternative schemes is not prohibited (see our discussion of Gaffney v. Cummings below); and indeed, in the case of impact on racial/linguistic representation, such foresight as to expected consequences may even be held to be necessary for jurisdictions covered by the Voting Rights Act (see discussion of racial vote dilution standards below).

What are the values that should be taken into account in districting? No doubt most familiar is the goal of preserving "natural" communities and the related goal of not crossing political subunit boundaries. Other well-known goals include requiring contiguity of districts and imposing a requirement of district compactness. But there are certain other values, not generally as familiar, that are also worthy of realization and that might in certain instances appear more compelling than the ones just mentioned (see Table 1):

(1) The Majority Rule Principle. While the Supreme Court has persistently refused to endorse any criterion of strict proportional representation, at a minimum it might be argued that voting majorities should be transformed into legislative majorities and that any districting that fails to achieve this has failed to provide fair and effective representation (see Scarrow, 1981). The Supreme Court has, however, not yet been confronted with such an argument, or with documentation that would demonstrate that a given districting effort was so biased as to be consistently likely to deny a group with the support of a majority of voters control of the legislature, and thus deny effective implementation of the majority rule principle.

(2) Absence of Bias. At the aggregate level, for partisan elections, an even more general goal than that of translating an electoral majority into a legislative majority is the goal that the districting system not be *biased* against one or the other of our two major parties. This criterion has been termed "neutrality" by Niemi and Deegan (1978). By neutrality we mean that both parties should have to poll approximately the same proportion of the vote in order to win a given portion of the districts. (Note that

the majority rule principle is subsumed in the principle of neutrality. Any two-party system that satisfies neutrality will, unless it is perverse, necessarily give a voting majority at least a bare majority of legislative seats.) Why should one party have to poll 55% of the state vote in order to win a majority of the legislature, while the other party has to poll only, say, 48%? Why should a party be denied majority control of the legislature if it polls a majority of the vote? Anyone, or any group, who designs a districting system that achieves these results—even if the system is the product of well-intentioned, blindfolded nonpartisans—has designed a system that has achieved the very opposite of fair and effective representation.

(3) Preservation of Minimal Representation. In addition to being neutral (unbiased), it seems reasonable that a districting system should assure that neither party is ever totally obliterated by a landslide. To assure that result, as well as to ensure some continuity of legislative membership, there must be some safe districts for each party.

(4) Political Competitiveness. On the other hand, however, it also appears desirable that many districts should be competitive. How else is new blood going to be infused into the legislature, or how else is majority control going to shift back and forth as the majority sentiment in the electorate shifts back and forth?

The problem, of course, is how these various criteria can be reconciled. Niemi and Deegan (1978), in what is destined to be a classic essay, began to specify feasible tradeoffs between goals such as electoral responsiveness, neutrality, and competitiveness. In designing districting plans, we believe that the tradeoff issue can be addressed in an operations research framework as a problem of maximizing a specified objective function (a weighted set of goals) subject to constraints (the voting strength of the relevant parties/groups in the electorate and the geographic distribution of this voting strength). As far as we are aware, the only direct applications of the powerful mathematical tools in the operation research literature to the *political* aspects of reappor-

tionment are Niemi and Deegan (1978) and Musgrove (1977), although operations research techniques have often been used to find sets of districts whose deviations from an equal population standard fall within an acceptable range, and many available programs also take district compactness into account (see, e.g., Nagel, 1972).

We believe work on formal characteristics of the tradeoff relationships among conflicting criteria for "fair and effective" representation can be useful in *clarifying* (albeit certainly not *resolving*) the value choices faced by those engaged in redistricting by providing invaluable insight into what choices are *feasible.* Similarly, such research could ultimately be of great value to the courts.

Proportionality of Group Representation and Affirmative Action Gerrymandering

If we look to the aggregate outcome level, one natural criterion against which to judge apportionment schemes is proportional representation of group interests: the criterion that cognizable groups (whether political parties or racial or religious minorities) obtain representation in the legislature proportional to their share of population.[4]

In Whitcomb (1971: 153-154), the U.S. Supreme Court explicitly rejected the view that the protection of minority rights requires some form of proportional representation for minorities.

> On the record before us plaintiffs' position comes to this: that although they have equal opportunity to participate in and influence the selection of candidates and legislators, and although the ghetto votes predominantly Democratic and that party slates candidates satisfactory to the ghetto Negroes, Negroes, along with all other Democrats, suffer the disaster of losing too many elections. But typical American legislative elections are district-oriented, head-on races between candidates of two or more parties. As our system has it, one candidate wins, the others lose. Arguably the losing candidates' supporters are without representation since the men they voted for have been defeated; arguably they have been denied equal protection of the laws since they have

> no legislative voice of their own. This is true of both single-member *and* multimember districts. *But we have not yet deemed it a denial of equal protection to deny legislative seats to losing candidates, even in those so-called safe districts where the same party wins year after year* [emphasis added].

The Court in Whitcomb, like the Federal District Court before it, eschewed any indication that blacks living in the ghetto were entitled to any certain number of legislators. Rather, "districts should be drawn with an eye that is color blind, and sophisticated gerrymandering would not be countenanced" (Whitcomb, 1971: 138; see also 305 F. Supp at 1391-1392).

Nonetheless, in a series of cases beginning with Gaffney v. Cummings (1973), the U.S. Supreme Court has come remarkably close to endorsing districting designed to ensure proportional representation of groups when this apportionment does not violate equal population standards. In Gaffney the Court was confronted with a scheme designed to guarantee each party a percentage of House and Senate seats in the Connecticut legislature proportional to their share of the statewide vote. To do this the clear majority of seats was designed to be "safe" for one or the other party. The result was described by proponents as "a fair political balance" and by opponents as "political gerrymandering." The Supreme Court, accepting in effect the former characterization, asserted that

> neither we nor the district courts have a constitutional warrant to invalidate a state plan, otherwise within tolerable proportion limits, because it undertakes, not to minimize or elminate the political strength of any group or party, but to recognize it and, through districting, provide a rough sort of proportional representation in the legislative halls of the state [Gaffney v. Cummings, 1973: 754].

According to Gerhard Casper (1973: 23), "The Court had never before gone so far in supporting proportional representation as an ideal." However, as one lawyer (Dolgow, 1977: 470) has pointed out, if a legislature can establish district lines to fairly represent the two dominant political interests, it is not difficult

to imagine its proceeding one step further and "locking" those interests into the citadels of power.

There are several important philosophical and policy issues raised by the Gaffney decision regarding "sophisticated" political gerrymandering. One of these is the desirability of "safe-seat" districting. Another issue arises, if, instead of Democrats and Republicans, we are dealing with other groups, e.g., racial, religious, or linguistic minorities. How should that affect our judgment as to the appropriateness of gerrymandering in the interest of guaranteed minority representation? Consider two groups roughly equal in size occupying a territory that is to be partitioned into two districts. Should this partitioning be done so as to give each group one safe seat? Or would it be preferable to foster political competition and fluidity—in which candidates might wish to seek support across partisan/racial/religious lines? What if the ratio is 60/40? Should the minority still get a safe seat? Similarly, consider a minority that makes up roughly one-third of the population of an area (over which it is spread fairly evenly) that is to be partitioned into three districts. Should the strength of this minority be concentrated so as to virtually guarantee it one seat, or is it indeed better for the minority and/or for fair representation to allocate seats by criteria of geographic compactness (in which case the minority will have no representative of its own but perhaps partial claim on the allegiance of three representatives)? In short, should we seek to gerrymander guaranteed minority representation?

These and related issues arise directly in several cases that came before federal courts in the mid-1970s, with results that do not point clearly in a single direction. The court's benign attitude toward bipartisan gerrymandering was reasserted in White v. Weiser (1973: 797-798), in which it held that drawing district boundaries "in such a way as to minimize the number of contests between present incumbents does not in and of itself establish invidiousness."

In Taylor v. McKeithen (1974) the Fifth Circuit employed the standards of a political access test to overturn a reapportionment plan imposed by the U.S. District Court of the Eastern District of

Louisiana. The lower court had imposed a districting map that had originally been drawn by a special master to correct population inequalities that showed "wide deviations from the norm" (Taylor v. McKeithen, 1974: 893). The legislative scheme approved by the lower court in Taylor involved the creation of two districts with black majorities and two districts with large white majorities. Under an alternative plan submitted by the legislature, blacks would be in the majority in only one district. The lower court rejected this latter plan because it concluded that the alternative scheme "practically eliminates the possibility of a Negro being elected from any of the four districts while the court-approved plan at least gives them a fair chance in two out of the four districts" (Taylor v. McKeithen, 1974: 901). In reversing the lower court, the Fifth Circuit invoked a test of access to the political system rather than a test of proportionality in outcome and asserted that the black population would not be denied effective political participation under the legislator-proposed alternative plan.[5] "Citing Whitcomb for the proposition that the Constitution extends equal protection of the laws to people, not to interests, the Fifth Circuit found no substantial evidence that special black districts were necessary to assure successful black participation in the political system" (Dolgow, 1977: 466-477).

In the most important gerrymandering case to date, United Jewish Organizations of Williamsburg v. Carey (1976), the Supreme Court ruled permissible a form of "affirmative action" gerrymandering. To correct alleged underrepresentation of black and Puerto Rican minorities, certain legislative district lines in New York were redrawn so as to create at least one state assembly district in Brooklyn with an overwhelming black and Hispanic majority. Previously blacks and Hispanics had been more or less evenly spread over the districts in question. In the process, a tightly knit, ultraorthodox community of Hasidic Jews, which had been contained entirely within the boundaries of a single assembly district with a 61.5% nonwhite population, was divided into two districts—one with an 88% nonwhite population and the other with a 65% minority constituency. The Court held that it was not impermissible for the state to draw lines so as to correct

invidious discrimination and that the plaintiffs, as white voters, were not being denied equal opportunity for political participation.

The Court's argument for its decision in United Jewish Organizations is not, in our view, a well-reasoned one. As Dolgow (1977: 478) notes, "Both United Jewish Organizations and Zimmer reflect a conception of political participation that equates access with 'winning' and 'winning' with electing 'my own kind.'" We, on the other hand, share the view of Tribe (1978: 658-659) that

> To speak of a group's electing "its" representative is, after all, an oversimplification. Various candidates appeal in varying degrees to all population groups. Thus a minority might insure some representation even in a district where it could not come close to electing a candidate who espoused its views without reservation; the minority could help elect the candidate whose views were least obnoxious to its members. Of course, if there were clearly dichotomized minorities and majorities—and if voters never cast wayward ballots—the minority might still be completely denied representation. But these factual assumptions defy the facts of political life; there are many types of interests and many gradations of opinion, with the result that a process of accommodation is generally undertaken in which even small minorities can successfully vie for influence.

While the Williamsburg case has been attacked as reflecting "an underlying assumption of the right to proportional representation" (Dolgow, 1977: 475), this drastically overstates the nature of the Supreme Court's holding in Williamsburg. First, the jurisdiction was one covered by the Federal Voting Rights Act, and this created a special presumption that affirmative action might be called for. The Court's seeming support of affirmative action gerrymandering in Brooklyn should not be construed as necessarily extending to jurisdictions *not* covered by the Voting Rights Act.[6] Second, the nonwhite and Hispanic population figures in the newly created districts given the impression that these districts ought lopsidedly to be under minority control. In fact, if corrected for the proportion of the population that is of

voting age (considerably lower for Hispanics and blacks), then the districts look considerably more competitive (Eric Schnapper, personal communication, June 13, 1980). They look even more competitive when we take into account lower minority turnout and the likelihood that black voters and voters of Puerto Rican descent will not always vote as a bloc. Finally, while the Hasidic Jewish community previously had an assembly district to itself, its membership had been divided across other political boundaries (e.g., U.S. Congressional districts).

The Balloon Effect

It is a commonly held view that for single-member districts "a chance pattern will, over the long haul, operate in such a way as to make the percentage of the population and the percentage of representation more or less equal" (Wells, 1979: 529). However, for complex statistical reasons that space limitation prevents us from discussing (see Tufte, 1973; Niemi and Deegan, 1978; Grofman, 1981c), *except under very special circumstances unlikely to be ever achieved in practice, random districting will not yield proportionality between a group's vote percentage and the share of legislative seats it wins.* It particular, in a two-party competition if partisan strength is randomly distributed across districts (with a certain specified variance), then a random drawing of district lines gives rise to an expected S-shaped relationship between party's aggregate vote share and its share of legislative seats. If we let S be seat share and V vote share, this seats/vote relationship is well approximated by the function $(1 - S)/S = [(1 - V)/V]^K$. For K = 3, we have the so-called "cube law" of politics (Kendall and Stuart, 1950). One implication of the cube law (or any $K > 1$) is what Backstrom et al., (1978) have referred to as the "balloon effect," in which *the legislative power of majorities is exaggerated and that of minorities minimized* (see Figure 1).

The balloon effect will be less pronounced when minorities are geographically concentrated. For a group with less than 50% voting strength, to the extent that its voting strength is ge-

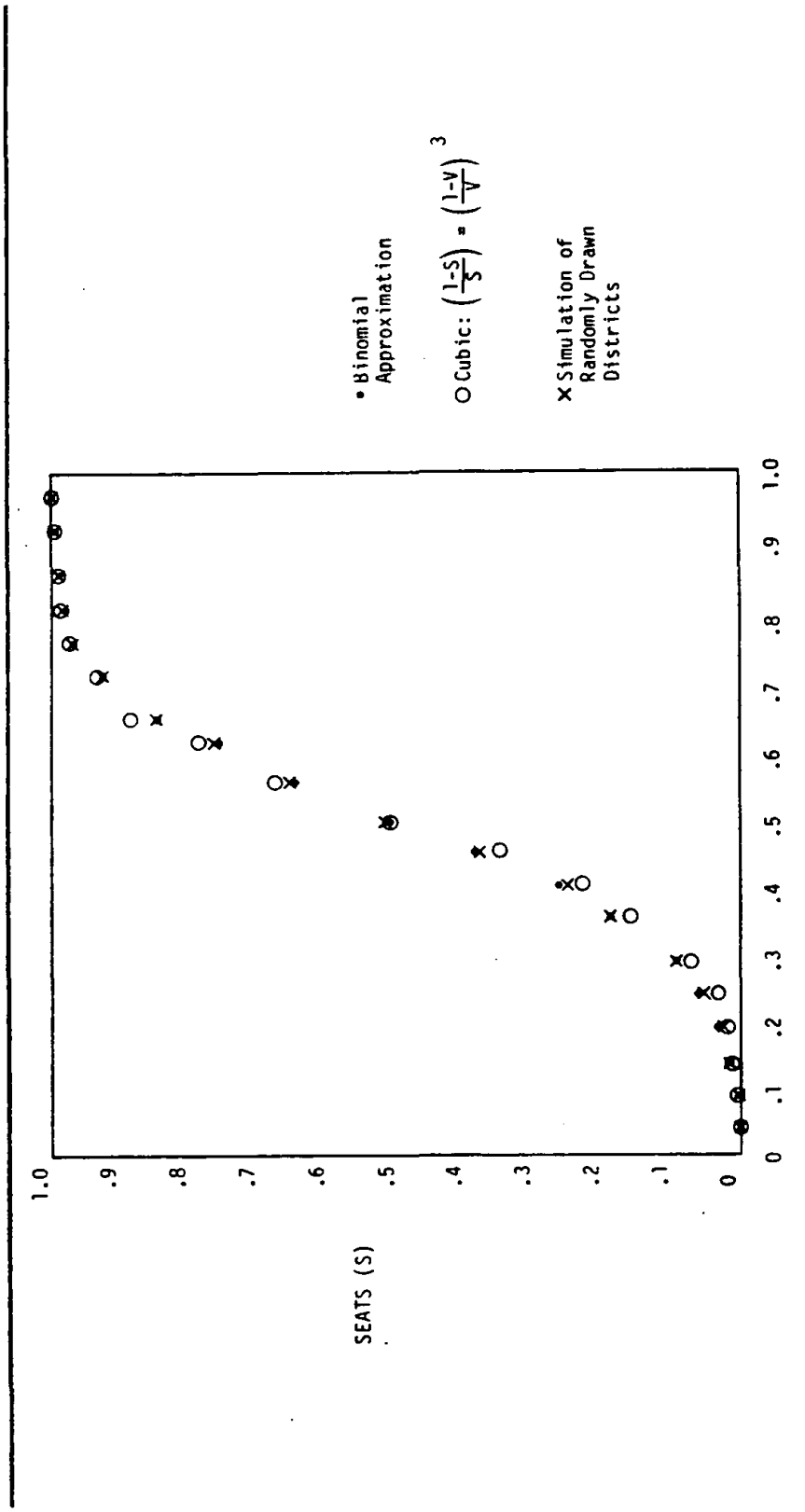

Figure 1: Relationship Between Vote Percentage and Seat Percentage for a Single-Member District Legislature Whose Equipopulation Districts Have Been Randomly Drawn (K = 3)

ographically concentrated, its seat share will, in general, be more nearly proportional to its vote share than would be predicted by the cube law. Some of its votes may be wasted by being concentrated in its own "safe" districts, but this waste is overshadowed in importance by the possibility of the minority concentrating sufficient strengh to capture a number of districts rather than wasting its strength through dispersion (Musgrove, 1977; Wildgen and Engstrom, 1980). Backstrom et al. (1978), Engstrom and Wildgen (1977) and Wildgen and Engstrom (1980) have proposed to measure fairness of apportionment (i.e., proportionality between vote share and seat share) as relative to that which would be statistically expected under a random drawing of compact and contiguous district lines given the actual geographic pattern of minority and majority population dispersion.

We anticipate that with the increased sophistication of political science models of seats/votes relationships (see especially Tufte, 1973; Niemi and Deegan, 1978; Backstrom et al., 1978; Engstrom and Wildgen, 1977; Wildgen and Engstrom, 1980; Grofman, 1981c), complex statistical challenges to districting schemes based on their expected racial or partisan impacts will be brought to the courts in the 1980s. Such challenges will not rest on a demand for proportionality but rather on a demand for neutrality and fairness.

Even when criteria such as equipopulation, compactness, and contiguity are all adhered to, contemporary technology still admits a plethora of alternative districting schemes (see Backstrom et al., 1978). Moreover, we should emphasize that contrary to popular belief, *one can't recognize a political gerrymander by its shape*. Cartography is *not* what determines a gerrymander. One can have a gerrymander with districts that appear on sight to be highly regular, and fair districting schemes that may appear to the eye to contain grossly gerrymandered districts. What defines a gerrymander is the fact that some group or groups (e.g., a given political party or a given racial/linguistic group) is discriminated against compared to one or more other groups in that a greater number of votes is needed for the former to achieve a given

proportion of legislative seats than is true for the latter, *and* this bias is *not* one that can be attributed solely to the differing degree of geographic concentration among the groups (see especially Sickels, 1966; Musgrove, 1977).

In general, it is our view that when the impact of a districing scheme (or election system) can be projected (or judged in retrospect) with a very high degree of certainty, schemes that can be shown to be grossly discriminatory in their impact on the representation of cognizable groups beyond what might reasonably be expected by chance should be struck down as unconstitutional. We do not believe that schemes that cannot be directly shown to have been intentionally gerrymandered ought therefore to have been made inviolable to constitutional challenge.

At issue is (1) the theoretical problem of how to measure extent of discrimination and how to determine what constitutes statistically significant deviation and (2) how to realistically project "hypothetical" election outcomes. In this context it is useful to consider the Supreme Court's comment in the 1973 case of Gaffrey v. Cummings (1973: 752-753, emphasis added):

> It may be suggested that those who redistrict and reapportion should work with census, not political, data and achieve population equality without regard for political impact. But *this politically mindless approach* may produce, *whether intended or not,* the most grossly gerrymandered results; and, in any event, it is most unlikely that the political impact of such a plan would remain undiscovered by the time it was proposed or adopted, *in which event the results would be both known and, if not changed, intended* [see also our discussion of the Mobile case below].

Choice of Districting Mechanism

We share the preference of the late Robert Dixon for a bipartisan process of districting rather than for a process that has been (at least ostensibly) politically "blindfolded." On this topic, we can do no better than quote Dixon (1979: 25-27) at some length.

> The important thing is to have an open process available for general inspection providing some informed sense of what has gone into the computer (other than bare body data) and—even more importantly—what comes out of the computer in terms of reasonable predictions of the future political performance of the district lines suggested.
>
> Here more than one path leads to Rome. My preference, feasible in many states, would be use of a bipartisan commission with tie breaker device for the process of reapportionment and congressional districting. Our experience with almost two decades of the "one man-one vote" revolution shows that such a device not only has logical appeal but practicability.
>
> This is not to say that it will every be possible to *guarantee* fairness in a district system of election, any more than the Federal Trade Commission can guarantee fairness in competition. It is distinctly possible, however, indeed necessary, for a body whose raison d'etre is to attempt to achieve a fair political result, to discard plans that are predictably unfair in the light of all that is known about the political behavior of the area in question. Indeed, this mode is the way the FTC was designed to operate—to negate, case-by-case, unfair methods of competition. Obviously, to accomplish the unfairness policing mission of the FTC or by a bipartisan or other form of districting body, a broad intake of all relevant data is absolutely essential. In the context of the helpful FTC analogy, this would mean data bearing on all aspects of competition. For a bipartisan commision it means data bearing on all aspects of political and electoral behavior.

We agree, too, with Dixon that the agency responsible for districting ought not to be hampered by rigid standards (e.g., *maximizing* compactness) designed to eliminate all discretion. Indeed, rigid, a priori "technical" standards that do not take into account the distribution of partisanship and group membership may be counterproductive to the achievement of "fair and effective" representation. As Dixon (1969: 27) wisely puts it:

> Loose guides such as contiguity, observance of local political division lines, and compactness insofar as compatible with tight population equality are commonly mentioned and may be harmless—with one significant exception. Shape requirements focus on form rather than on the substance of effective political representa-

> tion. A benign gerrymander, in the sense of some asymmetrical districts, may well be required in order to assure representation of submerged elements within a larger area.

In our view, the greates risk in a bipartisan districting process is that the districting that results will be a "bipartisan gerrymander," i.e., one that seeks to preserve incumbents of both parties and to drastically reduce the number of potentially competitive districts. Such a gerrymander would violate our belief that "seats in a representative body should change . . . as vote totals change" (Niemi and Deegan, 1978: 1304). Like Dixon (1979: 28-32) we applaud the emphasis in Gaffney that districting ought to avoid manufacturing a legislative majority out of a miority of the popular vote, but we are less sanguine than Dixon that an *unbiased* but also largely *uncompetitive* set of districts, such as that approved by the Court in Gaffney, is desirable. Unfortunately, as noted previously, given political and demographic realities in the real world, no districting system can simultaneously satisfy all the criteria we might wish it to (see Niemi and Deegan, 1978).

ELECTION MECHANISMS OTHER THAN SINGLE-MEMBER DISTRICTS

If political subunits are of discrepant sizes, in a single-member districting system some small units will be denied their "own" representatives, while some larger units will be divided up. Political boundaries can be fully preserved only by (1) allowing for multiple-member districts (which may use plurality "at-large" voting or some form of proportional representation), or (2) by using weighted voting to compensate for population differences across political subunits.

While single-member districting is the most common form of representation in the United States, multimember districting and mixed single- and multiple-member apportionments are to be found in various levels of government in the United States; and in

one state (New York) weighted voting is the most common of the various systems in use for county government. In the late 1960s and 1970s such non-single-member districting systems have come under increasing challenge as violating Fourteenth Amendment "equal protection" standards.

Multiple-Member and At-Large Plurality-Based Elections

Apportionment schemes at the state and local levels often make use of multimember districts, the polar type of which is, of course, the at-large election. Such plans typically allocate the number of representatives to a district in direct proportion to that district's population. In the aftermath of the Supreme Court's entrance into the "political thicket" of reapportionment, the constitutionality of multimember districts has recently been challenged on several grounds.

> First, multimember districts are said to submerge political [especially racial] minorities. The "winner-take-all" character of the typical election scheme creates the possibility that a specific majority will elect all the representatives from a multimember district whereas the outvoted minority might have been able to elect some representatives if the multimember district had been broken down into several single-member districts [Tribe, 1978: 750].[7]

A second (and closely related) challenge against multimember districts is based on the alleged propensity of representatives from such districts to act as a bloc. Chosen from the same constituency, almost certainly of the same party, the identity of interests among such representatives could be expected to be greater than those chosen from distinct districts, and thus they might not fully mirror the views of all the citizens in the district (especially those in the overall voting minority).

A third argument against multimember districts is that the tie between a representative and his or her constituency is weakened when a voter does not have a single representative to regard as his or her "own" (see Jewell, 1981).

A fourth accusation against multimember districts is based on a mathematical argument, advanced by Banzhaf (1966), that

claims that residents of smaller districts are being denied equal representation because residents in the larger districts who are electing represenatives proportional to their numbers have a more than proportionate chance of affecting election outcomes. (This issue and the mathematics underlying this argument are discussed at length in Grofman and Scarrow, 1981a, and Grofman, 1981d.)[8]

None of these arguments was mentioned in the first of the post-Baker cases challenging multimember districts, Fortson v. Dorsey (1965). Rather, in that case the complaint was that voters in the Georgia legislature's single-member districts could elect their own representatives, while voters in the subdistricts of each multimember district (who elected representatives at large but with the candidates required to be residents of a subdistrict, with each subdistrict allocated exactly one representative) were, it was proposed, being denied their own representative since voters from outside the subdistrict helped to choose the subdistrict's representative. In Fortson the Supreme Court rejected this argument, concluding that voters in multimember districts did indeed elect their own representatives—the representatives of the *county*, rather than of the subdistrict in which they happened to reside. In Fortson (1965: 433) the Supreme Court held (as it had in Reynolds, 1969: 577) that "equal protection does not necessarily require formation of all single-member districts in a state's legislative apportionment scheme." The Court went on to assert (Reynolds, 1964: 439) that "the legislative choice of multimember districts is subject to constitutional challenge only upon a showing that the plan was designed to or would operate to minimize or cancel out the voting strength of racial or political groups," a view it reaffirmed in the next case to come up on this issue (Burns v. Richardson, 1965).

The challenge to the multimember apportionment scheme in the next major case in this area, Whitcomb v. Chavis (1971), rested on two quite distinct bases. The first was the assertion that the Marion County (Ohio) district in question "illegally minimizes and cancels out the voting power of a cognizable racial minority in Marison County" (Whitcomb v. Chavis, 1971: 144). This claim was rejected by the Court on the grounds of an

inadequate showing as to the facts. The second was the claim (the fourth argument enumerated above) that "voting power does not vary inversely with the size of the district and that to increase legislative seats in proportion to increased population gives undue voting power to the voter in the multimember district since he has more chances to determine election outcomes than does the voter in the single-member distict" (Whitcomb v. Chavis, 1971: 144-145). This argument was also rejected by the Supreme Court. However, in Whitcomb the court continued to assert that the constitutionality of multimember districting could be challenged on a case-by-case basis.

In White v. Regester (1973), the U.S. Supreme Court found that multimember districts, as designed and operated in Bexar County, Texas, indiviously excluded blacks and Mexican-Americans from political participation, and that single-member districts were required to remedy the effects of past and present discrimination against blacks and Mexican-American. In White the Court lived up to its promise in Fortson and Whitcomb that a properly mounted challenge to multimember districting, when sustained by an *historical* record of discrimination, could, in fact, succeed.

In subsequent cases, some apportionments that make use of multimember districts have been struck down as unconstitutional by the federal courts, usually in situations where there was a well-documented record of previous discrimination and a record of racially or linguistically polarized voting; but the courts have reiterated that multimember districts are not per se unconstitutional. However, the Supreme Court (in Connors v. Johnson, 1971, and Chapman v. Meier, 1975) has indicated a presumption against "*court-ordered* multimember district plans in the absense of exigent circumstances" (Tribe, 1978: 755, emphasis added) while the Voting Rights Act has, since the early 1970s, been so construed by the Justice Department as to virtually ban a jurisdiction covered by the Act from replacing single-member districts with multimember ones (see Grofman, 1981a, for further details).

In the most important case on multimember districting decided to date,[9] the Supreme Court in City of Mobile Alabama v. Bolden

(1980) ruled (in a 6-3 vote with Justices Brennan, White, and Marshall dissenting) that an at-large election system in Mobile did not unfairly dilute black voting strength—overturning a lower court ruling that had required Mobile to eliminate its present form of (commission-based) government and switch to single-member districting.

The facts in the Mobile case are not really in dispute. Under the at-large system for city council elections, because of a pattern of racially polarized bloc voting, black electoral success was nil, despite blacks' constituting a massive population minority in the city. There existed a clear history of racial discrimination in the city as well. The key question at issue in Mobile was whether there had to be proof of discriminatory *intent*. Justice Stewart (joined by Justices Burger, Powell, and Rehnquist), following a line of reasoning laid down in Village of Arlington Heights v. Metropolitan Housing Development Corporation (1976), said that there had to be purposeful discrimination.

There were five separate opinions in Mobile in addition to the four-member plurality opinion, and it is difficult to be sure what, if any, clear guidelines have been laid down in this case. It does appear, however, that before repudiating a multimember system, a majority of the present Court will either require *very high* standards of proof of discriminatory *intent* (the four Justices in the plurality) or allow to pass constitutional muster any scheme that is supported by any neutral justification, i.e., any voting scheme that is not entirely motivated by a desire to curtail the political strength of the minority (Justice Stevens). Given such stringent criteria, few, if any, multimember districting schemes would be declared unlawful. Moreover, the one holding on which there was a clear majority in Mobile was that the impact standards enunciated by the Fifth Circuit Court of Appeals in Zimmer v. McKeithen (1973) were insufficient by themselves to establish a prima facie case for intentional discrimination. It was under these standards that many of the multimember districting schemes previously repudiated as unconstitutionally discriminatory had been judged (see Grofman, 1981a).

The Mobile case is a very troubling one in a number of ways. First, we prefer the repudiated standards of Zimmer to those

enunciated in any of the concurring opinions in Mobile. The prevailing standards in Mobile will perpetuate election systems that severely handicap black and Hispanic electoral success, especially at the municipal level.[10] Second, we find the plurality opinion remarkably sophistic in its claim that its views in the Mobile decision are fully consistent with earlier decisions such as Fortson v. Dorsey and White v. Regester. In particular, the language of Fortson (1965: 439) is clear that the "choice of multimember districts is subject to challenge only upon a showing that the plan was designed to *or* would operate to minimize or cancel out the voting strength of racial or political groups." Similarly, as Justice White scathingly points out in his dissent in Mobile, the standards enunciated by the Fifth Circuit Court of Appeals in Zimmer were derived directly from the Supreme Court's own language in White v. Regester and Whitcomb v. Chavis. Third, the absence in Mobile of any constitutional principles on which a majority could clearly agree means that we can expect conflicting decisions from the lower courts on the constitutionality of particular election systems that make use of multimember districts or at-large elections unless, of course, minority groups are so dismayed by the Mobile decision as to cease bringing such systems to challenge before the courts.[11] Except in that unlikely event, the divided opinion in Mobile means that the definitive pronouncement on "vote dilution" constitutional standards as they apply to at-large elections and multimember districts is yet to come. In particular, still open in our view is the feasibility of resurrecting something like the impact guidelines offered by the Fifth Circuit in Zimmer as a way of providing an indirect prima facie case for intent to discriminate absent direct evidence of discriminatory purpose.

Weighted Voting, Approval Voting, the Alternative Vote, and Proportional Representation

Weighted Voting. Single-member districts may be used in conjunction with weighted voting or with approval voting or the alternative vote replacing a simple plurality rule. Each of those

modifications to the usual election procedures has various advantages and various disadvantages. Space limitations, however, prevent us from discussing these alternative election mechanisms in any detail (see Rae, 1971; Brams and Fishburn, 1978; Grofman, 1975, 1981a; Grofman and Scarrow, 1981a).

In weighted voting, rather than there being, say, a representative for every 10,000 voters, representatives receive votes in the legislature that are a function of the population they represent, e.g., one weighted vote for each 10,000 voters in their constituency. This device was adopted in the 1960s by a number of New York counties that had previously elected a county board of supervisors consisting of one representative from each township regardless of township population—a form of unit voting system struck down by the New York courts in 1965. Weighted votes in all the New York counties to adopt weighted voting in the 1960s were allocated directly proportionally to the population being represented. In an important case in the late 1960s, Iannucci v. Board of Supervisors of the County of Washington (1967), the New York Court of Appeals held that weighted voting was permissible only if the weight assignments were such as to give rise to Banzhaf power values for each legislator exactly proportional to be population he or she represents. Such Banzhaf power scores are based on a game-theoretic notion of "decisive" votes—votes that could change the outcome (see Banzhaf, 1965, 1966; Brams, 1975; Lucas, 1974; Grofman and Scarrow, 1980, 1981a, 1981b). In general, the weights that optimize the fit between a legislator's Banzhaf power score and the size of the constituency he or she represents will be very close to weights assigned on the basis of a simple linear proportionality between a legislator weighted vote and the population he or she represents.

While weighted voting as used in New York counties permits huge discrepancies (as much as 100 to 1) between the weights of the legislator from the largest and the smallest units being represented, it does have the striking advantage of also permitting political subunits (townships in the case of New York county government) to stay intact and to each have a representative of its own. Weighted voting has not, to our knowledge, been used in

local governments outside of the state of New York, but it is available as a device that could be considered in post-1980s reapportionments—although its constitutionality has never been subject to test in federal courts. Its best potential use, in our view, would be where subunits were not widely discrepant in size (e.g., population ratios of less than 2 to 1). Its use in such cases has been strongly advocated by Professor Lee Papayanopoulos (personal communication, June 15, 1980), who has served as a consultant to most of the New York counties that have adopted weighted voting.

Approval Voting. Approval voting (Brams and Fishburn, 1978) permits each voter to cast as many ballots as there are candidates, less one. By voting for a candidate, a voter is expressing willingness to see that candidate elected. The candidate with the greatest number of approval votes is declared elected.

Brams and Fishburn (1978) show that approval voting has a number of nice properties. One of the desirable characteristics of approval voting is that it renders more likely the selection of a majority winner. A majority winner is simply that candidate, if any, who could receive a majority in a head-on-head contest against each of the other candidates. Clearly, a majority winner (if one exists) satisfies our intuitive notions of what is meant by a majority choice (Black, 1958; Grofman, 1981e). Consider the Goodell versus Buckley versus Ottinger New York senatorial vote. Buckley won with only about 40% of the vote. If Ottinger were not in the race, Goodell would have beaten Buckley, since liberal Democrats would have voted for Goodell in preference to the conservative Buckley. On the other hand, if Buckley had not been in the race, it is very likely that Goodell would have beaten Ottinger—since more conservative voters would have probably voted for the Republican candidate, Goodell, rather than for the Democrat, Ottinger, even though both candidates were popularly identified as strong liberals. Because Goodell could have beaten either of his opponents in a head-on-head contest, he is what is referred to as a Condorcet winner. Of course, in the actual race, he lost. Had voters cast approval votes, it is likely that many liberals

would have voted for both Goodell and Ottinger, that strong conservatives would have voted for Buckley only, and that some Republican conservatives would have voted for Goodell as well. Since liberal voters in this race outnumbered conservative ones and Republican voters outnumbered Democratic ones, it is likely that Goodell would have been elected had approval voting been used for this race.

The Alternative Vote. The alternative vote is another mechanism that has been proposed to cope with multicandidate races in which the plurality choice may be other than the Condorcet winner. Under the alternative vote, voters are asked to rank order all candidates. All first-place votes are counted. If no candidate receives a majority of first-place votes, the lowest candidate is dropped and his or her votes reallocated to the second choice candidates on those ballots that had designated him or her a first choice. The process of dropping the lowest candidate from the race and reallocating votes continues, until one candidate has received a majority. It can be shown (Grofman, 1975) that under reasonable assumptions the alternative vote makes it more likely that a majority winner will be chosen. In the Goodell/Buckley/Ottinger senatorial contest, the alternative vote would likely have led to the choice of Ottinger. No candidate received a majority of first-place choices, Goodell received the fewest first choice votes, and most Goodell voters would have had Ottinger as their second choice. Thus, in this case, the majority winner would not have been chosen; however, the perverse result of a candidate (Buckley) being chosen who was not preferred to *either* of his opponents whould have been avoided.

The alternative vote has been used in a few cities (mostly "college towns") but has never caught on as a voting reform—possibly because the rank-ordered ballot complicates voter choice and the transfer procedures considerably complicate the vote tallying process.

Proportional Representation. Proportional representation (PR), although the most common election mechanism in democratic societies, is largely foreign to the U.S. electoral experience.

Like most English-speaking nations, virtually all elections in the United States make use of simple plurality decision making. Only slightly over two dozen U.S. cities have ever made use of PR (in the form of the Hare single transferable vote)—most during the period from 1915 to 1945. Currently only Cambridge (for both municipal and school board elections) and New York (for school board elections only) make use of the Hare system.[12] However, from 1870 to 1980 the lower house of the Illinois Legislature was elected from 3-member districts using cumulative voting, a form of proportional representation.[13] While PR has been vociferously attacked as leading inevitably to factionalism and a breakdown of stable majority government, the U.S. experience with the Hare system and with cumulative voting has been largely positive. PR's failure to catch on in the United States, and its repudiation in virtually all the jurisdictions that used it, can be attributed to a variety of factors—few if any of which have anything to do with its actual merits (see Grofman, 1981a).

While early in this century the single transferable vote was struck down by the courts in some jurisdictions on the grounds that it violated constitutional or charter provisions that gave citizens the right to vote for the candidates of their choice, there are no recent cases challenging its legitimacy. While federal courts have repudiated the doctrine that groups have an a priori right to proportional representation, in our view it is unlikely that statury adoption of PR would be blocked on "one man, one vote" grounds.

We believe that the present-day concern for effective minority representation ought to lead to renewed interest in proportional representation. There are, however, as yet no signs of such a PR revival at the local or state level and, indeed, cumulative voting has just been ended in Illinois.[14] In the Democratic party, however, winner-take-all primaries have been replaced by a form of proportional representation in the presidential nominating process, and minority quotas (or goals) for delegate selection have been adopted.

CONCLUSIONS

Cases involving reapportionment deal with one of the fundamental problems of democratic theory—the nature of "fair and effective" representation. Reapportionment litigation is an area that combines legal scholarship on the explication of constitutional principles with the use of statistical techniques to analyze case-specific data. Social science research on the implications of alternative districting plans/electoral systems, whether in the context of the specific factual circumstances of a particular case or in terms of abstract models of tradeoff relationships among conflicting districting criteria, can play an important role in aiding judges to resolve the constitutional and empirical questions that will be at issue in the reapportionment litigation of the 1980s. In the 1980s the equal population standard will be taken for granted. The key questions that the courts will confront will be much subtler, e. g., (1) How do we measure political gerrymandering and establish standards as to when gerrymandering has exceeded constitutionally permissible limits? (2) How do we determine when non-single-member district election mechanisms have unconstitutionally "submerged" or "diluted" the voting strength of racial or other minorities? (3) How do we reconcile conflicting constitutional or statutory districting criteria?

We believe that social science research can be useful to the courts in clarifying the value choices that must be made in providing standards of statistical measurement for concepts (such as gerrymandering) that are at present quite fuzzily defined at best. While the existence of clear and widely acceptable statistical measures of gerrymandering and/or vote dilution would certainly have been no panacea for the difficult decisions confronted by the court in cases like City of Mobile v. Bolden (1980) or Gaffney v. Cummings (1973), and while such measures of *effect* (or expected effect) do not directly address the issue of *intent to discriminate,* which has been emphasized on recent cases such as Mobile, nonetheless, it seems clear to us that, as we move into the 1980s, U.S. courts would be helped (especially in cases involving

alleged racial or partisan gerrymandering) by the development of statistical techniques to compare expected outcomes of particular districting/electoral schemes with the outcomes that might be expected given "neutral" single-member districting.

NOTES

1. Scholars in other English-speaking democracies shake their heads in disbelief that U.S. courts should have been so all-consumed with questions of mathematical precision in population equality. Canadians have long recognized that a legislative district located in a dense urban area is easier to represent in the Canadian House of Commons than is a district in the prairie provinces whose dimensions are measured in thousands of square miles. Hence Canadians do not worry that one district may be 25% smaller in population than another. Britishers have acknowledged that Welshmen and Scotsmen are outnumbered by Englishmen by a margin of 9 to 1, and they have concluded that the House of Commons is a better representative body if those cultural minorities are allowed to elect representatives in greater number than a strict population formula would allow. In other words, Canadians and Britons have attempted to come to grips with the complex and admittedly difficult question of representation rather than to be consumed by the quest for mathematical equality.

2. We might further extent the argument if we assume that both distrticts are equally competitive but that the incumbent legislator in one district, thanks to his or her seniority, heads a powerful committee, while the other is only a freshman legislator.

3. An example of such legislation is HR 11516 (96th Congress, 1st Session, January 25, 1979), drawn up with Common Cause support, which requires (a) that single-member districts satisfy equal population guidelines (permitting only a 2% discrepancy from strict equality), (b) that the boundaries of each district shall (consistent with the equal population requirement) coincide with the boundaries of local subdivisions, (c) that each district shall be composed of contiguous territories, (d) that districts shall be compact in form, (e) that the boundaries of districts may not be drawn for the purpose of favoring any political party or any specific incumbent or any other individual, and (f) that the boundaries of a district may not be drawn for the purpose of diluting the voting strenth of any language minority group or of any racial minority group (see Common Cause, 1977; Adams, 1977).

4. Recall that single-member districting will not, in general, achieve aggregate proportionality between a party or group's vote share and its share of legislative seats.

5. The factors relied upon by the court to reach this conclusion included "the shrinking white population, the increasing black population, and the accelerating black registration" in Orleans Parish. Since the three districts with white majorities would still have substantial nonwhite communities, blacks would be assured "a voice in the political processes" (Taylor v. McKeithen, 1974: 902). Emphasis was also placed on the fact that a black senator had been elected in one of the disputed districts, although black registration in that district was under 50%. By comparison, the district court's plan virtually assured white control in two districts for the foreseeable future. So great was the white majority in

these legislative seats that the "white senators from these districts could ignore with impunity the special needs of blacks in those districts" (Taylor v. McKeithen, 1974: 902).

6. Of course, if you don't like the Williamsburg ruling this may be scant consolation. The Voting Rights Act now cover 25 states in whole or in part (see Wollock, 1980, for details). It expires in 1982, and the fight over its renewal is expected to be intense (Joaquin Avila, Mexican-American Legal Defense and Educational Fund, personal communication, November 1980).

7. Clearly, the nature of political and demographic realities will determine the extent to which single-member or multimember districting will help or hinder particular political, racial, or religious minorities. If a minority is reasonably large and geographically concentrated, it may expect to get its "own" representative(s) in a single-member district but might be swamped by other groups if forced to compete for representation in a very large multimember district. On the other hand, if a minority is not geographically concentrated and if it has some political clout, it may be far more effective in a larger multimember unit where it may be granted some representation, perhaps even representation proportional to its numbers, rather than be engaged in fighting and losing a number of struggles for control of single-member districts (see discussion in Carpenetti, 1972). Nonetheless, the available empirical evidence is quite strong that, at least for municipal elections, minority representation is considerably more proportional in ward-based cities than in cities with at-large elections. Particularly striking is the evidence based on before-and-after comparisons of cities that shifted from at-large to district-based elections (see Grofman, 1981a, and references therein).

8. Multimember districts have, however, not been without their defenders. Around the turn of the century replacing district systems with at-large electons was the goal of municipal reformers anxious to break the power of "ward" politicians. A number of scholars, such as Bryce (1889: 463-464, cited in Klain, 1955: 1118), deplored the spread of single-member districts, holding them responsible for the decline in quality of state legislatures. The area of choice being smaller, "inferior men are chosen." For a more detailed discussion of the issues in the single-member versus multimember controversy, see Grofman (1981, appendix thereto, available upon request from the author).

9. Mobile involved a commission form of government that mingles legislative and administrative function, and it has been suggested that "as a direct precedent for multimember state legislative districts, the Mobile case may well be irrelevant" (Burks et al., 1980: 29). Nonetheless, as these authors go on to say, the Constitutional principles on which Mobile was decided are "those that will continue to govern legislative and congressional redistricting cases to come." We should also note that there are important differences between cases like Mobile, brought as constitutional challenges, and cases brought under the Voting Rights Act, for which different standards may apply (see Grofman, 1981a, for fuller discussion).

10. The constitutionality of multimember elections is of particular concern at the local level of government since more than 60% of U.S. cities and about one-third of U.S. counties use an at-large system and a significant proportion of the remaining cities and counties use a mix of single-member and multimember districts (Jewell, 1971; MacManus, 1978).

11. There are a number of constitutional subtleties in the Mobile case that our discussion omits entirely, e.g., the distinction between cases under the Fourteenth Amendment and cases under the Fifteenth Amendment (see Burks et al., 1980: 30-33).

12. The alternative vote is the single transferable vote restricted to a single-member district.

13. We use the term "proportional representation" to refer to the principle that the distribution of legislature seats should correspond with the distribution of the popular vote for legislative candidates. In Illinois Assembly races, voters are given three votes, which they may divide equally among three candidates (one vote each), divide equally among two candidates (one-and-a-half votes each), or give exclusively to one candidate (who receives all three votes). Cumulative voting is also used in the primary races for assembly seats.

14. A referendum to reduce the size of the lower house, which also eliminated cumulative voting, carried in November 1980.

CASES

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AVERY v. MIDLAND COUNTY (1968) 390 U.S. 474.
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