

Studies in Public Choice

Bernard Dolez
Bernard Grofman
Annie Laurent
Editors

In Situ and Laboratory Experiments on Electoral Law Reform

French Presidential Elections

 Springer

Studies in Public Choice

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French Presidential Elections

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For more than a decade, the Center for the Study of Democracy (CSD) at the University of California, Irvine (UCI), founded by Professor Russell Dalton, has been sponsoring cumulative research on comparative electoral systems. One of its signature projects has been the set of five volumes and one journal minisymposium covering the major (families of) electoral systems: the single non-transferable vote, the single transferable vote, mixed member systems, list PR systems, runoff systems, and plurality systems, respectively. Each publication has been the end product of a CSD conference held at UCI and/or in Canada or Europe.

- (1) B. Grofman, Sung-Chull Lee, Edwin Winckler and Brian Woodall (eds.) *Elections under the Single Non-Transferable Vote in Japan, Korea and Taiwan*. University of Michigan Press, 1999.
- (2) S. Bowler and B. Grofman (eds.) *Elections under the Single Transferable Vote in Australia, Ireland and Malta*. University of Michigan Press, 2000.
- (3) M. Shugart and M. Wattenberg (eds.) *Mixed Member Systems: The Best of Both Possible Worlds?* Oxford University Press, 2001.
- (4) B. Grofman and A. Lijphart (eds.) *The Evolution of Electoral and Party Systems in the Nordic Countries*. Agathon Press, 2002.
- (5) B. Grofman, S. Bowler and A. Blais (eds.) “Minisymposium on Runoff Elections.” *Electoral Studies*, Vol. 27, 2008.
- (6) B. Grofman, S. Bowler, and A. Blais (eds.) *Duverger’s Law in Canada, India, the U.S. and the U.K.* Berlin: Springer Verlag, 2008.

After the completion of its series of conferences on alternative voting methods, CSD has continued to sponsor cutting-edge research on electoral systems.

This volume contains substantially revised versions of the experimental papers prepared for a CSD conference on “Reforming the French Presidential Election System: Experiments on Electoral Reform” held in Paris, June 15–16, 2009, at the headquarters of CEVIPOF, the research unit of Sciences-Po concerned with voting and elections. This conference was co-organized jointly by Bernard Dolez, Bernard Grofman, and Annie Laurent and jointly sponsored by CSD, CEVIPOF, Sciences-Po, and GAEL (the electoral studies group of the French Political Science Association), with primary funding from the Jack W. Peltason (Bren Foundation) Chair at the University of California, Irvine. We are deeply indebted to the various

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A companion conference, “Evaluating the Long Run Consequences of 1990s Electoral Reform: Comparing Italy and Japan,” was held November 28–29, 2008 at the University of Bologna. This conference was co-organized by Daniela Giannetti and Bernard Grofman, and jointly sponsored by CSD, the Department of Political Science at the University of Bologna (under grants from the Ministry of Education and from a private foundation: Giorgio Freddi, Principal Investigator), and by the Jack W. Peltason (Bren Foundation) Chair at the University of California, Irvine. An edited volume arising from that conference is also being published by Springer, and will serve to complement this book. We regard natural experiments (such as those that arose from the independently caused, but rather parallel in structure, changes in electoral laws in Japan and Italy) and the laboratory and field experiments on voting methods discussed in this volume, as powerful and complementary tools for developing a more realistic understanding of the independent effects of electoral laws.

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Chapter 1

Editors' Introduction: The Role of Controlled Experiments in Evaluating Proposed Institutional Reforms

Bernard Dolez, Bernard Grofman, and Annie Laurent

In the modern era, representation is the hallmark of democracy, and electoral rules structure how representation works and how effectively governments perform. Moreover, of the key structural variables in constitutional design,¹ it is the choice of electoral system that is usually the most open to change.

We can identify three different approaches in electoral system research. The first, associated largely with economics, but also characteristic of the research agendas of a number of political scientists, involves the formal study of electoral system effects through the deductive method, using mathematical tools ranging from set theory, to topology, to statistics, to game theory, to derive theorems about the properties of voting methods, and/or about the equilibrium behavior of voters and parties. The second, associated largely with political science, but recently also involving a number of economists, has a primarily empirical focus, and looks in depth at how electoral rules impact on political outcomes, either by conducting large and cross-sectional studies of real world data, or focusing on particular cases – including before and after analysis of what happens when electoral systems change. The third and more recent tradition, inspired largely by work in experimental economics, but also including political scientists, involves experimentation, either in the form of controlled laboratory experiments or in the form of in situ field studies. In each case, electoral rules are allowed to vary, and the consequences of different rules for outcomes are traced out. Experiments are usually designed to test expectations derived from either formal models of electoral rule effects or intuitions derived from observing how electoral rules appear to operate in various natural settings.

It is the last approach that will be the focus of the volume. The chapters in it report on experiments that look at alternatives to the present two round (majority runoff) election system used for the election of French presidents. This system is of considerable importance not only just because of its use in France but also because of its wide adoption in presidential elections in new democracies (e.g., Bulgaria, Poland, Romania, Russia, and Ukraine). However, our interest is only partly in the

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double ballot system; our broader interest is in the power of experiments to inform judgments about institutional choices and their consequences.

Before we turn to a review of the electoral system experiments reported in the chapters of this book, we wish to provide some basic background about the history of French electoral laws so as to avoid the need to repeat material in each of the chapters.

French Electoral History: A Brief Overview

The runoff system, also named *scrutin d'arrondissement*, was used for legislative elections during the last years of the Third Republic. As it then operated, it favored local “notables,” and was seen as not allowing the parties control over their elected officials. In the Liberation period immediately after WWII, many people associated the runoff system with the perceived flaws of French politics in the inter-war period. In the immediate post-WWII period, proportional representation replaced the *scrutin d'arrondissement*. However, despite this change, ministerial instability was even greater under the Fourth Republic than under the Third Republic, and proportional representation came to be blamed in large part for this instability.

In 1958, the new constitution chosen for the Fifth Republic established a parliamentary regime. The National Assembly could vote the premier and his cabinet out of office. Charles de Gaulle and other founding fathers of the Fifth Republic believed that the proportional representation of the Fourth Republic had given rise to what in France was called a “regime of parties,” associated with cabinet instability. For them, governmental stability required not only a new constitution, but also a change in electoral system. Michel Debré, who was General de Gaulle’s Prime Minister from 1958 to 1962, and one of the principal authors of the Constitution of the Fifth Republic, was in favor of a Westminster system of constitutional arrangements, with elections held under the plurality system. However, this electoral system seemed too far away from the French tradition, as well as not very compatible with French multipartism. Moreover, parties then allied with de Gaulle were opposed to plurality-based elections, and the runoff system reemerged as the electoral rule of choice in the Fifth Republic for legislative elections, with a form of it also used for presidential elections.

In the original constitution of 1958, the president was elected by an electoral college. In December of that year, De Gaulle was elected on the first round (without need for a second round runoff). But, in 1962, de Gaulle decided to modify the constitution to have the president elected by direct popular vote. This was done to give him a stronger position in terms of political legitimacy and expression of majority support. In this proposal for popular election of the President, the two-round ballot was retained, and this feature of the proposed change was not especially controversial. However, in contrast, the principle of direct universal suffrage for choosing the president was highly controversial; all political parties except the Gaullist party and the *Républicains Indépendants* party led by Valéry Giscard d’Estaing campaigned against this change. Georges Pompidou, de Gaulle’s prime minister at the time, was

censured by the National Assembly, which led de Gaulle to dissolve the Parliament and to call new legislative elections in November.

The year 1962 is an historic turning-point in French politics. With the direct election of the President, the nature of the Fifth Republic changed, becoming, according to the expression popularized by Maurice Duverger, a semipresidential regime. Perhaps even more importantly, the legislative elections of November 1962 saw the main political forces in France gathering in two camps: the camp of the “Yes,” with de Gaulle, and the camp of the “No.” These camps gathered together, respectively, those groupings who had been opposed to the referendum held a few weeks earlier to change to a popularly elected president, and those in favor of that change. In other words, the referendum and legislative elections of 1962 led to a sorting of French parties into two camps: one organized around the Gaullist party – which was again victorious in 1962 – and an opposition grouping with the Communist party as the main force. Thus, French parties sorted into what we might think of as a rightist bloc and a leftist bloc.

However, for a short time period there remains a third “centrist” grouping. In the 1965 presidential election, the center offered the candidacy of Jean Lecanuet; in the 1969 presidential election, the centrist candidate was Alain Poher. But, after Georges Pompidou succeeds de Gaulle as President in 1969, the center splits, with part of it shifting to the right and part to the left. Not having succeeded in conquering the “Elysée,” the home of the French president, they realize that they can ensure the reelection of their deputies only with the additional voting strength of either the right-wing parties or of the left wing parties.

At about the same time, François Mitterrand seeks to reorganize the noncommunist left. In 1971, he became the head of the new Socialist party, created largely from the rubble of the SFIO (Section française de l’Internationale ouvrière) at the time of the Epinay party congress. Important changes are also happening on the right. A few years later, after his election as president of the Republic in 1974, Valéry Giscard d’Estaing creates the UDF (Union pour la démocratie française) to gather the non-Gaullist right-wing parties. Now French politics is still divided into two blocs or camps, but within each there are two main rivals for dominance *within* the bloc. In the second round of the presidential election and in the second round of the legislative elections, electoral alliances are established on the left between the Communist party and the Socialist party, and on the right between the UDF and the Gaullist party. At the end of the 1970s, according to Duverger, the party system looked like a “quadrille bipolaire” (Duverger 1983) made up of four parties of roughly equal size, allied two by two.

Presidential and legislative elections in France now both use runoff voting systems, but the exact rules differ between the two systems. For the presidential election, only the top two candidates can enter the second round, but many more candidates can, in principle, be eligible for the second round of the legislative elections. For the legislative elections, the top two candidates are automatically qualified for the second round. Other candidates can run if they pass over the qualification threshold. It is set at 5% of the registered votes for the 1958 elections, but raised to 10% for the 1967 elections then to 12.5% since the 1978 elections, which mechanically both makes more difficult qualification for the second round and penalizes the

Table 1.1 The decrease in contestation on the second round from 1958 to 1981 Metropolitan France including Corsica

	1958	1962	1967	1968	1973	1978	1981
Constituencies decided in the first round	39	96	72	154	49	56	154
Only one candidate for the second round	0	1	0	1	1	8	10
Two candidates for the second round	73	209	323	266	326	409	309
Three or more candidates for the second round	353	159	75	49	97	1	1
Total	465	465	470	470	473	474	474

minor parties. In the 1978 legislative elections as in the 1981 ones there was only one contest with more than two parties. (See Table 1.1.)

The use of the runoff system for the all French elections during its first two decades gave birth to a party system rather different from the one predicted by the $M + 1$ rule (Cox 1997, p. 123) in which a two-round two-candidate majority runoff ballot should yield (no more than) three major competitors, and a legislative first round outcome where many parties might be eligible to enter the second round should give rise to considerably more than two candidates in the second round of the French legislative elections. Instead, because of the potential for competition within as well as between the two blocs on the first round, and the expectation of competition being between the two blocs on the second round in the presidential election when only two candidates survive, France could sustain multiparty politics at the presidential level, while at the same time limiting the most meaningful competition in presidential elections to that between the two blocs. Similarly, because of frequent arrangements among the parties in a bloc to have low vote share candidates drop out in the second round of legislative elections to help insure that a candidate of a different party but of their own bloc would be the plurality winner in the district (Tsebelis 1991), France could sustain multiparty legislative politics, while at the same time limiting competition on the second round.

So far we have focused on the implications of the runoff system for national competition but a variant of this system is also used for local elections. Indeed, runoffs have long been used in cantonal elections to choose the administrators of the department.¹ For municipal elections, the proportional representation rules then

¹ Half of the seats are up for reelection every 3 years. A candidate is elected in the first round if s/he obtains the absolute majority of the votes cast and the support of a quarter of the registered voters. Otherwise, a second round takes place 1 week later. The top two candidates can run for the second round, as well as all candidates who got a first round number of votes equal to at least 10% of the registered voters in the polity.

into force in the cities of 30,000 and more inhabitants were abandoned in 1965, in favor of a two-round list system with a majoritarian component (*scrutin de liste majoritaire à deux tours*). At present, this system is in place for all cities above 3,500 and gives party lists which receive a majority of the votes a majority of the seats, with remaining seats distributed to the other lists proportionally to vote share provided that the party has received at least 5% of the votes. However, if no party receives a majority of the votes on the first round, then those parties with at least 10% of the votes advance to the second round. In the second round, even if there is no majority party, the plurality party is given a majority of the seats, with the remaining seats proportionally allocated to the other parties.

Thus, in the early period of the Fifth Republic, at all levels of government, proportional representation was eradicated in favor of some form of the runoff system. This change in electoral rules is widely credited as having favored both bipolarization of the French party system and governmental stability.

However, changes implemented during the period 1979–1986 created an even wider range of variation in electoral rules in France than just the variation across types of runoffs. Proportional representation in a single nationwide constituency (under a closed list form of PR) was chosen for the first European parliament elections, in 1979.² As of 1983, for municipal election a hybrid two-round list system with a majoritarian component (*scrutin de liste majoritaire à deux tours*). As noted in the previous paragraph for the French regional elections which took place for the first time in 1986, proportional representation in department-wide constituencies was used. PR was even used for the 1986 national legislative elections, though subsequent parliamentary elections reverted back to two round runoffs.

In past decades, the smooth function of two bloc politics has been challenged in various ways in addition to the adoption of PR methods for some types of elections. The emergence of new cleavages (issues) has contributed both to the weakening of the dominance of the left/right cleavage and to the emergence of new parties (Greens, National Front). As a consequence, the nature of the two rounds of the presidential election has begun to change. The founding fathers of the Fifth Republic hoped that the presidential election would be decided in the first round. Failing this, a second round was intended to decide between the top-two candidates. In 1965, to his own surprise and that of many observers, de Gaulle failed to obtain an absolute majority in the first round of voting. But, in fact, since de Gaulle's initial selection, no presidential candidate has won a majority on the first round. Both candidates and voters now know that the second round is going to be the decisive round, and thus who enters the second round becomes critical. In consequence, the "meaning" of the first round has greatly changed. For "strong" candidates, i.e., those who have a real chance to win, the first round decides among them by determining the top two finalists who will face off against each other 2 weeks later during the second round. But now, candidates without any chance of winning can run either to benefit from media exposure or to show their level of support before negotiating to give their

² The legal threshold for eligibility to win seats was fixed at 5% of the votes cast.

endorsement to one of the two actual finalists. For voters, the first round is now used both to select the top-two finalists of the round turn, and to show preferences among the full set of candidates, including those who have little chances of advancing to the second round.

Over time the number of candidates in the first round of the French presidential election has rather steadily increased: 6 candidates in 1965, 7 in 1969, and 12 in 1974. The subsequent attempt to toughen the rules for eligibility to be on the presidential ballot, notably, increasing the required number of signatures to stand for election,³ has had little or no effect. For example, 16 candidates ran in 2002, and 12 in 2007.

Another change is that, over the years, first round presidential ballots have become more and more “proportionalized” (Parodi 2002, 497), by which is meant that there is a more even distribution of vote shares across the parties who contest the first round. In particular, the total vote share of the two candidates who make it to the second round has declined, and the vote share a candidate needs to come in second on the first round has concomitantly been declining. François Mitterrand got 31.7% in forcing de Gaulle into a runoff in 1965; Jacques Chirac made it into the second round of the 1995 presidential election with only 20.8% of the vote. In 2002, after 5 years of cohabitation between a Gaullist President and Social premier, Jacques Chirac, the Gaullist, and Lionel Jospin, the Socialist, gathered, respectively, only 19.9 and 16.2%. Moreover, the latter only finished third, (barely) behind Jean-Marie Le Pen, thus putting a rightist and an ultra-rightist candidate into the second round. (See Table 1.2.)

Both the proliferation of minor candidates in the April 21, 2002 presidential election (16) and the dispersion of votes on the left were responsible for the “clap of thunder” that came as a surprise to parties, voters, pollsters, and pundits. In the second round, Jacques Chirac was overwhelmingly reelected, as voters on the left “held their nose” and voted against the perceived greater evil. A few weeks later, during the 2002 legislative elections, minor parties were largely annihilated.

On the eve of the 2004 regional elections and the European elections, the debate about electoral systems was reopened. For the regional elections, the proportional representation system was replaced by a hybrid runoff system, drawn from the municipal electoral system, giving a bonus to the victorious list. For the European elections, the national territory was cut out into eight large constituencies, which

Table 1.2 Vote shares in the first round of French Presidential elections: 1965–2007

	1965	1969	1974	1981	1988	1995	2002	2007
Top two candidates	76.3	67.7	75.8	54.2	54.1	44.1	36.7	57.1
Second candidate	31.7	23.2	32.6	25.8	20.0	20.8	16.9	25.8

³ To be eligible to run candidates must obtain signatures (named in France *parrainages*), not from voters, but from among the set of roughly 50,000 elected officials at various levels of government (from members of Parliament, to local office holders). Over time, the number of signatures which are required has increased: from 100 signatures in 1965 to 500 in 1976 and thereafter.

would, *ceteris paribus*, favor the large parties as compared to having a single national constituency⁴ (Dolez and Laurent, forthcoming).

Today, although the constellation of French parties and party share distribution has changed greatly from earlier periods (e.g., the Communist Party has been in steady decline) there still remain rather strong two-bloc tendencies. Moreover, a key feature of the runoff system at the presidential level still operates to help prevent extreme parties from gaining electoral success.

In the 1950s, the Communist Party (PC) was the strongest French party. A major goal leading to use of the majority runoff method for presidential elections in the Fifth Republic was to prevent the election of a communist president. The runoff system chosen guaranteed that all anti-communist voters would have a chance to vote against the communist candidate on the second round – assuming, not unreasonably, that a communist candidate would be one of the two top vote getters. Intended to frustrate the extreme left-party, this mechanism worked equally well in coping with a candidate of the extreme right party in the 2002 presidential election. At the second round, Jacques Chirac faced Jean-Marie Le Pen, the National Front leader, and won with over 82% of the valid votes, by gathering votes of all voters who were frightened by the prospect of a Le Pen victory.

Outline of the Volume

Remarkably, despite the potential data set in former French colonies, for many decades French academia has had relatively little interest in the comparative study of electoral rules, or even in electoral reform within France. Two key features of the French Fifth Republic, its semi-presidential system and its two-round ballot, when coupled with a strong left–right dimension of party competition and a rather tightly balanced competition, with similar voting strength on the parties of the right and on the left, made it very likely that the second round of the presidential election would find a candidate of the left facing a candidate of the right, with the median voter being decisive (Lemminicier et al. 2008). In legislative elections in the Fifth Republic, which were also double ballot, but in which more than two candidates might make it into the runoff, coordination/strategic withdrawal within the bloc of parties of the right and within the bloc of parties of the left still made it likely that the actual resultant contest would, for all practical purposes, be a left–right showdown if there were to be a contest at all (Tsebelis 1991). This combination of essentially two-bloc competition and a strong presidency was widely thought to have solved the stability problem that bedeviled the Fourth French Republic (François, forthcoming).

But the rise of an ultra-right party headed by Jean-Marie Le Pen that did not fully fit into the traditional left–right dimension, and which seemingly required a

⁴ All the other main components of the prior electoral system remained identical: the PR system, the legal threshold (5%), the principle of “bloc” closed lists and the vote-to-seat-translation rule (d’Hondt method).

dimension of its own to capture voter propinquities (Adams et al. 2005; cf. Chiche et al. 2000; Laslier and Van der Straeten 2006), and the recent failures of the second round of French presidential contests to yield a left–right contest (as happened in 2002) or to select the Condorcet winner, i.e., the candidate who could in pairwise contest defeat each and every other candidate (as happened in 2007), has helped raise the visibility in France of electoral reform issues, especially in academia. For these historical reasons, and for straightforward theoretical reasons having to do with the power of the experimental method to test theoretical models, beginning with the French presidential election of 2002, there have been a number of experiments on the effects of election methods done by teams of French scholars (both economists and political scientists), and by scholars of French politics from the US, such as Michael Lewis-Beck.

The six other chapters in this volume look at alternatives to the present two-round system for electing French presidents, including approval voting (where voters identify the set of candidates whom they regard as “satisfactory”); simple plurality; the single transferable vote as used for the selection of a single candidate, where voters give rankings to all the candidates, and the candidate with a majority of the votes is chosen, with alternatives with fewest votes being deleted and votes reallocated until a single candidate gets a majority (a method called the “alternative vote” in Australia, and the “instant runoff” in the US); a ranking based variant of the alternative vote called the “Coombs method,”² in which, when no candidate has a majority, instead of eliminating the candidate with fewest first place votes, we eliminate the candidate with most last place votes; and an interesting new method based on “grading,” the method of “majority judgment,”³ invented by Michel Balinski and Rida Laraki (which, without requiring unidimensionality can, nonetheless, be thought of as a means to select the candidate who is most acceptable to the median voter), as well as a simplified variant of that method (with only three “grades” permitted), called by Baujard and Igersheim-Chauvet “evaluation voting.”⁴ The first three of the remaining chapters are each written by a different team of economists: Etienne Farvaque, Hubert Jayet, and Lionel Ragot – based primarily at the University of Lille; Antoinette Baujard and Herrade Igersheim-Chauvet – representing the work done by a group initially based at University of Caen; and Balinski and Laraki – who are based at the Ecole Polytechnique. Each chapter reviews the field experiments during the first round of the 2007 French presidential election conducted by the group. All the field experiments build on an experimental protocol originally developed by Balinski et al. (2003). In each case the experiments took place outside the polls, using ballot papers that mimicked those used in the actual election – with the voting arrangements having been done with the permission of local authorities and having a considerable degree of realism.⁵ In particular, voters were made aware of the experiment in advance, via mechanisms such as an information letter mailed to them, an informational meeting in their town, or mention of the planned experiment by local newspapers, and radio and television stations. The next chapter, by Laslier, an economist at the Ecole Polytechnique who himself has been very actively involved in experiments of this type (see e.g., Laslier and Van der Straeten 2008), considers the methodological benefits and drawbacks of this form of in situ

experiment for analyzing effects of alternative voting methods, and considers some of the results from experiments run on the 2002 French presidential elections.

Chapters six and seven offer more traditional laboratory experiments. Each is written by a team of political scientists. The study by Bernard Dolez and Annie Laurent draws participants from both France and Canada; it primarily compares plurality and the double round ballot. The study by Jill Wittrock and Michael Lewis-Beck draws its participants from the US and also compares the double ballot to plurality. Both the Dolez-Laurent study and the Wittrock-Lewis-Beck study assign voters to ideological positions on a left–right continuum, with voters rewarded by how close the outcome is to their induced ideological preference. The purely experimental studies allow their authors to introduce variation in the nature of voter preferences, but at the cost of reduced realism. The two modes of experimentation are a natural complement to one another.⁶

The double round system used for presidential elections, at least as it operated in practice in France prior to 2002, can be characterized as having a number of desirable features. In particular, there were many alternatives to choose from on the first round, thus making it easier for voters to express sincere preferences for candidates whom they felt close to but, at the same, the limitation to two candidates at the final round guaranteed a majority winner. Also, while the two-ballot method does not guarantee the selection of a Condorcet winner it can be shown, under assumptions of unidimensionality, to be more likely to select a Condorcet winner than simple plurality (Grofman and Feld 2004). And, as we noted previously, the system tended to discourage the selection of extremist presidential candidates as compared to what might happen under simple plurality. Moreover, as we also noted, in conjunction with France’s semi-presidential parliamentary system and other features of French political competition, the double round ballot was credited with restoring political stability as compared with politics in the Fourth Republic.

On the other hand, results of the two-round ballot can be affected by which candidates choose to run, and by misperceptions about expected vote shares leading to mistakes in strategic voting – as happened in France in 2002, when too many supporters of the Socialist Party candidate, Lionel Jospin, confided that he would win enough votes to enter the second round, deserted him in favor of more left-wing alternatives to “send a message,” leaving him in third place, behind the anti-immigration “spoiler” candidate, Jean-Marie Le Pen.⁷ A further drawback of the double round ballot that several of the studies reported in this volume call attention to is the failure to pick a Condorcet winner when one exists. In the 2007 election, in many constituencies, and in France as a whole (Abramson 2008), it seems clear that François Bayrou was the Condorcet winner, i.e., could have defeated each and every one of the other candidates in paired competition.

Each of the methods examined in the papers in this volume as an alternative to the double round presidential system has something attractive about it, whether in terms of extreme simplicity (plurality) or in terms of a high probability of selecting an alternative which may truly be regarded as the majority winner (approval voting, the single transferable vote),⁸ or as the median choice (the method of majority judgment, evaluation voting), or in terms of resistance to strategic manipulation (the

single transferable vote).⁹ Nonetheless, we do not expect change in the rules for electing French presidents.

Despite flaws visible in recent presidential elections, the presidential double ballot system incontestably remains one of the most solid pillars of the regime, questioned neither by the left nor by the right. In particular, the runoff system guarantees that the president gets more than 50% of the votes cast, thus reinforcing presidential legitimacy. On the other hand, the future of the runoff system is more dubious for legislative elections. On the left, the Socialist party, under pressure from the Greens, has called for introducing a proportional representation component into legislative elections. On the right, Nicolas Sarkozy, the President of France elected in 2007, has suggested the desirability of adopting a plurality system for the future “territorial” elections, which perhaps will substitute for both regional and departmental elections as of 2014. He would expect this change to favor his party, the UMP – in 2009 viewed as the French party with greatest support. It is thus possible that, in the future, the runoff voting system will be used only for presidential elections.

But even if the experiments reported in this volume, and other work, do not lead to increased pressure to change the presidential election rules in France, the central question addressed by each of the studies, whether or not (and under what circumstances) we can expect double ballot outcomes to differ from those of single ballot systems, remain theoretically important, and the results of the experiments clearly show that, with either actual voter preferences or under assumptions about the unidimensionality of voter preferences, double ballot rules often produce different results from single ballot rules. Moreover, the papers also cover a wide range of additional important topics. These include the study of electoral rule impact on effective number of candidates, on the extent of strategic voting by voters, on the range of party ideologies, and on how far, ideologically, is the chosen candidate from the voter population. In addition, the Balinski-Laraki paper looks at some formal properties of voting rules, and the statistical robustness of experimental results based on sampling. Among the many interesting empirical findings in the various chapters, strategic voting is more common in plurality than in proportional systems and thus, as hypothesized, Duverger’s psychological effect vis-à-vis party proliferation is stronger in plurality than in proportional systems (Dolez and Laurent); the method of majority judgment, in addition to satisfying a number of normative criteria that distinguish it from other methods, can yield outcomes distinct from other methods (Balinski and Laraki), but in 2007 it, like Borda and Condorcet, but unlike the actual double ballot system in use, selected Bayrou as the preferred choice; the winner in 2007 under approval voting would also have been Bayrou (Baujard and Igersheim), but no candidate received an absolute majority of approval votes; “low approval rates and the low evaluations obtained by candidates show that even elected candidates (Chirac and Sarkozy) do not have a huge support in the population” (Laslier); the winner in 2007 under the Coombs rule would have been Bayrou, but Sarkozy was the winner under the single transferable vote (Farvarque, Jayet, and Ragot); and the double ballot system used in French presidential elections “encourages ideological movement away from the center, and toward the extremes” (Wittrock and Lewis-Beck).

Experimental methods allow us to address questions about causality in a way that simply cannot be replicated with direct analyzes of raw data from any single election, or even from a set of elections. Among the questions which the studies reported here allow us to directly answer are whether other election methods would have avoided problems such as failure to allow voters a clear ideological choice and to choose a candidate broadly representative of voter preferences in ways that the double ballot might fail to do; and, if so, at what cost in terms of new problems being created. We believe that experimental methods have great potential to inform our understanding of the consequences of choice of institutional mechanisms, and we believe the papers we have collected for this volume clearly demonstrate the potential power of such methods in the specific context of reforming the French presidential election system. Moreover, we believe that they provide both a beacon and a model for similar use of experimentation in a wide variety of other institutional contexts, where issues of institutional reform are on the agenda, or might be put there.

Notes

¹These key modes of governance include the dimension anchored by (con)federal arrangements at one end and unitary forms of government at the other, and the dimension of choice anchored by a unitary directly elected executive with strong powers, at one end, and a parliamentary system, where the executive is chosen by the parliament, at the other.

²See Grofman and Feld (2004).

³In French, this voting method has been referred to as the *méthode majoritaire*.

⁴The paper by Dolez and Laurent also considers a proportional method.

⁵Technically, these in situ studies might not properly be labeled “experiments,” since there was not a random assignment of subjects to alternative treatment effects, but the studies did fit a model of experimental intervention, in which a given underlying set of preferences was manipulated under alternative voting methods, with the comparison result the outcome found under the voting rule actually in use in France.

⁶The papers in this volume, which look at the information that can be gleaned from field and laboratory experiments, are intended also to be complementary to those in a companion volume (edited by Daniela Giannetti and Bernard Grofman), which looks at so-called “natural experiments” i.e., ones involving before and after comparisons in situations in which there has been a change in electoral rule. That volume compares the long run consequences of similar types of electoral reforms made in Japan and in Italy in the early 1990s and seeks to explain how and why the effects of electoral change varied so dramatically in the two countries.

⁷The legislative version of the double ballot system used in France requires especially complex bargaining to minimize coordination inefficiencies.

⁸Of course, neither approval voting nor single transferable vote (STV) always picks the Condorcet winner. But, under approval voting, when voters use the rule of thumb of “approving” the alternatives that are above their median preference, this voting method has a substantial chance of picking a Condorcet winner when one exists; while STV can be expected to have a substantial chance of picking a Condorcet winner when choices are arrayed along a single dimension.

⁹The STV has been attacked because it violates *positive responsiveness*, and thus there are circumstances where voting for a candidate will actually make it less likely that that candidate will be chosen. However, the cognitive burden of determining when and how it makes sense to vote insincerely is very high under STV when the electorate is large and there are a moderately large number of alternatives being considered.

Chapter 2

Election by Majority Judgment: Experimental Evidence

Michel Balinski and Rida Laraki

Introduction

Throughout the world, the choice of one from among a set of candidates is accomplished by elections. Elections are mechanisms for amalgamating the wishes of individuals into a decision of society. Many have been proposed and used.

Most rely on the idea that voters compare candidates – one is better than another – so have lists of “preferences” in their minds. These include first-past-the-post (in at least two avatars), [Condorcet’s method \(1785\)](#), [Borda’s method \(1784\)](#) (and similar methods that assign scores to places in the lists of preferences and then add them), convolutions of Condorcet’s and/or Borda’s, the single transferable vote (also in at least two versions), and approval voting (in one interpretation).

Electoral mechanisms are also used in a host of other circumstances where winners and orders-of-finish must be determined by a jury of judges, including figure skaters, divers, gymnasts, pianists, and wines. Invariably, as the great mathematician Laplace (1820) was the first to propose two centuries ago they asked voters (or judges) not to compare but to evaluate the competitors by assigning points from some range, points expressing an absolute measure of the competitors’ merits. Laplace suggested the range $[0, R]$ for some arbitrary positive real number R , whereas practical systems usually fix R at some positive integer. These mechanisms rank the candidates according to the sums or the averages of their points¹ (sometimes after dropping highest and lowest scores). They have been emulated in various schemes proposed for voting with ranges taken to be integers in $[0, 100]$, $[0, 5]$, $[0, 2]$, or $[0, 1]$ (the last approval voting).

It is fair to ask whether any one of these mechanisms – based on comparisons or sums of measures of merit – actually makes the choice that corresponds to the true wishes of society, in theory or in practice. All have their supporters, yet all have serious drawbacks: every one of them fails to meet some important property that a

¹Laplace only used this model to deduce Borda’s method via probabilistic arguments. He then rejected Borda’s method because of its evident manipulability.

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good mechanism should satisfy. In consequence, the basic challenge remains: to find a mechanism of election, prove it satisfies the properties, and show it is practical.

The existing methods of voting have for the most part been viewed and analyzed in terms of the traditional model of social choice theory: individual voters have in their minds “preference” lists of the candidates, and the decision to be made is to find society’s winning candidate or to find society’s “preference” list from best (implicitly the winner) to worst. *All* of the mechanisms based on this model are wanting because of unacceptable *paradoxes* that occur in practice – Condorcet’s, Kenneth Arrow’s and others – and *impossibility theorems* – due to Arrow (1963), to Gibbard (1973) and Satterthwaite (1973). Moreover, as Young (1988, 1986) has shown, in this model finding the rank-ordering wished by a society is a very different problem than finding the winner wished by a society: said more strikingly, the winner wished by society is not necessarily the first placed candidate of the ranking wished by society! In fact, the traditional model harbors a fundamental *incompatibility* between winning and ranking Balinski and Laraki (2007, 2010). The mechanisms based on assigning points and summing or averaging them seem to escape the Arrow paradox (though that, it will be seen, is an illusion), but they are *all* wide open to strategic manipulation. However, evaluating merits, as Laplace had imagined, leads to a new theory as free of the defects as can be.

The idea that voting depends on comparisons between pairs of candidates – the basic paradigm of the theory of social choice – dates to medieval times: Ramon Llull proposed a refinement of Condorcet’s criterion in 1299 and Nicolaus Cusanus proposed Borda’s method in 1433 (see, McLean (1990); Hägele and Pukelsheim (2001, 2008)). The impossibility and incompatibility theorems are one good reason to discard the traditional model. The 2007 experiment with the majority judgment described in this article provides another: fully one third of the voters declined to designate one “favorite” candidate, and on average voters rejected over one third of the candidates. These evaluations cannot be expressed with “preference” lists. Thus, on the one hand the traditional model harbors internal inconsistencies, and on the other hand voters do not in fact have in their minds the inputs the traditional model imagines, rank orders of the candidates. Put simply, it is an inadequate model.

The majority judgment is a new mechanism based on a different model of the problem of voting (inspired by practice in ranking wines, figure skaters, divers, and others). It asks voters to evaluate every candidate in a common language of grades – thus to *judge* each one on a meaningful scale – rather than to compare them. This scale is absolute in the sense that the merit of any one candidate in a voter’s view – whether the candidate be “excellent,” “good,” or merely “acceptable” – depends only on the candidate (so remains the same when candidates withdraw or enter). Assigning a value or grade permits comparisons of candidates, do not permit evaluations (or any expression of intensity). In this paradigm, the majority judgment emerges as the unique acceptable mechanism for amalgamating individuals’ wishes into society’s wishes. Given the grades assigned by voters to the candidates, it determines the final-grades of each candidate and orders them according to their final-grades. The final-grades are *not* sums or averages.

The fact that voters share a common language of grades makes no assumptions about the voters' utilities: utilities measure the satisfactions of voters, grades measure the merits of candidates. Sen (1970) proposed a model whose inputs are the voters' utilities: but satisfaction is a complex, relative notion. The satisfaction of seeing, say, Jacques Chirac (the incumbent candidate of the traditional right) elected in 2002 depends on who opposed him: many socialist voters (or others of the left) who detested Chirac were delighted to see him crush Jean-Marie Le Pen (the ever present candidate of the extreme right). So satisfaction is not independent of irrelevant alternatives and leads to Arrow's paradox. But with a common language of grades, such voters could decide to evaluate Chirac's merit as *Acceptable* or *Good* opposed to Le Pen and/or Lionel Jospin (the incumbent Prime Minister and candidate of the Socialist Party) while awarding a grade of *Poor* or *to Reject* to Le Pen.

In the real world, satisfaction of a voter depends on a host of factors that include the winner, the order of finish, the margin of victory, how socio-economic groups have voted, the method of election, etc. Utilities, we believe, *cannot* be inputs to practical decision mechanisms. Grades of a common language have an absolute meaning that permit interpersonal comparisons. Common languages exist. They are defined by rules and regulations and acquire absolute meanings in the course of being used (e.g., the points given to Olympic figure skaters, divers and gymnasts, the medals given to wines, the grades given to students, the stars given to hotels, etc.). The principal experiment of this paper shows that a common language may be defined for voters in a large electorate as well.

The majority judgment avoids the unacceptable paradoxes and impossibilities of the traditional model. The *theory* that shows why the majority judgment is a satisfactory answer to the basic challenge is described and developed elsewhere (see Balinski and Laraki (2007, 2010)). In this theory, Arrow's theorem plays a central role as well: it says that without a common language, no meaningful final grades exist. Theorems show – and experiments confirm – that while there is no method that avoids strategic voting altogether, the majority judgment best resists manipulation.

The aim of this article is to describe electoral field experiments (as versus laboratory experiments) that show majority judgment provides a *practical* answer to the basic challenge. The demonstration invokes new methods of validation and new concepts. The experiments, and the elections in which they were conducted, show the well-known methods fail to satisfy important properties, and permit them to be compared.

Background of the Experiments

The experiments were conducted in the context of the French presidential elections of 2002 and 2007. Except for the provision of a “run-off” between the top two finishers, this is exactly the mechanism used in the U.S. presidential elections and primaries in each state: an elector has no way of expressing her or his opinions

Table 2.1 Votes: United States presidential election of 2000

2000 Election	National vote	Electoral college	Florida vote
George W. Bush	50,456,002	271	2,912,790
Albert Gore	50,999,897	266	2,912,253
Ralph Nader	2,882,955	0	97,488

concerning candidates except to designate exactly one “favorite.” In consequence – imagine for the moment a field of at least three candidates – his or her vote counts for nothing in designating the winner unless it was cast for the “winner,” for no expression concerning the remaining two or more candidates is possible.

The first-past-the-post system is, of course, subject to *Arrow’s paradox* – the winner may change because of the presence or absence of “irrelevant” candidates – as is practically every system that is used to elect a candidate throughout the world. The U.S. presidential election of 2000 is a good example (see Table 2.1). Ralph Nader had no chance whatever to be elected, but his candidacy for Florida’s 26 electoral votes alone was enough to change the outcome.²

French Presidential Election of 2002

The French presidential election of 2002 with its sixteen candidates is a veritable story-book example of the inanity of the first-past-the-post mechanism (see Table 2.2). Jacques Chirac, the incumbent President, was the candidate of the Rassemblement pour la République (RPR), the big party of the “legitimate” right; Lionel Jospin, the incumbent Prime-Minister, that of the Parti Socialist (PS); Jean-Marie Le Pen that of the extreme right, Front National party (FN); and François Bayrou that of the moderate Union pour la Démocratie Française (UDF, the ex-President Valéry Giscard d’Estaing’s party). Arlette Laguiller was the perennial candidate of a party of the extreme left, the Lutte Ouvrière. The extreme right had two candidates, Le Pen and Bruno Mégret; the moderate right five, Chirac, Bayrou, Alain Madelin, Christine Boutin, and Corinne Lepage; the left and greens four, Jospin, Jean-Pierre Chevènement, Christiane Taubira, and Noël Mamère; and the extreme left four, Laguiller, Olivier Besancenot, Robert Hue, and Daniel Gluckstein. One group managed to present only one candidate, Jean Saint-Josse: the hunters.

France fully expected a run-off between Chirac and Jospin, and was profoundly shocked to be faced with a choice between Chirac and Le Pen. Chirac crushed Le Pen, obtaining 82.2% of the votes in the second round, but the vast majority of Chirac’s votes were against Le Pen rather than for him. The left – socialists, communists, trotskysts, etc., – had no choice but to vote for Chirac. His votes represented very different sentiments and intensities.

² This, of course, assumes that the vast majority of Nader’s votes would have gone to Gore.

Table 2.2 Votes: French presidential election, first-round, April 21, 2002

J. Chirac	J.-M. Le Pen	L. Jospin	F. Bayrou
19.88%	16.86%	16.18%	6.84%
A. Laguiller	J.-P. Chevènement	N. Mamère	O. Besancenot
5.72%	5.33%	5.25%	4.25%
J. Saint-Josse	A. Madelin	R. Hue	B. Mégrét
4.23%	3.91%	3.37%	2.34%
C. Taubira	C. Lepage	C. Boutin	D. Gluckstein
2.32%	1.88%	1.19%	0.47%

Most polls predicted that Jospin would have won against Chirac with a narrow majority; Sofres predicted a 50–50% tie on the eve of the first round.³ Had either Chevènement, an ex-socialist, or Taubira, a socialist, withdrawn, most of his 5.3% or her 2.3% of the votes would have gone to Jospin, so the second round would have seen a Chirac-Jospin confrontation, as had been expected. In fact, Taubira had offered to withdraw if the PS was prepared to cover her expenses, but that offer was refused. It has also been whispered that the RPR helped to finance Taubira’s campaign (a credible strategic gambit backed by no specific evidence). Moreover, if Charles Pasqua, an aging past ally of Chirac, had been a candidate – as he had announced he would be – then he could well have drawn a sufficient number of votes from Chirac to produce a second round between Jospin and Le Pen, which would have resulted in a lopsided win for Jospin. Anything can happen when the “first-past-the-post” (or the “two-two-past-the-post”) mechanism is used! This – and the Nader Florida phenomenon – is nothing but Arrow’s paradox: the winner depends on the presence or absence of candidates including those who have absolutely no chance of winning. It also shows that the mechanisms invite “strategic” candidacies: candidates who cannot hope to win (or survive a first round) but can cause another to win (or to reach the second round) by drawing votes away from an opposing candidate.

French Presidential Election of 2007

French voting behavior in the presidential election of 2007 was very much influenced by the experience of 2002. There were twelve candidates. Nicolas Sarkozy was the candidate of the UMP (Union pour un Mouvement Populaire, founded in 2002 by Chirac), its president and the incumbent minister of the interior; Ségolène Royal that of the PS; Bayrou again that of the UDF (though he announced immediately after the first round that he would create a new party, the MoDem or Mouvement démocrate); and Le Pen again that of the FN. The extreme left had

³ In their last 11 predictions (late February to the election), the Sofres polls showed Jospin winning seven times, Chirac two times, a tie two times.

Table 2.3 Votes: French presidential election, first round, April 22, 2007

N. Sarkozy	S. Royal	F. Bayrou	J.-M. Le Pen
31.18%	25.87%	18.57%	10.44%
O. Besancenot	P. de Villiers	M.-G. Buffet	D. Voynet
4.08%	2.23%	1.93%	1.57%
A. Laguiller	J. Bové	F. Nihous	G. Schivardi
1.33%	1.32%	1.15%	0.34%

five candidates – Besancenot (again), Marie-George Buffet, Laguiller (again), José Bové, and Gérard Schivardi – , the extreme right had two – Le Pen (of course) and Philippe de Villiers – and the hunters one, Frédéric Nihous.

The distribution of the votes among the twelve candidates in the first round is given in Table 2.3. In the second round, Nicolas Sarkozy defeated Ségolène Royal by 18,983,138 votes (or 53.06%) to 16,790,440 (or 46.94%).

In response to the debacle of 2002, the number of registered voters increased sharply (from 41.2 million in 2002 to 44.5 million in 2007), and voter participation was mammoth: 84% of registered voters participated in both rounds. Voting is, of course, a strategic act. In 2007, voters were acutely aware of the importance of who would survive the first round. Many who believed that voting for their preferred candidate could again lead to a catastrophic second round, voted differently. Some, in the belief that their preferred candidate was sure to reach the second round, may have voted for that candidate’s easiest-to-defeat opponent. Such behavior – a deliberate strategic vote for a candidate who is not the elector’s favorite (“le vote utile”) – was much debated by the candidates and the media, and was practiced. A poll conducted on election day⁴ asked electors what most determined their votes. One of the seven possible answers was a deliberate strategic vote: this answer was given by 22% of those (who said they voted) for Bayrou, 10% of those for Le Pen, 31% of those for Royal, and 25% of those for Sarkozy. Comparing the first rounds in 2002 and 2007 also suggests deliberate strategic votes were important in 2007: in 2002 the seven minor candidates of the left and the greens (Laguiller, Chévènement, Mamère, Besancenot, Hue, Taubira, Gluckstein) had 26.71% of the vote, whereas in 2007 six obtained only 10.57% (Besancenot, Buffet, Voynet, Laguiller, Bové, Schivardi); in 2002 the five minor candidates of the right and the hunters (Saint-Josse, Madelin, Mégret, Lepage, Boutin) had 13.55% of the vote whereas in 2007 two obtained only 3.38% (Villiers, Nihous).

The very fact of being a candidate is a strategic act. To become an official candidate requires 500 signatures. They are drawn from a pool of about 47 thousand elected officials who represent the 100 departments, must include signatures coming from at least 30 departments, but no more than 10% from any one department. Both Besancenot and Le Pen appeared to have difficulty in obtaining them. Sarkozy publicly announced he would help them obtain the necessary signatures, as a service to democracy.

⁴ By Tns – Sofres – Unilog Groupe Logica CMG, April 22, 2007.

Table 2.4 Polls, March 28 and April 19, 2007, potential second round (IFOP)

	Bayrou		Sarkozy		Royal		Le Pen	
Bayrou	–	–	54%	55%	57%	58%	84%	80%
Sarkozy	46%	45%	–	–	54%	51%	84%	84%
Royal	43%	42%	46%	49%	–	–	75%	73%
Le Pen	16%	20%	16%	16%	25%	27%	–	–

Table 2.5 Projected second round results, from vote in Faches-Thumesnil experiment [Farvaque et al. \(2007\)](#) (e.g., Sarkozy has 48% of the votes against Bayrou)

	Bayrou	Sarkozy	Royal	Le Pen
Bayrou	–	52%	60%	80%
Sarkozy	48%	–	54%	83%
Royal	40%	46%	–	73%
Le Pen	20%	17%	27%	–

Polling results (Table 2.4) suggest that François Bayrou was the *Condorcet-winner*: he would have defeated *any* candidate in a head-to-head confrontation. Moreover, the pair by pair confrontations determine an unambiguous order of finish (there is no “Condorcet cycle”): Bayrou is first, Sarkozy second, Royal third and Le Pen last. The information in Table 2.4 suffices to determine the “Borda scores”⁵ among the four candidates. On March 28, the Borda-scores were: Bayrou 195, Sarkozy 184, Royal 164, and Le Pen 57. On April 19, they were: Bayrou 193, Sarkozy 180, Royal 164, and Le Pen 63. Condorcet and Borda agree on the order of finish.

Another experiment [Farvaque et al. \(2007\)](#) was conducted in Faches-Thumesnil (a small town in France’s northern-most department, Nord) on election day, where the official results of the first round were close to the national percentages. Voters were asked to rank-order the candidates, permitting the face-by-face confrontations to be computed (see Table 2.5): they yield the same unambiguous order of finish among the four significant candidates.

The Majority Judgment

2007 Experiment

The experiment took place in three of Orsay’s 12 voting precincts (the 1st, 6th, and 12th). Orsay is a suburban town some 22 km from the center of Paris. In 2002 it was the site of the first large electoral experiment conducted in parallel with a

⁵ A candidate’s *Borda-score* is the sum of the votes he or she receives in all pair by pair votes. Equivalently, with n candidates, a voter gives $n - 1$ *Borda-points* to the first candidate on his/her list, $n - 2$ to the second, down to 0 to the last. The sum of a candidate’s Borda-points is the candidate’s Borda-score.

presidential election (Balinski et al. 2003, discussed below). The three precincts were chosen among the five of the 2002 experiment as the most representative of the town and its various socioeconomic groups. Potential participants were informed about the experiment well before the day of the first round by letter, an article in the town's quarterly magazine, an evening presentation open to all, and posters (as had been done in 2002). The various communications explained how the votes would be tallied and the candidates listed in order of finish, and showed the ballot they would be asked to use. Thus, this was a *field* experiment.

The intent was to find out whether real, uncontrollable voters of widely differing opinions and incentives could intelligently evaluate many candidates using the ballots of the majority judgment. The outcome was unknown and risky: perhaps few would cooperate or the evaluations would prove too difficult, perhaps a minor candidate would emerge victorious or the winner would receive a very low grade, perhaps indeed the results would simply be chaotic. The analysis of voters' behavior shows that the results make sense and that they evaluated honestly; in any case, they had no incentive to evaluate strategically. This permits a comparison of different methods of voting based on a real "preference profile" of voters in a real election; had the experiment itself been real and binding, some voters would have voted strategically, which would have precluded a valid comparison of methods.

It is important to appreciate that the three precincts of Orsay were *not* representative of all of France: the order between Royal and Sarkozy was reversed, Bayrou did much better than nationally and Le Pen much worse (see Table 2.6).

On April 22, the day of the first round, after voting officially in these three precincts, voters were invited to participate in the experiment using the majority judgment. A team of three to four knowledgeable persons were in constant attendance to encourage participation and to answer questions. Voting *à la* majority judgment was carried out exactly as is usual in France: ballots were filled in the privacy of voting booths, inserted into envelopes, and then deposited in large transparent urns. A facsimile of the ballot (in translation) is given in Table 2.7.

Several comments concerning the ballot are in order. First, the voter is confronted with a specific question which he or she is asked to answer. Second, the answers, or evaluations, are given in a language of grades that is *common* to all French citizens: with the exception of *to Reject*, they are the grades given to school children.

Table 2.6 French presidential election, first round, April 22, 2007: national vote vs. vote in the three precincts of Orsay

	N. Sarkozy	S. Royal	F. Bayrou	J.-M. Le Pen
National	31.18%	25.87%	18.57%	10.44%
Orsay precincts	28.98%	29.92%	25.51%	5.89%
	O. Besancenot	P. de Villiers	M.-G. Buffet	D. Voynet
National	4.08%	2.23%	1.93%	1.57%
Orsay precincts	2.54%	1.91%	1.40%	1.69%
	A. Laguiller	J. Bové	F. Nihous	G. Schivardi
National	1.33%	1.32%	1.15%	0.34%
Orsay precincts	0.76%	0.93%	0.30%	0.17%

Table 2.7 The majority judgment ballot (English translation)

Ballot: Election of the President of France 2007

*To be president of France,
having taken into account all considerations,
I judge, in conscience, that this candidate would be:*⁶

	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>
Olivier Besancenot						
Marie-George Buffet						
G�rard Schivardi						
Fran�ois Bayrou						
Jos� Bov�						
Dominique Voynet						
Philippe de Villiers						
S�gol�ne Royal						
Fr�d�ric Nihous						
Jean-Marie Le Pen						
Arlette Laguiller						
Nicolas Sarkozy						

Check one single grade in the line of each candidate.
No grade checked in the line of a candidate means to Reject the candidate.

These evaluations are *not* numbers: they are *not* abstract values or weights that a voter almost surely assumes will be added together to assign a total score to each candidate (and so may encourage him or her to exaggerate up or down), but mean the same thing (or close to the same thing) to everyone.

Contrary to the predictions of several elected officials and many Parisian “intellectuals,” the voters had no problem in filling out the ballots. For the most part, one minute sufficed. The queues to vote by the majority judgment were no longer than those to vote officially (though of course the experimental vote did not require electors to sign registers or present their papers of identity). Moreover, 1,752 of the 2,360 who voted officially (or 74%) participated in the experiment: the waiting times could not have been long. In fact, the rate of participation was slightly higher because in France a voter can assign to another person a proxy to vote for him or her, and the experiment did not allow anyone to vote more than once. Nineteen of the 1,752 ballots were indecipherable or deliberately subverted, leaving a total of 1,733 valid ballots.

⁶ The question in French: “Pour pr sider la France, ayant pris tous les  l ments en compte, je juge en conscience que ce candidat serait:” The grades in French: “Tr s bien, Bien, Assez bien, Passable, Insuffisant,   Rejeter.” The names of the candidates are given in the official order, the result of a random draw.

Each member of the team that conducted the experiment had the impression that the participants were very glad to have the means to express their opinions concerning *all* the candidates, and liked the idea that candidates would be assigned grades.⁷ An effective argument to persuade reluctant voters to participate was that the majority judgment allows a much fuller expression of a voter's opinions. The actual system offered voters only 13 possible *messages*: to vote for one of the twelve candidates, or to vote for none. The majority judgment offered voters more than 2 billion possible messages.⁸ Several participants actually stated that the experiment had induced them to vote for the first time: finally, a method that permitted them to express themselves.

The Results

Voters were particularly happy with the grade *to Reject*, and used it the most: there was an average of 4.1 of *to Reject* per ballot and an average of 0.5 of no grade (which, in conformity with the stated rules, was counted as a *to Reject*). Voters were parsimonious with high grades and generous with low ones (see Table 2.8). Only 52% of voters used a grade of *Excellent*; 37% used *Very Good* but no *Excellent*; 9% used *Good* but no *Excellent* and no *Very Good*; 2% gave none of the three highest grades.

Six possible grades assigned to twelve candidates implies that a voter was unable to express a preference between every pair of candidates. The number of different grades actually used by voters shows that in any case they did not wish to distinguish between every pair (see Table 2.9) since only 14% used all six grades. This suggests that six grades was quite sufficient. A scant 3% of the voters used at most two grades, 13% at most three, suggesting that more than three grades is necessary.

The highest grades were often multiple. Almost 11% of the ballots had at least two grades of *Excellent*; 16% had at least two grades of *Very Good* and no grade of *Excellent*; almost 6% had at least two grades of *Good*, no *Excellent*, no *Very Good*. In all, more than 33% of the ballots gave the highest grade to at least two candidates. Thus, one of every three voters did not designate a single “best” candidate. This seems to indicate that voters conscientiously answered the question that was posed.

Table 2.8 Average number of grades per majority judgment ballot

	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>	<i>Sum</i>
Avg./ballot	0.69	1.25	1.50	1.74	2.27	4.55	12

Table 2.9 Percentages of voters using k grades ($k = 1, \dots, 6$)

1 grade	2 grades	3 grades	4 grades	5 grades	6 grades
1%	2%	10%	31%	42%	14%

⁷ A collection of television interviews of participants prepared by Raphaël Hitier, a journalist of *I-Télé*, attests to these facts.

⁸ With twelve candidates and six grades, there are $6^{12} = 2,176,782,336$ possible messages.

It also shows that many voters either saw nothing (or very little) to prefer among several candidates or, at the least, were very hesitant in making a choice among two, three, or more candidates. Moreover, many voters did not distinguish between the leading candidates: 17.9% gave the same grade to Bayrou and Sarkozy (10.6% their highest grade to both), 23.3% the same grade to Bayrou and Royal (11.7% their highest grade to both), and 14.3% the same grade to Sarkozy and Royal (4.1% their highest to both). Indeed, 4.8% gave the same grade to all three (4.1% their highest to all three: all who gave their highest grade to Sarkozy and Royal also gave it to Bayrou). These are significant percentages: many elections are decided by smaller margins.

This finding is reinforced by two facts observed elsewhere. First, a poll conducted on election day⁹ asked at what moment voters had decided to vote for a particular candidate. Their hesitancy in making a choice is reflected in the answers: 33% decided in the last week, a third of whom (11%) decided on election day itself. For Bayrou voters, 43% decided in the last week and 12% on election day; for Sarkozy voters, the numbers were 20% and 6%; for Royal voters, 28% and 9%; for Le Pen voters, 43% and 18%. But the “first-past-the-post” system *forced* them to make a choice (or to vote for no one). Second, the [Farvaque et al. \(2007\)](#) asked voters to rank-order all twelve candidates. They were testing “single-transferable-vote” mechanisms.¹⁰ Rank-ordering fewer than twelve meant that those not ranked were all considered to be placed at the bottom of the list (so the mechanisms could not “transfer” votes to such candidates). Nine hundred and sixty voters participated, only 60% of those who voted officially, and 67 ballots were invalid. Only 41% of the valid ballots actually rank-ordered all twelve candidates. Fifty-three percent rank-ordered six or fewer candidates, 29% of them rank-ordered three or fewer. All of this bespeaks of a reluctance to rank-order many candidates: it *is* a difficult, time-consuming task.

Of the 1,733 valid majority judgment ballots,¹¹ 1,705 were different. It is surprising they were not all different. Had all those who voted in France in 2007 (some 36 million) cast different majority judgment ballots, less than 1.7% of the possible messages would have been used. Those that were the same among the 1,733 valid ballots of the experiment contained only *to Reject*'s or were of the type an *Excellent* for Sarkozy and *to Reject* for all the other candidates. The opinions of voters are richer, more varied and complex by many orders of magnitude than those they are allowed to express by all current systems.

The outcome of voting by majority judgment in the three precincts is given in Table 2.10. Since every candidate was necessarily assigned a grade – assigning no grade meant assigning a *to Reject* – each candidate had exactly the same number of

⁹ by TNS Sofres – Unilog Groupe Logica CMG, April 22, 2007, the same poll cited earlier.

¹⁰ These elect the candidate who is ranked first by a majority. If there is no such candidate, then candidates are eliminated, one by one, their votes “transferred” to the next on the lists, until a candidate *is* ranked first by a majority. The choice of who to eliminate may differ. One mechanism eliminates the candidate ranked first least often; another eliminates the candidate ranked last most often. In the experiment the first elected Sarkozy, the second elected Bayrou.

¹¹ 559 in the 1st precinct, 601 in the 2nd, 573 in the 3rd.

Table 2.10 Majority judgment results, three precincts of Orsay, April 22, 2007

	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>
Besancenot	4.1%	9.9%	16.3%	16.0%	22.6%	31.1%
Buffet	2.5%	7.6%	12.5%	20.6%	26.4%	30.4%
Schivardi	0.5%	1.0%	3.9%	9.5%	24.9%	60.4%
Bayrou	13.6%	30.7%	25.1%	14.8%	8.4%	7.4%
Bové	1.5%	6.0%	11.4%	16.0%	25.7%	39.5%
Voynet	2.9%	9.3%	17.5%	23.7%	26.1%	20.5%
Villiers	2.4%	6.4%	8.7%	11.3%	15.8%	55.5%
Royal	16.7%	22.7%	19.1%	16.8%	12.2%	12.6%
Nihous	0.3%	1.8%	5.3%	11.0%	26.7%	55.0%
Le Pen	3.0%	4.6%	6.2%	6.5%	5.4%	74.4%
Laguiller	2.1%	5.3%	10.2%	16.6%	25.9%	40.1%
Sarkozy	19.1%	19.8%	14.3%	11.5%	7.1%	28.2%

grades. Accordingly, the results may be given as percentages of the grades received by each candidate. In fact, there were relatively few ballots that assigned no grade to a candidate.¹² *Everyone* with some knowledge of French politics who was shown the results with the names of Sarkozy, Royal, Bayrou and Le Pen hidden invariably identified them: the grades contain meaningful information.

The evidence conclusively demonstrates that the age-old view of voting – and the basic assumption of the traditional model of social choice theory – is not a reasonable model of reality.

The *majority-grade* of a candidate is his or her median grade. It is simultaneously the highest grade approved by a majority and the lowest grade approved by a majority. For example, Dominique Voynet’s majority-grade (see Table 2.10) is *Acceptable* because a majority of 2.9% + 9.3% + 17.5% + 23.7% = 53.4% believe she merits at least that grade and a majority of 23.7% + 26.1% + 20.5% = 70.3% believe she merits at most that grade.

The *majority-ranking* orders the candidates according to their majority-grades. However, with twelve candidates and six grades some candidates will necessarily have the same majority-grade. The general theory Balinski and Laraki (2007, 2010) shows that two candidates are never tied for a place in the majority-ranking unless the two have *precisely* the same set of grades. But when there are many voters, as is typical in most elections, the general rule for determining the majority-ranking may be simplified. Three values attached to a candidate – called the candidate’s *majority-gauge* – are sufficient to determine the candidate’s place in the majority-ranking:

$$(p, \alpha, q) \text{ where } \begin{cases} p = \% \text{ of grades above majority-grade,} \\ \alpha = \text{majority-grade, and} \\ q = \% \text{ of grades below majority-grade.} \end{cases}$$

¹² No grade was assigned to each of the candidates in the following percentages: Nihous 7.2%, Schrivardi 5.8%, Laguiller 5.3%, Villiers 4.3%, Buffet 4.3%, Voynet 4.3%, Bové 4.2% Besancenot 3.2%, Bayrou 2.9%, Le Pen 2.7%, Royal 1.8%, Sarkozy 1.7%.

A mnemonic helps to make the definition of this order clear: supplement a majority-grade (other than *Excellent* or *to Reject*) by a “mention” of \pm that depends on the relative sizes of p and q and call it the *majority-grade**:

$$\alpha^* = \begin{cases} \alpha^+ & \text{if } p > q, \\ \alpha^- & \text{if } p \leq q, \end{cases}$$

(the possibility that $p = q$ is slim). Thus, for example, Sarkozy’s majority-gauge is (38.9%, *Good*, 46.9%) and his majority-grade* is *Good*⁻. Naturally, α^+ is better than α^- .

Consider two candidates A and B with majority-gauges (p_A, α_A, q_A) and (p_B, α_B, q_B) . A ranks ahead of B , and (p_A, α_A, q_A) ahead of (p_B, α_B, q_B) , when

- A ’s majority-grade* is better than B ’s (or $\alpha_A^* > \alpha_B^*$), or
- their majority-grade*s are both α^+ and $p_A > p_B$, or
- their majority-grade*s are both α^- and $q_A < q_B$.

To illustrate,

- Bayrou with (44.3%, *Good*⁺, 30.6%) ranks ahead of Royal with (39.4%, *Good*⁻, 41.5%) because *Good*⁺ is better than *Good*⁻,
- Besancenot with (46.3%, *Poor*⁺, 31.2%) ranks ahead of Buffet with (43.2%, *Poor*⁺, 30.5%) because 46.3% > 43.2%, and
- Royal with (39.4%, *Good*⁻, 41.5%) ranks ahead of Sarkozy with (38.9%, *Good*⁻, 46.9%) because 41.5% < 46.9%.

It is practically certain that this rule for deciding the order suffices to give an unambiguous order of finish in any election with many voters.

The majority-grades and the majority-gauges for the experiment are given in the order of the majority-ranking in Table 2.11. The majority-ranking is very different from the rank-ordering obtained in the three precincts of Orsay with the current system. Sarkozy had the highest number of *Excellents*, but also the highest number of *to Rejects* among the three serious candidates. *Every* grade of the candidates counts in determining their majority-grades and the majority-ranking. Le Pen – fourth according to the official vote – is last according to the majority judgment because 74.4% of the voters graded him *to Reject*. Another marked difference with the current system is the green candidate Voynet’s fourth-placed finish (instead of seventh-placed): the electorate was able to express the importance it attaches to problems of the environment while giving higher grades to candidates it judged better able to preside the nation. Once elected, Sarkozy recognized this importance: his new government has one “super-ministry,” the Ministry of Ecology and Sustainable Development.

Notice that the “raw” majority judgment results make a very strong case for ranking Bayrou first, Royal second and Sarkozy third for the following reason. Except for the *Excellents*, whose percentages taken alone give the opposite rank-ordering, the percentages of at least *Very Good*, at least *Good*, etc., at least *Poor*, all agree with that order (see Table 2.12). Practically any reasonable election mechanism will agree with this ranking of the three important candidates.

Table 2.11 The majority-gauges (p, α, q) and the majority-ranking, three precincts of Orsay, April 22, 2007

	Majority-ranking	$p =$ Above maj.-grade	$\alpha^* =$ The majority-grade*	$q =$ Below maj.-grade	Natl. rank.	Orsay rank.
1st	Bayrou	44.3%	<i>Good</i> ⁺	30.6%	3rd	3rd
2nd	Royal	39.4%	<i>Good</i> ⁻	41.5%	2nd	1st
3rd	Sarkozy	38.9%	<i>Good</i> ⁻	46.9%	1st	2nd
4th	Voinet	29.8%	<i>Acceptable</i> ⁻	46.6%	8th	7th
5th	Besancenot	46.3%	<i>Poor</i> ⁺	31.2%	5th	5th
6th	Buffet	43.2%	<i>Poor</i> ⁺	30.5%	7th	8th
7th	Bové	34.9%	<i>Poor</i> ⁻	39.4%	10th	9th
8th	Laguiller	34.2%	<i>Poor</i> ⁻	40.0%	9th	10th
9th	Nihous	45.0%	<i>to Reject</i>	–	11th	11th
10th	Villiers	44.5%	<i>to Reject</i>	–	6th	6th
11th	Schivardi	39.7%	<i>to Reject</i>	–	12th	12th
12th	Le Pen	25.7%	<i>to Reject</i>	–	4th	4th

The columns headed “Natl. rank.” and “Orsay rank.” are the national rank-orders by the current system

Table 2.12 Cumulative majority judgment grades, three precincts of Orsay, April 22, 2007

	At least					
	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>
Bayrou	13.6%	43.3%	69.4%	84.2%	92.6%	100%
Royal	16.7%	39.4%	58.5%	75.3%	87.5%	100%
Sarkozy	19.1%	38.9%	53.2%	64.7%	71.8%	100%

Validation

The result of the second round on May 6, 2007, in the three voting precincts of Orsay was

Ségolène Royal: 51.3%

Nicolas Sarkozy: 48.7%

The results of the face-to-face confrontations between every pair of candidates may be estimated from the majority judgment ballots¹³ by comparing their respective grades (see Table 2.13). In particular, Royal defeats Sarkozy with 52.3% of the vote, a “prediction” of the outcome of the second round within 1%. The participants seem to have expressed themselves in the majority judgment ballots in conformity with the manner in which they actually voted. The 1% difference is easily explained. Twenty-six percent of the voters did not participate in the experiment; and the last two weeks of the campaign may have changed perceptions. The closeness of the estimate to the outcome shows the majority judgment ballots are consistent with the observed facts.

¹³ The information in Table 2.10 does not suffice.

Table 2.13 Face-to-face elections, percentages of votes estimated from majority judgment ballots, three precincts of Orsay, April 22, 2007

	Bay	Roy	Sar	Voy	Bes	Buf	Bov	Lag	Vil	Nih	Sch	LP
Bayrou	–	56	60	77	77	81	83	83	84	90	90	86
Royal	44	–	52	73	74	78	81	80	77	85	87	81
Sarkozy	40	48	–	59	61	64	66	66	77	75	75	80
Voynet	23	27	41	–	56	59	67	67	66	75	79	74
Besancenot	23	26	39	44	–	53	60	61	62	69	74	70
Buffet	19	22	36	41	47	–	57	59	61	68	73	69
Bové	17	19	34	33	40	43	–	51	56	62	66	65
Laguiller	17	20	34	33	39	41	49	–	56	62	66	64
Villiers	16	23	23	34	38	39	44	44	–	54	56	59
Nihous	10	15	25	25	31	32	38	38	46	–	53	56
Schivardi	10	13	25	21	26	27	34	34	44	47	–	54
Le Pen	14	19	20	26	30	31	35	36	41	44	46	–

It shows, for example, Royal winning 52% of the vote against Sarkozy and, symmetrically, Sarkozy winning 48% of the vote against Royal. The percentage of ballots that give to both candidates of a pair the same grade is split evenly between them

Table 2.14 First round vote, percentages of votes estimated from majority judgment ballots, three precincts of Orsay, April 22, 2007

	Major			Leftist						Rightist		
	Bay	Roy	Sar	Voy	Bes	Buf	Bov	Lag	Sch	Vil	Nih	LP
Estimate 1	25.6	25.6	28.4	3.5	4.9	2.6	1.6	1.6	0.4	2.3	0.5	2.9
Actual	25.5	29.9	29.0	1.7	2.5	1.4	0.9	0.8	0.2	1.9	0.3	5.9
Estimate 2	25.3	25.4	27.4	3.4	4.6	2.5	1.5	1.5	0.3	1.9	0.4	5.8

The estimates of Table 2.13 show Bayrou to be the Condorcet- and the Borda-winner, which is consistent with all polls. Moreover, the estimates of the face-to-face races determine an unambiguous order of finish – it is the order given in the table – so there is no Condorcet-cycle. This order is almost the majority-ranking.

The majority judgment ballots may also be used to estimate the extent of deliberate strategic voting (not in accord with voters’ convictions) in the first round under the current system (see Table 2.14). It is naturally assumed that a candidate receiving the highest grade accorded by a voter would receive his or her one vote. But since a third of the voters gave their highest grade to more than one candidate, an assumption must be made concerning their behavior. Estimate 1 naively assumes such votes are split evenly among the candidates receiving the highest grade. Estimate 2 takes into account Le Pen’s very peculiar niche in the far right of the French political spectrum: it assumes that when a voter’s highest grade goes to Le Pen and others, then her or his vote goes to Le Pen only (if you vote far right it is more strategic to vote for Le Pen, but why not add the others if you can). This second assumption explains almost perfectly what happened to the far right, and seems to be the better model. Comparing estimate 2 with the actual vote suggests that 6.3% of the 13.8% for the six candidates of the left and greens (so a little less than half of their

Table 2.15 Actual percentages, first round, April 22, 2007, in Orsay’s 12th precinct (top row of percentages with names of candidates above) and all of France (bottom row of percentages with names of candidates below)

	Roy	Sar	Bay	LP	Bes	Vil	Voy	Bov	Buf	Lag	Nih	Sch
12th	32.0	26.6	20.2	10.0	2.7	2.5	2.3	1.3	1.2	0.8	0.2	0.0
Ntnl	31.2	25.9	18.6	10.4	4.1	2.2	1.9	1.6	1.3	1.3	1.2	0.3
	Sar	Roy	Bay	LP	Bes	Vil	Buf	Voy	Bov	Lag	Nih	Sch

Table 2.16 The majority-gauges (p, α, q) and the majority-ranking, Orsay’s 12th precinct, April 22, 2007¹⁴

	Majority-ranking	$p =$ Above maj.-grade	$\alpha^* =$ The majority-grade*	$q =$ Below maj.-grade
1st	Royal	42.4%	Good+	40.1%
2nd	Bayrou	40.8%	Good+	31.4%
3rd	Sarkozy	38.0%	Good–	48.7%
12th	Le Pen	30.9%	to Reject	–

votes according to estimate 2) went to Royal and Sarkozy, three-quarters of them for Royal, one-quarter for Sarkozy. Contrary to the stated opinions of most political observers, it seems that Bayrou voters backed him by conviction not strategy.

Some persons have averred that the majority judgment necessarily favors centrist candidates. This is neither true in theory nor in practice, despite the fact that Bayrou was a centrist candidate. First, observe that Bayrou’s share of the vote was considerably higher in the three precincts of Orsay than in the entire nation: winning in Orsay’s three precincts implies little about what might have happened nationally. Second, consider the actual first round percentage results in the 12th precinct. They were close to the result in all of France when the percentages of Royal and Sarkozy are permuted (see Table 2.15).

Bayrou was as much a centrist candidate in the 12th precinct as he was in the three precincts. Yet, in the 12th precinct Bayrou was *not* the majority judgment winner (see Table 2.16): Royal was first.

The results of the face-to-face confrontations between the pairs of major candidates deduced from the majority judgment ballots in the 12th precinct are given for the four major candidates in Table 2.17. Bayrou is again the Condorcet-winner despite Royal’s majority judgment victory: Why?

The reason is clear. Bayrou was the *second* choice of a very large number of voters, so against Royal alone in the current system he would naturally take a large number of Sarkozy’s votes and against Sarkozy alone he would naturally take a large number of Royal’s votes. The majority judgment ballots show that the voters who gave Sarkozy their highest grade strongly preferred Bayrou to Royal, those who

¹⁴ The majority-grades and the majority-ranking of the candidates after Sarkozy is the same as for the three precincts except that Besancenot obtains a *Poor–*, and de Villiers is placed 9th and Nihous 10th.

Table 2.17 Projected second round results, Orsay's 12th precinct (e.g., Sarkozy has 41% of the votes against Bayrou)

	Bayrou	Royal	Sarkozy	Le Pen
Bayrou	–	53.5%	59.0%	82.8%
Royal	46.5%	–	54.3%	77.9%
Sarkozy	41.0%	45.7%	–	77.7%
Le Pen	17.2%	22.1%	22.3%	–

Table 2.18 Grades given to three major candidates by voters who gave their highest grade to one of the others, three precincts of Orsay, April 22, 2007¹⁵

		<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>
Bayrou's grades	By Royal	7%	33%	29%	16%	9%	6%
	By Sarkozy	6%	28%	30%	19%	9%	8%
Sarkozy's grades	By Royal	3%	10%	16%	15%	11%	45%
	By Bayrou	6%	22%	24%	17%	6%	25%
Royal's grades	By Bayrou	7%	26%	26%	20%	13%	9%
	By Sarkozy	3%	13%	22%	24%	18%	21%

Table 2.19 Distributions highest grades, three precincts of Orsay, April 22, 2007

Grades:	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>
Highest	52%	37%	9%	2%	0%	1%
Second highest	–	35%	41%	16%	5%	3%
Third highest	–	–	26%	40%	22%	13%

gave Royal their highest grade strongly preferred Bayrou to Sarkozy, whereas those who gave their highest grade to Bayrou evaluated Royal and Sarkozy about equally (see Table 2.18).

Face-to-face confrontations ignore how the electorate *evaluates* the respective candidates (just as the 2002 run-off ignored the respective evaluations of Chirac and Le Pen) except, of course, that one is evaluated higher than the other. Two thirds of the second highest grades are merely *Good* or worse (see Table 2.19). This is why being second in the rankings of voters has very different senses and aggregating them as does Borda is not meaningful.

First ranked candidates often elicit strong support and strong opposition. Second ranked candidates are often centrists. In consequence, a second ranked candidate is often favored in face-to-face confrontations, so is favored by Condorcet's method. Such centrist candidates are even more favored by Borda's method: when there are many marginal candidates of the right and the left, the second ranked candidates

¹⁵ A Tnes-Sofres poll of March 14–15, 2007 showed 72% of Royal voters (respectively, 75% of Sarkozy voters) giving their votes to Bayrou in a second round against Sarkozy (respectively, against Royal).

garner many Borda points because they are ahead of most of them. But this is not true with the majority judgment: the evaluations – the *grades* of the second ranked candidates – decide, not the place in the ranking.

The closeness of the actual results in Orsay’s 12th precinct to the national results (when Sarkozy takes the place of Royal) suggests that Sarkozy could have been first in the majority-ranking at the national level.

Common Language

The theoretical underpinnings of the majority judgment require that voters (or judges, when the problem is to rank competitors or alternatives) evaluate the candidates in a language of grades that is common to them all. Evaluations should be absolute, not relative. Therefore, the question to be confronted by a voter must not suggest “how do you compare the candidates,” but instead address “how do you evaluate each candidate.” The question posed and the language of grades offered in the ballot must make this distinction clear. Polls in the 2007 French presidential elections illustrate the point (see Table 2.20). The question on the left suggests an absolute evaluation, the question on the right a relative comparison. The results show the well known fact that “yes” or “no” answers can yield strikingly varying results as a function of the question posed.

What constitutes a “good” common language, how is one to test whether a language of grades or of measurement is “good,” and, indeed, why can one assume that a common language exists at all?

Common languages assuredly do exist because they have been routinely invented, learned through use, and commonly understood in a host of applications, including ranking figure skaters, gymnasts, divers, pianists, wines and students (these and other practical uses of common languages of measurement are investigated in Balinski and Laraki (2010)). In particular, the Chopin International Piano Competition has used a number scale since its establishment in 1927 (though the range of the numbers has changed over time). Schools and universities either give number grades or letter grades together with their numerical “equivalents.”

Table 2.20 Polling results, March 22, 2007 (Bva)

	Question: Would each of the following candidates be a good President of France?		Question: Do you personally wish each of the following candidates to win the presidential election?	
	Yes	No	Yes	No
Bayrou	60%	36%	33%	48%
Sarkozy	59%	38%	29%	56%
Royal	49%	48%	36%	49%
Le Pen	12%	84%		

The numbers, of course, are abstract and mean nothing until they are defined. The “natural” language of words are their definitions. Using numbers suggests that the mechanism for amalgamating the grades of many judges will be to take their sum or average (as does the Chopin competition since 1927), and may well induce judges or voters (or teachers and professors) to assign the grades strategically in view of their ultimate use. For this reason it is better to choose a “natural” language, although repeated use eventually converts numbers into words that have well-defined meanings (e.g., when a professional judge says a dive in an international competition is an “8.5,” all of his or her peers will know exactly what that means, whether they agree or not).

Finding a language of grades that is common to all the *voters* in a society is less easy since it must be understood the first time it is used. France mainly uses a 0–20 grading systems in its schools and universities, but it also uses the six descriptive words of the majority judgment ballots (with the exception of *to Reject*), words familiar to all French school children. A “good” language should contain a sufficient number of grades to enable voters to express themselves as fully as they wish, which argues in favor of a language with many grades. It should also be common to all voters – that is, be used and understood “in the same way” by all voters – which argues for a language with few grades. The choice that was made in this experiment appears to have been judicious for several reasons.

First, all of the grades were used a significant number of times (see Table 2.8).

Second, six grades were sufficient, for only 14% of all the voters used all six grades, suggesting that more grades would have been used by very few. About 73% used four or five grades, and the average was 4.5 grades per ballot (see Table 2.9).

Third, it is possible to test whether the six “words” used in this experiment constituted a “common” language or did not. The idea is to ask whether the voters used the language in the same way: Did subsets of the voters use each of the words on average about the same number of times, i.e., are the distributions of the grades used similar? Different approaches may be used to answer this question, but several, very simple direct tests show convincingly that the grades did constitute a common language in the experiment.¹⁶ One is to compare the use of the words in the ballots coming from the naturally defined subsets that are the voting precincts; another is to take random samples – or random disjoint samples – from among the 1,733 ballots. Table 2.21 shows that each of the three voting precincts – the 1st with 559 voters, the 6th with 601 voters, and the 12th with 573 voters – used the language in almost exactly the same way, which of course agreed with the use of the language by the entire population. It also suggests that similar results obtain when random subsets of 100 and when random disjoint subsets of 50 are chosen from the 1,733 ballots. The outcomes in the different precincts are different – and the outcomes on different samples are different – but the use of the language is practically the same.

¹⁶ An extensive investigation, Balinski and Laraki (2010), uses many of the standard statistical tests to confirm this finding.

Table 2.21 Average number of words per majority judgment ballot, 2007 Orsay experiment (σ is the standard deviation; 10 random samples of 100 and 10 disjoint random samples of 50 were taken)

	Three prcts.	1st prct.	6th prct.	12th prct.	Samples of 100		Disjoint samples of 50	
					Avg. (σ)	Range	Avg. (σ)	Range
<i>Excellent</i>	0.7	0.7	0.7	0.7	0.7 (0.07)	0.6/0.8	0.7 (0.12)	0.5/0.9
<i>Very good</i>	1.3	1.2	1.2	1.4	1.2 (0.13)	1.1/1.5	1.3 (0.16)	1.1/1.5
<i>Good</i>	1.5	1.5	1.4	1.6	1.5 (0.13)	1.4/1.7	1.5 (0.27)	0.9/1.8
<i>Acceptable</i>	1.7	1.7	1.7	1.8	1.8 (0.15)	1.7/2.1	1.7 (0.27)	2.1/2.6
<i>Poor</i>	2.3	2.3	2.3	2.2	2.3 (0.19)	2.1/2.7	2.3 (0.19)	2.1/2.6
<i>to Reject</i>	4.6	4.8	4.6	4.3	4.5 (0.29)	4.1/4.8	4.5 (0.41)	4.1/5.3

Table 2.22 Counts of usage of grades by ballot, 2007 Orsay experiment

	Prct.	Number of times Grades used in a ballot								
		0	1	2	3	4	5	6	7	8–12
<i>Excellent</i>	1st	47.0%	43.1%	7.7%	1.6%	0.2%	0.2%	0.0%	0.0%	0.2%
	6th	46.6%	41.8%	8.7%	2.0%	0.7%	0.0%	0.2%	0.0%	0.2%
	12th	51.1%	37.3%	7.9%	2.3%	0.9%	0.2%	0.0%	0.0%	0.3%
<i>Very good</i>	1st	30.2%	40.3%	19.7%	6.8%	1.1%	1.3%	0.5%	0.2%	0.0%
	6th	28.8%	37.9%	22.0%	7.2%	2.7%	0.8%	0.3%	0.3%	0.0%
	12th	26.0%	37.9%	20.4%	8.2%	4.4%	2.1%	0.7%	0.3%	0.0%
<i>Good</i>	1st	24.3%	35.1%	22.2%	11.4%	4.7%	1.4%	0.7%	0.2%	0.0%
	6th	26.3%	35.1%	20.5%	10.1%	5.3%	2.2%	0.3%	0.2%	0.0%
	12th	21.8%	30.4%	25.5%	12.0%	7.2%	2.3%	0.3%	0.3%	0.2%
<i>Acceptable</i>	1st	23.3%	29.3%	20.0%	16.8%	6.4%	3.6%	0.2%	0.0%	0.4%
	6th	22.6%	28.8%	24.1%	13.0%	6.5%	3.7%	0.3%	0.5%	0.5%
	12th	22.5%	23.0%	24.6%	17.1%	7.3%	3.8%	0.5%	0.9%	0.2%
<i>Poor</i>	1st	16.5%	20.0%	22.9%	15.9%	14.0%	5.5%	2.9%	1.4%	0.9%
	6th	16.3%	24.0%	19.5%	17.0%	9.5%	5.7%	5.8%	1.0%	1.3%
	12th	23.2%	20.8%	18.5%	15.2%	10.6%	6.1%	3.1%	1.4%	1.0%
<i>to Reject</i>	1st	3.0%	6.1%	10.7%	12.0%	16.3%	17.2%	10.4%	9.3%	15.0%
	6th	4.7%	4.7%	9.2%	17.0%	18.1%	14.5%	11.0%	7.3%	13.6%
	12th	7.0%	7.3%	14.5%	14.0%	14.5%	13.8%	7.3%	7.0%	14.7%

Table 2.22 simply gives the number of times each of the grades was used in each of the voting precincts. For example, the three percentages in bold type say that in the 1st precinct the grade *Very Good* was used twice in 19.7% of the ballots, in the 6th precinct it was used twice in 22.0% of the ballots, and in the 12th precinct it was used twice in 20.4% of the ballots. They are remarkably the same in all three precincts.

Fourth, the estimates of the second round results based on the majority judgment ballots in the three precincts together and in each of them singly were close to the observed outcomes as well, as shown in Table 2.23. They assumed: (1) when a voter gave a higher grade to one candidate than the other he or she would obtain 1 vote in the second round; and (2) when voters gave the same grades to both candidates

Table 2.23 Second round results, percentages of votes estimated from first round majority judgment ballots vs. actual outcomes, Orsay, April 22, 2007¹⁷

	Three precincts		1st precinct		6th precinct		12th precinct	
	Estimated	Outcome	Estimated	Outcome	Estimated	Outcome	Estimated	Outcome
Royal	52.3%	51.3%	48.2%	47.2%	54.4%	53.7%	54.3%	52.6%
Sarkozy	47.3%	48.7%	51.8%	52.8%	45.6%	46.3%	45.7%	47.4%

each would obtain $\frac{1}{2}$ vote in the second round. The closeness of the estimates to the observed outcomes suggests these assumptions were well founded, implying the language permitted the voters to correctly express their preferences and their indifferences.

Properties of the Majority Judgment

Given a common language, the majority judgment – the *majority-grade* and the *majority-ranking* – has been proven to be the *only* mechanism that is acceptable according to several different criteria (see Balinski and Laraki (2007, 2010) for precise definitions and results). Here, we only describe and illustrate the salient properties that are enjoyed by the majority judgment in the context of the experiment. *All* of the other mechanisms mentioned in this article violate several of these properties.

Ordinal. The common language is ordinal – no measure of intensity between grades is implied – so the mechanism used must be ordinal as well. The majority judgment is ordinal: the majority-ranking is independent of any parametrization of the language. Mechanisms based on sums or averages of points are not ordinal.

Respects the majority. The majority-grade (or median) is the unique mechanism, which guarantees that when a majority of the electorate gives a grade g to a candidate, that candidate’s majority-grade is g . Everyone of a majority can give a point score of p to a candidate, but that candidate’s average will certainly not (in general) be p .

Transitive. The majority-ranking is transitive. The Condorcet-paradox shows that the Condorcet criterion is not transitive. Identifying instances where it has occurred in practice is rare because of lack of information, but it has been observed Kurrild-Klitgaard (1999).

Satisfies IIA. The majority judgment satisfies independence of irrelevant alternatives. The grades are absolute not relative, so if some candidate drops out, the remaining candidates’ grades remain the same. None of the mechanisms whose

¹⁷ Royal’s scores are consistently though slightly overestimated. This probably reflects changes in opinions in the 2 weeks that separated the two rounds of voting (due, in particular, to the televised debate between the two candidates).

inputs are rank-orders satisfy IIA (including first-past-the-post, Borda's and its generalizations to scoring systems, and the single transferable vote).

Monotone. If every grade of a candidate is replaced by the same or a better grade, the candidate's place in the majority-ranking cannot be lower. If every grade of a candidate is replaced by a strictly better grade, the candidate's majority-grade must be raised. Monotonicity is not satisfied by the single transferable vote: if a winning candidate C is raised in the lists of some voters but otherwise the lists remain the same, C may no longer be the winner. Nor is it satisfied by the French first-past-the-post with run-off system: if in 2007 Sarkozy's first round vote had increased at the expense of Royal, Bayrou could have finished second, the run-off would have been between Sarkozy and Bayrou, and Bayrou would (might) have won.

Resists strategic manipulation. Take a candidate, say Ségolène Royal, whose majority-gauge is

$$(39.4\%, \textit{Good}, 41.5\%).$$

Only a voter who can change Royal's majority-grade or majority-gauge by changing the grades they give her can have any strategic impact. Who are those voters and what are their motivations to change?

Suppose a voter believes a candidate merits a grade of g and the further the majority-grade is from g the less she or he likes it (a reasonable motivation¹⁸). Then the voter's optimal voting strategy is to give the candidate the grade g : the majority judgment is *strategy-proof-in-grading*.¹⁹ More is true. The majority judgment is *group strategy-proof-in-grading*. If a group of voters (e.g., belonging to a same political party) believed Royal merited better than *Good* and all raised the grade they gave her, her majority-gauge would remain the same; if all lowered the grades they gave her, her majority-gauge would decrease and perhaps her majority-grade as well (not their intent). If they believed Royal merited worse than *Good* and all lowered the grades they gave her, her majority-gauge would remain the same; if all raised the grades they gave her, her majority-gauge would increase and perhaps her majority-grade as well (not their intent). If, finally, they believed she merited a *Good*, and all either raised or lowered the grades they gave her, her majority-gauge and perhaps her majority-grade as well would either increase or decrease (not their intent).

These "strategy-proof-in-grading" properties are certainly not true of any mechanism based on sums or averages of points, nor of Borda's and its derivatives. If any voter either raises or lowers the points given a candidate – or raises or lowers a candidate's place in the voter's list –, that candidate's sum or average increases or decreases (a tiny bit) – and the candidate may be raised or lowered in the final ranking. And if many voters either raise or lower the points given a candidate – or raise or lower a candidate's place in their lists – that candidate's sum or average increases or decreases a lot – and the candidate is very likely to be raised or lowered in the final ranking.

¹⁸ The voter's preferences in grading are said to be "single-peaked."

¹⁹ In an entirely different context, a related technical result is proved in [Moulin \(1980\)](#).

The strategy of a voter may, however, focus on the final ranking of the candidates rather than on their final grades. It is impossible to completely eliminate the possibility of strategic manipulation if a voter is prepared for a candidate’s final grade to be either above or below what she or he thinks the candidate merits: there is no mechanism that is “strategy-proof-in-ranking.”²⁰ But the majority judgment best resists such manipulation. Take the example of Bayrou with a *Good*⁺ and Royal with a *Good*⁻, their respective majority-gauges being,

Bayrou: (44.3%, *Good*, 30.6%) Royal: (39.4%, *Good*, 41.5%).

How could a voter who wished Royal to be ranked higher than Bayrou manipulate? By changing the grades assigned to try to lower Bayrou’s majority-gauge and to raise Royal’s majority-gauge. But the majority judgment is *partially strategy-proof-in-ranking*: those voters who can lower Bayrou’s majority-gauge cannot raise Royal’s, those who can raise Royal’s majority-gauge cannot lower Bayrou’s. For suppose such a voter can lower Bayrou’s. Then he or she must have given Bayrou a *Good* or better: but having preferred Royal to Bayrou the voter gave a grade of better than *Good* to Royal, so he or she cannot raise Royal’s majority-gauge. Symmetrically, a voter who can raise Royal’s majority-gauge must have given to her a *Good* or worse, so to Bayrou a worse than *Good*, so the voter cannot lower Bayrou’s majority-gauge. Compared with mechanisms that sum or average, the majority judgment cuts in half the possibility of manipulation, however bizarre a voter’s motivations (or whatever may be a voter’s utility function).

As a matter of fact, 32.9% of the voters gave a higher grade to Royal than to Bayrou. Their types are summarized in Table 2.24. The 9.2% of voters of type A – who gave an *Excellent* or *Very Good* to Royal and an *Acceptable* or worse to Bayrou – can do nothing to raise Royal’s majority-gauge or to lower Bayrou’s. On the other hand, if all of the types C, D, and F lowered Bayrou’s grade to *Acceptable* (it serves no purpose to lower them further) then his majority-gauge would go below Royal’s. But that is unlikely, because most voters prefer voting in accord with their convictions (especially when they are asked to give absolute evaluations of candidates rather than relative comparisons).

Table 2.24 Strategic voting: could Royal have won in Orsay’s three precincts?

Type	Percentage ballots	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>	Strategic change
A	9.2%	R	R		B	B	B	Cannot
B	2.8%		←	←	←-R	B	B	1/4
C	6.3%	R	B→	→	→			1/3
D	6.9%		R	B→	→			1/3
E	2.4%		←	←-R	B			1/3
F	3.2%	R		B→	→			1/2
G	2.1%		←	←-R		B	B	1/2

(Type A voters, for example, gave an *Excellent* or *Very Good* to Royal, an *Acceptable* or worse to Bayrou. The arrows indicate increases and decreases in grades; the bar | that no purpose is served by going further)

²⁰ In the context of the traditional model, this is the Gibbard-Satterthwaite theorem.

A more reasonable scenario would be: one-quarter of the type B voters, who gave a mere *Acceptable* to Royal, raise her grade up to *Very Good* (more is of no use); one-third of the types C, D, and E, who see only a slight difference between Royal and Bayrou, change (but more than indicated in Table 2.23 is of no use); and one-half of the types F and G, who see a more substantial difference between the two candidates, change (again, more than indicated in Table 2.24 is of no use). This scenario implies that 38% of the Royal voters who are able to have an impact by giving grades strategically do so (by way of comparison, a poll on election day showed 31% of Royal supporters voted strategically). The result is to change the candidates' majority-gauges to

Bayrou: (42.2%, *Good*, 36.6%) Royal: (42.0%, *Good*, 40.8%),

so both have the majority-grade* *Good*⁺, but Bayrou remains ahead in the majority-ranking. This shows how the majority judgment resists manipulation; it also shows that the amount of useful exaggeration is in any case limited. In contrast, mechanisms based on summing (including Borda's) or averaging points share *none* of the safeguards against manipulation discussed above.

Voters' utilities. In theory the motivations of voters and their satisfaction are modelled by their "utilities." Given the decision mechanism and whatever information that is available, a rational voter chooses a message that maximizes his or her utility. But the utility function of a voter is at once complex and completely unknown. It is plausible to imagine that a voter would like a candidate's final grade to be as close as possible to the grade he or she believes the candidate merits, etc. but it ain't necessarily so. In the "plausible" case, the candidate's utility function is absolute, otherwise it becomes relative, i.e., what counts are the candidates' final rankings not their final grades. It is "strategy-proof" for large classes of absolute utility functions. When the utilities of voters depend solely on the winner – a hypothesis often made – no mechanism is "strategy-proof." The majority judgment is not only partially-strategy-proof when utilities are relative but the analysis of the "game" of voting shows its behavior dominates that of other methods at Nash equilibria [Balinski and Laraki \(2010\)](#).

Grades for candidates. Voters who participated in the experiment were delighted with the idea that the majority judgment assigns grades to candidates. The majority-grade is a signal that expresses the electorate's appreciation of a candidate. Chirac's "triumph" with over 82% of the vote in 2002 would have been very different with the majority judgment. Chirac would have won, but his grade would have been modest, Le Pen's a *to Reject*. Voynet's grade in the 2007 experiment clearly expresses the electorate's concern with environmental problems, whereas the official vote completely failed to do so. Le Pen's grade in the 2007 experiment shows the electorate's strong refusal of his ideas, whereas according to the official vote he was one of the major candidates. Even when there is exactly one candidate – which often occurs – the majority judgment may be used to disclose the electorate's evaluation of that candidate.

The majority judgment is *grade-consistent* in the following sense: if there are two separate parts of an electorate and the majority-grade of a candidate in each is a g , then the majority-grade of the candidate is a g in the whole electorate as well. This idea is suggested by the following concept invented Young (1975) to characterize the scoring methods (that assign a fixed number of points to each place in a voter's ranking, such as Borda's, or first-past-the-post). A method is *winner-consistent* if the method used in each of two separate parts of an electorate makes candidate C the winner, then the method used in the whole electorate must make C the winner as well. The same idea may be used to characterize the point-summing methods.²¹ But scoring (and point-summing) methods are all highly manipulable. The majority judgment is not winner-consistent, and that is a good property: winning is a relative concept that puts aside absolute evaluations and so opens the door to all the inconsistencies (the different intensities of the two parts of the electorate should count).

Every vote counts. A husband and wife with opposite opinions sometimes skip voting since their votes "cancel each other out." There are many situations where one or a group of voters' ballots cancel each other out if a mechanism based on summing or averaging points or a scoring method is used. For example, one voter gives the same number of points to opposing candidates; or several voters give points to opposing candidates that sum to the same total; or the inputs are rank-orders, and a group of voters places every candidate in every slot of their rankings the same number of times. But this is not true of the majority judgment: every grade contributes to the determination of the majority-ranking (even when a voter gives the same grade to every candidate). Moreover, whatever may be a voter's grade or whatever may be the grades of a group of voters, there exists a situation where the voter or the group of voters is decisive, that is, counting the voter's or the group of voter's ballot(s) gives one outcome, not counting it or them gives another outcome.²²

Freedom of expression. Some critics have averred that a voter should be forced to "make up his or her mind" by expressing a clear-cut preference between any two candidates. The first-past-the-post system has this property (unless the voter abstains or hands in a blank ballot). Any mechanism in which the input is a rank-order of the candidates forbids the voter from expressing any intensity of preference: the second ranked candidate is only that, whatever the voter's evaluation. But why limit any voter's freedom of expression? Should not someone who sees no discernable difference between two or more candidates be allowed to record this? Should not a voter who believes his or her second ranked candidate is merely acceptable or worse be allowed to express this? The majority judgment gives voters complete freedom of expression (within the bounds of the language).

²¹ See Balinski and Laraki (2010). In *point-summing methods*, voters assign points from an interval to candidates and they are ranked according to the sum of their points.

²² See Balinski and Laraki (2007), or Balinski and Laraki (2010) for proofs.

An Application to American Primaries

American presidential primaries leap to mind as an immediately realistic application: not only would it be relatively easy to implement, but it would permit a much more complete expression of the voters' opinions. With as many as five to ten candidates, the first-past-the-post system drastically curtails expressions of the voters' opinions. Moreover, a "big winner" often garners as little as 25% of the total vote, hardly a mandate to be singled out as the principal candidate. A very small scale experiment was conducted on the web in late September, early October 2008. Members of INFORMS²³ were asked:

"Suppose that instead of primary elections in states to designate candidates, then national elections to choose one among them, the system was one national election in which all eligible candidates are presented at once. Or, suppose you are in a state holding a primary where you are asked to evaluate the candidates of all parties (at least one state primary votes on all candidates at once). A possible slate of candidates for President of the United States could be: [followed the names of the eight candidates given in Table 2.25 below together with their affiliations.]"

They were then instructed: "You will be asked to evaluate each candidate in a language of grades. A candidate's majority-grade is the middlemost of her/his grades (or the median grade). The candidates are ranked according to their majority-grades. The theory provides a natural tie-breaking rule." The ballot was the same as in Table 2.7.

Then they were invited to vote. The experiment was certainly not representative of the US electorate (nor was it meant to be). The results are nevertheless of interest.

In this case, the winner stands out as the only candidate with a *Very Good*, and the collective opinion of those who voted is quite clear.

Table 2.25 INFORMS web experiment, mid-September to mid-October, 2008

	p better than the majority-grade	α the majority-grade	q worse than the majority-grade	
1st	Barack H. Obama	35.9%	<i>Very Good+</i>	32.0%
2nd	Hillary R. Clinton	45.0%	<i>Good+</i>	33.6%
3rd	Collin L. Powell	32.8%	<i>Good-</i>	41.2%
4th	Michael R. Bloomberg	42.0%	<i>Acceptable+</i>	31.3%
5th	John R. Edward	36.6%	<i>Acceptable+</i>	32.8%
6th	John S. McCain	33.4%	<i>Acceptable-</i>	44.2%
7th	W. Mitt Romney	46.6%	<i>Poor+</i>	22.9%
8th	Michael D. Huckabee	33.5%	<i>Poor-</i>	47.3%

²³ The Institute for Operations Research and the Management Sciences, a scientific society. A large majority of the members are US citizens, but many members are citizens of other nations.

Other Voting Mechanisms

Approval Voting

On April 21, in the first round of the French presidential election of 2002 – well before we had any inkling of even working on the general problem of electing and ranking – one of us initiated an approval voting experiment,²⁴ conducted under the same general conditions as the experiment of 2007, in five of Orsay’s twelve precincts²⁵ and the one precinct of Gy-les-Nonains, a small country town in Loiret. Of the 3,346 voters, 2,597 who voted officially (or 78%) participated in the experiment, 2,587 ballots were valid.

Officially, voters were confronted with having to give their one vote to one of sixteen candidates in the official vote. The ballot of the experiment consisted of a list of the candidates together with instructions saying:

“Rules of approval voting. The elector votes by placing crosses [in boxes corresponding to candidates]. He may place crosses for as many candidates as he wishes, but not more than one per candidate. The winner is the candidate with the most crosses.”

The instructions are deliberately neutral: no question is asked, no language is suggested, the explanation is purely relative.²⁶

On average the voters cast 3.15 crosses per ballot (the distribution is given in Table 2.26). The actual system offered voters 17 possible messages, approval voting offered more than 65 thousand.²⁷ Of the 2,587 valid ballots, 813 were different. Voters expressed their relief at having the possibility of casting crosses for as many candidates as they wished.

This experiment offered a rare opportunity to show that the expressed preferences of voters are far from being “single-peaked” with regard to a left/right political

Table 2.26 Number of ballots with k crosses, $k = 0, 1, \dots, 16$, approval voting experiment, five voting precincts of Orsay and Gy-les-Nonains, first round, April 21, 2002

Crosses	0	1	2	3	4	5	6	7	8	9	10/16
Ballots	36	287	569	783	492	258	94	40	16	6	6
Percentage Ballots	1.4	11.1	22.0	30.3	19.0	10.0	3.6	1.5	0.6	0.2	0.2

²⁴ The idea to experiment approval voting on a large scale in parallel with a presidential election actually goes back to 1995, when Balinski and Laurant Mann prepared a basic plan, but were too late to realize it. For a detailed account of the 2002 experiment, see Balinski et al. (2003).

²⁵ 1st, 5th, 6th, 7th, and 12th.

²⁶ This is standard practice. The 2007 ballot for the election of the officers of the Society for Social Choice and Welfare gives similarly neutral instructions: “You can vote for any number of candidates by ticking the appropriate boxes.”

²⁷ With 16 candidates there are $2^{16} = 65,536$ possible messages. With the majority judgment, there are 6^{16} or some 2.8 trillion possible messages.

Table 2.27 Approval voting results, five precincts of Orsay and Gy-les-Nonains, first round, April 21, 2002

	Percentage ballots with crosses	Percentage of all crosses	Official vote first round
Jospin	40.5%	12.9%	19.5%
Chirac	36.5%	11.6%	18.9%
Bayrou	33.5%	10.7%	9.9%
Chevènement	30.3%	9.6%	8.1%
Mamère	28.9%	9.2%	7.9%
Madelin	21.3%	6.8%	5.0%
Taubira	18.9%	6.0%	3.2%
Lepage	17.9%	5.7%	2.8%
Besancenot	17.6%	5.6%	3.1%
Laguiller	15.4%	4.9%	3.7%
Le Pen	14.6%	4.6%	10.0%
Hue	11.5%	3.6%	2.7%
Saint-Josse	7.8%	2.5%	1.7%
Boutin	7.8%	2.5%	1.3%
Mégret	7.7%	2.4%	1.3%
Gluckstein	4.3%	1.4%	0.8%
Total	314.6%	100%	100%

spectrum, i.e., there exists no alignment of the candidates by which a voter who most prefers any candidate C increasingly dislikes other candidates the further they are from C in the alignment. For if there were such an alignment, the total number of possible sincere messages – messages that are consistent with the voters’ preferences – could be at most 137.²⁸

The outcomes in the six voting precincts with approval voting and with the official voting are given in Table 2.27. The one significant difference between them is that Le Pen is third in the official vote, eleventh in the approval vote (otherwise, Laguiller moves up three places to behind Madelin and Bescancenot moves up one place to behind Taubira). The four most important candidates – Chirac, Le Pen, Jospin and Bayrou – all lost relative support in approval voting, whereas every one of the minor candidates gained relative support. If Orsay and Gy-les-Nonains were at all representative of France, the results of the experiment showed that the indecision of the country – the lack of enthusiasm for any one candidate or party – was even more extreme than the usual method of voting indicated. No candidate received anywhere near a majority of the ballots (no “legitimacy” is added to the first-placed candidate, contrary to the claims made for approval voting [Brams and Fishburn 1983](#)). Whereas we had entered into this experiment persuaded by the

²⁸ The crosses would have to be consecutive with regard to the alignment: there are 16 such messages with one cross, 15 with two, 14 with three, . . . , 1 with sixteen and 1 with none.

Table 2.28 Percentages of both crosses or both no crosses, five precincts of Orsay and Gy-les-Nonains, first round, April 21, 2002

	Jospin	Chirac	Bayrou	Mamère	Chévènement	Le Pen
Jospin	–	34%	44%	75%	56%	48%
Chirac	34%	–	66%	51%	54%	64%
Bayrou	44%	66%	–	55%	60%	61%
Mamère	75%	51%	55%	–	52%	61%
Chévènement	56%	54%	60%	52%	–	54%
Le Pen	48%	64%	61%	61%	54%	–

usual “common sense” arguments that approval voting was a good idea, the results left us with a distinct feeling that it is not a reasonable mechanism. We did not know exactly why. Now we believe we do.²⁹

The result of the second round on May 5, 2002 in the five precincts of Orsay and the one of Gy-les-Nonains was

Jacques Chirac: 89.3% Jean-Maire Le Pen: 10.7%

The electorate’s will expressed by approval votes, is not sufficient to “predict” this outcome (nor therefore the result of any other face-to-face confrontation). Crosses and no crosses do not communicate enough information. The problem is the frequency with which voters assigned crosses to two candidates or no crosses to two candidates (see Table 2.28).³⁰

Three estimates of a face-to-face vote between Chirac and Le Pen were calculated. In each, if a candidate has a cross and the other does not, the first is given 1 vote, the second is given none. The first estimate gives 1/2 vote to each candidate if both have crosses or neither do: giving crosses and giving no crosses to both candidates means the voter is indifferent between them. This yields the estimate

Jacques Chirac: 61% Jean-Maire Le Pen: 39%

The second estimate gives 1/2 vote to each if both have crosses, otherwise 0: giving crosses to both candidates means indifference between them; zeros say nothing concerning the two. This yields the estimate

Jacques Chirac: 79% Jean-Maire Le Pen: 21%

The last estimate gives no vote to each if both have crosses or both do not: no indifference is deducible. This yields the estimate

Jacques Chirac: 80% Jean-Maire Le Pen: 20%

None of these estimates comes close to the actual result. Several crosses on a voter’s approval ballot – and even more so, several no crosses – do not mean the voter is indifferent among the corresponding candidates. This shows that the approval voting

²⁹ For a different analysis of this experiment, see [Laslier and Van Der Straeten \(2004\)](#).

³⁰ The analyses are confined to the more important candidates.

mechanism does not permit the voters to correctly express their preferences or their indifferences. Crosses have different senses: it is not meaningful to aggregate them.

In this experiment, approval voting was presented and appears to be a mechanism that simply adds crosses: implicitly the vote is relative, it asks voters to make pair-by-pair comparisons. As a consequence, it invites strategic voting and is for that reason subject to Arrow's paradox. For if some candidates drop out, voters may change their assignments of crosses. For example, a voter's favorite candidate drops out so the voter gives a cross to a candidate to whom he or she had not given a cross before. This may change the order-of-finish among the remaining candidates. Circumstantial evidence for such behavior is given below.

On the other hand, approval voting may be presented and viewed as a mechanism that is a special case of the majority judgment when the common language of grades consists of two words. When there are exactly two grades mathematically, the approval voting ranking is the majority-ranking. But in this model, in this perception of the process, the vote is absolute, it asks voters to evaluate the candidates. In this case, the voter must be posed a question and be offered a common language of words that make it clear the grades have absolute meanings. This has not been the case in any of the theoretical discussions or applications of approval voting, where the question posed, the addition of crosses and the analyses of results all suggest the point of view that what is important is comparisons. Had anyone thought about crosses and no crosses as absolute evaluations, they would (or should) have immediately pointed out that approval voting is a mechanism that excludes Arrow's paradox, so satisfies IIA.

The contrast between absolute evaluations and relative comparisons may be seen in the very different questions posed in two 2007 polls (see above, Table 2.20): "Would each of the following candidates be a good President of France?" and "Do you personally wish each of the following candidates to win the presidential election?" The first poses an absolute question, the second a relative one. The first invites an evaluation, the second suggests a contrast. The answers are, in consequence, completely different. Significantly, the first question elicited a "yes" for the four major candidates considerably more in keeping with their *Good* or better grades in the 2007 majority judgment experience than did the second question.

If a cross is interpreted as an "approve" – so implicitly no cross is interpreted as a "disapprove" – then the winning candidate in the 2002 experiment, L. Jospin, is elected with a majority-grade of "disapprove," for that is the will of a majority of 59.5% of the electorate. It is unacceptable to elect a candidate of whom a majority disapproves. More grades are needed.

The crosses, it turns out, were used in the same way by the voters: there were on average 3.15 crosses per ballot over all six precincts, and about the same number in each. This does not, however, imply that the two "words" constituted a common language of absolute grades because usage includes strategic behavior, and perhaps what was in common was the strategic behavior. The point is this: if voters assign crosses because of absolute evaluations of the merits of candidates, then the language is common; otherwise, the language is not common. If the behavior is absolute, Arrow's paradox cannot arise; if it is not absolute, the paradox can arise since

the crosses assigned depend on the set of candidates. Another experiment that was conducted in 2007 in parallel with the first round of the French presidential election provides data that allows a circumstantial analysis of this issue.

The Baujard–Igersheim experiment [Baujard and Igersheim \(2007\)](#) tested two mechanisms at once³¹ – approval voting (and a point-summing mechanism with points 0, 1 or 2, discussed below) – in six different voting precincts³² with 2,836 participants (62% of those who voted officially). The approval voting ballot stated:

Instructions: You indicate, among the 12 candidates, those that you support. To do so encircle the name of that or those candidates whom you support. You may encircle one name, several names or no name, etc. The candidate elected with [this] method is the one who receives the highest number of supports.

On average, the voters cast 2.33 circles per ballot. Moreover, each of the six precincts did approximately the same, so the circles were used in about the same way by all voters. The outcomes over the six precincts are given in [Table 2.29](#). Again, no candidate had circles in a majority of the ballots; again, the (four) major candidates all lost relative support in approval voting whereas every one of the others gained; again, as a language, the mechanism failed because the winner’s grade – expressed by the majority – was “not support.”

The analysis of the absolute *vs.* relative vote issue is based on the considerable information found in the majority judgment ballots. Since the language is common to random samples of 50 or 100 voters from the three precincts in Orsay, it is

Table 2.29 Approval voting results, Illkirch/Louvigny/Cigné, April 22, 2007
[Baujard and Igersheim \(2007\)](#)

	Percentage ballots with circles	Percentage of all circles	Official vote first round
Bayrou	49.7%	21.4%	23.0%
Sarkozy	45.2%	19.4%	34.1%
Royal	43.7%	18.8%	23.6%
Besancenot	23.7%	10.2%	4.1%
Voynet	16.9%	7.3%	2.1%
Le Pen	11.6%	5.0%	7.6%
Bové	11.5%	4.9%	1.1%
Laguiller	9.3%	4.0%	1.0%
Villiers	9.0%	3.9%	1.7%
Buffet	7.4%	3.2%	0.8%
Nihous	3.4%	1.5%	0.6%
Schivardi	1.4%	0.6%	0.3%

³¹ One ballot contained both. This permits analyses of potential interest. On the other hand, the participants expressed themselves twice simultaneously, which may have induced interdependencies.

³² Three precincts in Illkirch (Alsace), two in Louvigny (Basse-Normandie), and one in Cigné (Mayenne).

Table 2.30 Average number of highest, second highest, and third highest grades, three precincts of Orsay, April 22, 2007

Grades:	Three precincts	1st precincts	6th precincts	12th precincts
Average number highest	1.64	1.51	1.62	1.80
Average number second highest	2.19	2.08	2.16	2.34
Average number third highest	2.76	2.73	2.78	2.76

reasonable to hypothesize that the distribution of grades is common to the voters anywhere in France (*nota bene*: the language is common, not the evaluations of the candidates). In the approval voting experiment, there were 2.33 circles per ballot. If voting behavior was based on an absolute scale only, then voters would cast circles either for the candidates deemed *Excellent*, or those deemed *Very Good* or better, or *Good* or better, etc. But (see Table 2.8) there are on average 0.69 *Excellent*'s, 1.94 *Very Good*'s or better, and 3.44 *Good*'s or better: none of these agrees with 2.33, suggesting that the behavior is not purely absolute.

Each majority judgment ballot assigns a grade to every candidate. The highest grade is given to one or more candidates; the second highest to one or more candidates; and so on down the list. Their averages may be computed (see Table 2.30): they are common to all three precincts as well. If voting behavior was based on a relative scale – assuming these averages are common to all of France – then 2.33 should be about equal to 1.64, or 3.83, or more. It is not, suggesting that the behavior is not purely relative.

Behavior in the 2007 approval voting experiment is better explained as a mixture of absolute and relative behavior:

- A voter casts circles for every candidate deemed above a *Good*.
- If the the voter deems no candidate above a *Good*, he or she casts circles for every candidate receiving his or her highest grade.

This behavior implies an average of 2.26 circles per approval ballot in the three Orsay precincts, an average of 2.09 in the 1st, of 2.27 in the 6th, and of 2.43 in the 12th. This is in substantial agreement with the 2.33 observed in the 2007 approval voting experiment.³³

Another observation reinforces the idea that voters express relative opinions in approval voting. The 2.33 on average approvals of 12 candidates in the 2007 Baujard–Igersheim experiment is an approval rate of 19.4%. The 3.15 on average approvals of 16 candidates in the 2002 Orsay experiment is an approval rate of 19.7%. This is incredible stability. It cannot be that a fifth of the candidates are always *Good* or above independent of who the candidates are (see, e.g., Table 2.31).

³³ Applying this behavior to the majority judgment ballots of the Orsay experiment to simulate an approval vote gives the following percentages of ballots with circles: Bayrou 51.1%, Royal 44.8%, Sarkozy 44.1%, Besancenot 16.8%, Voynet 14.5%, Buffet 11.6%, Villiers 9.9%, Bové 9.0%, Laguiller 9.0%, Le Pen 8.7%, Nihous 3.2%, and Schivardi 2.6%.

Table 2.31 Average number of grades per ballot: all and four candidates (Bayrou, Le Pen, Royal, and Sarkozy, normalized to sum to 12)

	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Acceptable</i>	<i>Poor</i>	<i>to Reject</i>	Sum
Avg/ballot all	0.69	1.25	1.50	1.74	2.27	4.55	12
Avg/ballot four	1.57	2.34	1.94	1.49	0.99	3.68	12

Behavior that sees voters approving of some 20% of the candidates suggests they are making relative evaluations just as they are asked to do, not absolute evaluations.

We conclude that the approval voting experiments exhibited behavior that was not purely absolute. There are two implications: first, Arrow's paradox cannot be excluded; second, this realization of approval voting is not an instance of the majority judgment with two grades.

Voting by Points and Summing

The well-nigh universally used mechanism for combining many number grades into one – in skating, diving, gymnastics, piano, wine, and other competitions – is to add them or to find their average. Recently, bloggers and others in the U.S.A. and France (and surely other countries) have suggested the same idea for voting (though the scales have varied). Some have suggested that an “easier” way to realize the majority judgment would be to assign a 5 to *Excellent*, a 4 to *Very Good*, down to a 0 to *to Reject*, and then simply add the numbers. Why use the numbers 5 down to 0 instead of (say) 10, 7, 6, 3, 1, and –2 is not explained. In any case, adding or averaging numbers of some arbitrary scale is a very misguided idea.

How to construct a scale of measurement is a science in and of itself. “Measurement theory” classifies scales according to their types (see, e.g., Krantz et al. 1971). “Nominal measures” use scales that only assign categories (e.g., a postal or telephone code): the only meaningful comparisons are “equal” or “not equal.” “Ordinal measures” use scales that only assign an order (e.g., the *A, B, C, D, E, F* school grades, the six word language of the Orsay experiment): the only meaningful comparisons are “equal,” “greater than,” and “less than.” “Interval measures” use number scales that assign an order but where also equal intervals have equal significance (e.g., Celsius and Fahrenheit temperatures): the meaningful comparisons are those of ordinal measurement, but it also makes sense to add, to subtract, and to find averages. Finally, “ratio measures” use number scales that are interval measures but where also zero has an absolute meaning (e.g., length, price, Kelvin temperatures): the meaningful comparisons are those of interval measures, but it also makes sense to multiply and divide.

Numerical languages used in practice – for evaluating students, skaters, earthquake damages, wines, divers, etc. – define what is meant by the numbers. Denmark's new seven-grade number language adopted for the academic year

2006–2007 (to conform with the new European Credit Transfer Accumulation System’s ECTS grading scale³⁴) is a good example: 12, 10, 7, 4, 2, 0, or –3. For sums and averages to make any sense at all, this scale must be an interval measure. The language of grades is described as follows:

- 12 (A) – *outstanding*, no or few unconsiderable flaws, 10% of passing students,
- 10 (B) – *excellent*, few considerable flaws, 25% of passing students
- 7 (C) – *good*, numerous flaws, 30% of passing students,
- 4 (D) – *fair*, numerous considerable flaws, 25% of passing students,
- 2 (E) – *adequate*, the minimum acceptable, 10% of passing students,
- 0 (Fx) – *inadequate*,
- –3 (F) – *entirely inadequate*.

To be an interval measure, the numbers must be related to the percentages of passing students. Imagine that all the real numbers from 2 (“the minimum acceptable”) up to 12 are the passing grades (they could be points obtained in an examination).³⁵ What grade should be assigned to a 5.7? That grade whose number (2, 4, 7, 10 or 12) is closest to 5.7, namely, *good*. Any number from the interval [5.5, 8.5] should be mapped into a *good*. By the same token any grade from the interval [2, 3] is mapped into an *adequate*, from [3, 5.5] into a *fair*, from [8.5, 11] into an *excellent*, and from [11, 12] into an *outstanding*. The five numbers (2, 4, 7, 10, 12) were chosen so that the intervals occupy, respectively, the percentages of the whole equal to the percentages of passing grades specified in the definition: [2, 3] occupies 10% of the interval from 2 to 12, [3, 5.5] occupies 25%, [5.5, 8.5] occupies 30%, [8.5, 11] occupies 25%, and [11, 12] occupies 10%.

But, is it reasonable to use numerical scales in voting? The answer is a resounding no, for several reasons.

First, the numbers mean nothing unless they are defined: proposals to use weights give them no definition. Their only real “meaning” is found in their strategic use. This induces comparisons, which immediately leads to Arrow’s paradox. In the traditional model, Arrow’s paradox arises when a candidate drops out because that may change the order of finish among the others. Here, it may arise when a candidate drops out because the strategies of voters may change, provoking a change in the order of finish among the others. Suppose a 0, 1, 2 scale is used, a voter believes several candidates are decent and the rest bad, gives a 2 to one “preferred” decent candidate, 1’s to the others, 0’s to the bad candidates. If the candidate with the 2 drops out, the voter may give a 2 to another “decent” candidate. Circumstantial evidence for such behavior is found in the Baujard-Igersheim 0, 1, 2 experiment Baujard and Igersheim (2007).

³⁴ The previous Danish number scale had ten integers: 0 through 13 *without* 1, 2, 4, and 12. The information concerning the Danish grading systems was found in <http://en.wikipedia.org/wiki/GPA>, December 5, 2007.

³⁵ This analysis results from a theoretical argument developed in Balinski and Laraki (2010).

The other ballot of that experiment stated:

Instructions. You give a grade to each of the 12 candidates: either 0, or 1, or 2 (2 the best grade, 0 the worst). To do so, place a cross in the corresponding box etc. The candidate elected with [this] method is the one who receives the highest number of points.

The instructions are neutral: nothing is said concerning the meaning of 0, 1, or 2. The numbers induce relative, so strategic, behavior. Other numbers could have been given. For example, -1 , 0 , and $+1$: mathematically there is strictly no difference, but were these numbers used the behavior of the voters would almost surely have been different.

On average, a ballot contained 1.68 “2’s,” 2.69 “1’s,” and 7.64 “0’s.” Behavior throughout the six precincts was very similar, so the “0’s,” “1’s,” and “2’s” were used in about the same way. However, the evidence suggests that voters used the numbers in a relative sense not an absolute sense. On average the “2’s” were used 1.68 times per ballot. If voters used the “2’s” as an absolute indication of merit, then its use should correspond to an evaluation of either *Excellent*, or at least *Very Good*, or at least *Good*, etc. But there are on average 0.69 *Excellent*’s, 1.94 at least *Very Good*’s, still more at least *Good*’s: none agrees with 1.68, so the behavior seems not to be purely absolute. On the other hand, 1.68 is in substantial agreement with the average number of highest grades regularly given in the Orsay experiment, 1.64 (see Table 2.30), suggesting that the “2’s” are purely relative.

Second, when numbers are used, they may well not be used in the same way at all: when a 0–100 scale is used, some voters may view 80 to be an excellent grade, others may see it as a merely middling grade.

Third, even if the numbers do provide a common language, they will almost certainly not be a proper interval measure, for that depends on who the candidates are and how the voters give their grades. For example, the 0–20 scale used in France is a common language, but an 18, 19, or 20 is unheard of in philosophy or literature, so the scale is not an interval measure. Once the distribution of the grades is known – after many elections (or many examinations) – it is possible to determine whether the scale is an interval measure and, if not, to correct it (as did the Danes). But then it is too late, since the weights must be announced ahead of time. Candidates and elections are much rarer than students and examinations, so it is not possible to “learn” and determine norms as the Danes did.

Fourth, even if it turned out that the scale did approximate an interval measure, the procedure *depends on irrelevant alternatives*, it is subject to Arrow’s paradox: for if one or several candidates drop out, the distribution of the remaining grades will almost certainly be different, so the scale is no longer an interval measure. The weights would then have to be changed to obtain a scale that makes it an interval measure, which could change the rank-order among the remaining candidates. When, for example, only the four important candidates are present – Bayrou, Le Pen, Royal, and Sarkozy – the distribution of the grades (normalized to sum to 12) is entirely different (as may be seen in Table 2.31). (This change is unimportant to the majority judgment because it is a purely ordinal method where no adding or averaging is done.)

Finally, there may well be situations where the numbers are at once a common language and an interval measure: possible examples are those used in evaluating wines, divers, and figure skaters, where the judges are professionals who have learned the meanings of the numbers and scales. But in this case, as in all cases when numbers are used, adding (or averaging) is a bad idea because among all possible mechanisms for amalgamating the numbers it is the most manipulable, so the most open to exaggeration and outright cheating.

A Statistical Comparison of Methods

The traditional mechanisms are Condorcet’s, Borda’s, and their derivatives and combinations. They have never been used in elections.³⁶ The mechanisms used in the USA, the UK, and France are first- and two-past-the-post. Approval voting is a relative new comer. None offers the voters the freedom of expression allowed by the majority judgment, none asks or yields the electorate’s evaluations of the candidates.

The database of the ballots of the 2007 Orsay experiment permits a statistical comparison of the behavior of methods by deducing the votes between pairs of candidates as follows: when their grades differ, a vote is given the candidate with the higher grade; when their grades are the same, each is given 1/2 vote. The experiments 1,733 ballots, the *representative base* refers to 501 ballots that are “representative” of the votes cast in the first round in all of France [considerably more extensive analyses have been made Balinski and Laraki (2010)]. The 501 ballots were drawn randomly from the database of the 1,733 valid ballots. Assuming that when k candidates receive the highest grade on a ballot each is accorded $1/k$ votes, Table 2.32 shows how they compare with the national vote.

The following methods are compared:

- First-past-the-post,
- Two-past-the-post,

Table 2.32 National first-round vote and estimates based on the representative base

	Sarkozy	Royal	Bayrou	Le Pen	Besancenot	Voynet	Others
National	31.2%	25.9%	18.6%	10.4%	4.1%	1.6%	Difference
501 sample	30.7%	25.9%	18.7%	9.3%	2.5%	3.2%	<0.6%

³⁶ Condorcet’s was, for a very short time, used to rank figure skaters, doubled – in case of an intransitivity – by Borda’s rule (see Balinski and Laraki 2010; in fact, the exact rule has been proposed and defended Dasgupta and Maskin 2004). Borda’s method was adopted in about 1,784 to elect members of France’s Academy of Sciences until a newly elected member, Napoléon Bonaparte, insisted it to be discarded in 1,800, presumably because it is highly manipulable, as Laplace had argued. It violates IIA, it ignores intensities, in Laplace’s words it gives “a big advantage to candidates of mediocre merit.” Arguments for it, alone or in convolutions, continue to be made to the present day Saari (2001).

- Condorcet’s,
- Borda’s,
- Approval voting where a ballot gives a cross, a tick, or a 1 whenever the grade is at least *Good*,
- Approval voting, where a ballot gives a cross, a tick, or a 1 whenever the grade is at least *Very Good*,
- Point-summing, where 5 points is given for *Excellent*, 4 for *Very Good*, 3 for *Good*, 2 for *Acceptable*, 1 for *Poor*, and 0 for *to Reject*,
- Majority judgment.

Two experiments investigate the manipulability of methods. Take a method. Ten thousand random samples are drawn from one of the bases, given that there is a unique winner *A* and a unique runner-up *B*. Two different strategies are applied. *Strategy 1*: All those ballots that give a grade to *B* two levels above the grade given to *A* are changed to raise *B* as much as possible and lower *A* as much as possible. Thus, for example, a ballot where *B* is *Good* and *A* is *Acceptable* nothing is changed, but if *A* is at most *Poor* then the change is made. *Strategy 2*: 30% of those ballots that give *B* a higher grade than *A* are changed to raise *B* as much as possible and lower *A* as much as possible. Tables 2.33 and 2.34 show how often the manipulation is successful in the sense that *A* is no longer the winner.

Note that if the Condorcet-winner *A* is no longer the winner, then there must be a Condorcet-cycle in the changed ballots. For, *A* has a higher grade than *B* on a

Table 2.33 Numbers of successful manipulations in 10,000 random samples of 101 ballots drawn from both bases, with each of seven methods³⁷

Total base	Point-summing	Borda	First-p-post	Apprvl \geq Good	Apprvl \geq Very good	Condorcet	Majority judgment
Strategy 1	9,418	8,145	8,435	4,536	3,559	5,071	3,138
Strategy 2	8,657	6,829	6,372	5,643	3,966	1,702	3,852
Rep base							
Strategy 1	9,965	9,313	8,699	8,569	8,407	7,042	6,142
Strategy 2	9,769	7,864	4,411	8,849	8,557	4,641	5,369

Table 2.34 Numbers of successful manipulations in 10,000 random samples of 201 ballots drawn from both bases, with each of seven methods

Total base	Point-summing	Borda	First-p-post	Apprvl \geq Good	Apprvl \geq Very good	Condorcet	Majority judgment
Strategy 1	9,797	8,121	8,737	3,557	2,012	6,173	2,612
Strategy 2	9,233	9,711	8,801	5,213	2,465	8,215	3,807
Rep base							
Strategy 1	9,998	9,199	8,731	9,633	9,345	8,953	7,548
Strategy 2	9,974	9,917	7,860	9,830	9,296	9,378	6,380

³⁷ With these strategies, voters cannot manipulate the two-past-the-post method.

majority of the ballots, and that cannot change; thus, some candidate C must have a higher grade than A on a majority of the changed ballots. But B had a higher grade than C on a majority of the ballots to begin with, so also in the changed ballots, implying a Condorcet-cycle must exist among the three in the changed ballots ($B > C > A > B$).

The statistics clearly show that the majority judgment is more stable against strategic manipulation than the other methods.

The database of 1,733 ballots confirms that there is no alignment of candidates according to which the “preferences” of all voters are “single-peaked.” However, the grades reveal a great deal of evidence about the preferences of each voter for the various candidates. One can calculate estimates of how voters favorable to one candidate might transfer their votes to others. It may be deduced from the numbers alone that statistically, the voters’ transfers are almost single-peaked among the important candidates Balinski and Laraki (2010). This may well be the case for other countries as well as France. In particular, Bayrou emerges as the single centrist candidate. This may be seen for other reasons as well (e.g., see Table 2.18). Thus, it becomes possible to compare the methods with regard to how they favor or penalize a centrist candidate.

Two experiments investigate how a centrist candidate fares under the various methods. This is an important question. The majority judgment has been attacked as a method that would be very favorable to centrists, and many political scientists, journalists, politicians, and voters believe that systematically electing centrists is not good for society. That allegation is shown to be wrong by the experiments. In one, the methods are used to obtain the results among only the three principal candidates, Bayrou, Royal, and Sarkozy. In the other, the methods are used to obtain the results among all twelve candidates: it turns out that in every case one of the three principal candidates is the winner. The results for the representative database are given in Table 2.35 (the results for the total database give the same ranking of the methods, but Bayrou is of course elected more frequently by each).

Several conclusions may be drawn from these results. First, the first- and two-past-the-post methods systematically eliminate centrist candidates, even when

Table 2.35 How the centrist candidate (Bayrou) fares under different methods: numbers of wins in 10,000 random samples of 201 ballots drawn from the representative database³⁸

	Royal		Bayrou		Sarkozy		Ties	
	(3)	(12)	(3)	(12)	(3)	(12)	(3)	(12)
First-past-the-post	656	977	0	0	9,261	9,022	83	5
Two-past-the-post	1,078	1,146	172	98	8,154	8,197	596	559
Approval \geq Very Good	472	467	651	658	7,919	7,947	958	928
Majority judgment	587	606	4,402	4,326	5,008	5,065	3	3
Condorcet	138	142	8,390	8,329	954	974	389	441
Approval \geq Good	36	23	9,436	9,465	30	40	498	472
Point-summing	132	139	9,444	9,463	260	239	164	159
Borda	51	12	8,659	9,976	1,122	0	168	12

(3) indicates the experiment with three candidates, (12) that with 12 candidates

they are highly regarded by the electorate (as was Bayrou in 2007). Second, the Condorcet method, and still more the point-summing and Borda methods, are extremely favorable to centrist candidates. In particular, notice that the more there are minor (unelectable) candidates, the more Borda guarantees the election of a centrist candidate. Third, approval voting is extremely sensitive to the question posed. When voters are asked to interpret “approval” as at least *Good* (in French, *Assez Bien*), the centrist is elected; when asked to interpret “approval” as at least *Very Good* (in French *Bien*), the centrist is eliminated. Imagine what would have happened if the threshold had been either higher or lower. Once again, this shows that approval voting’s two-word language is insufficient and arbitrary.

The majority judgment does not eliminate the centrist, yet neither does it necessarily elect the centrist. Statistically, Sarkozy wins more often than Bayrou. A method that is very favorable to the center will in the long run push all candidates to a centrist position. This is not desirable. Inversely, a method that systematically eliminates centrists will in the long run polarize society into two blocks. Something in between would seem to serve society better: a wider spectrum of political expression would be opened [Balinski and Laraki \(2010\)](#).

Conclusion

The majority judgment experiment proves that the model on which the theory of social choice and voting is based is inadequate: voters do not have preference lists of candidates in their minds. Moreover, forcing voters to establish preference lists only leads to inconsistencies, impossibilities, and incompatibilities. The model has led to important concepts, to criteria for testing the acceptability of voting mechanisms, and to a beautiful body of mathematical results, but it has failed to establish a *science* of social choice that deals with the actual practice of voting as well as the theory of voting because its premises are false.

The experiment shows that the model proposed here – that voters have evaluations of candidates in their minds and accept to express them in a common language – is much closer to the observed facts. Moreover, the model leads to a coherent theory.

The experiment shows the majority judgment is a practical mechanism. The theory shows – and the experiment illustrates – that it satisfies almost every criterion that has been advanced across the years to test whether a method of voting is acceptable. It resists but is not impervious to manipulation. But there exists no method that is. The majority judgment best resists manipulation by several criteria, as the

³⁸ In the experiment with three candidates, for example, Royal had 656 wins, Bayrou 0 wins, Sarkozy 9,261 wins, and there were 83 ties: the sum is 10,000 (and similarly for the other methods in both experiments). However, to Condorcet must be added 129 Condorcet-cycles in the experiment with three, and 114 Condorcet-cycles in the experiment with 12. Ties with the majority judgment means ties in the majority-gauges

experimental evidence has illustrated and mathematical arguments have proven Balinski and Laraki (2010). It offers voters the greatest freedom of expression and yields evaluations of all candidates (even when there is only one). Science is of course not static: more experiments will reveal more about the behavior of voters and their strategies, so perhaps other means will be found to express their opinions and to amalgamate them into society's opinion.

Changes in methods of election inevitably provoke changes in the behavior of candidates and voters. Today's voting methods – and in particular, the first-past-the-post systems – incite candidates to obtain the support of a majority of the voters and to forget the others. Voters are urged to give their allegiance to one party and oppose the others. Voters are unable to express their appreciations of the candidates (even when there are but two candidates, let alone more). Political strategy focuses on one important point: to gather 51% of the vote. Minorities may be ignored, even offended. The majority judgment incites candidates to seek the highest possible evaluation of every voter. Minorities cannot be ignored. Voters are confronted with a much more serious question – how do you evaluate the candidates? – and are given the means to express themselves. In consequence, instead of focusing on 51% of the electorate up to election day, then once pronounced the winner claim to represent 100% the next day, a candidate is motivated to address his appeal to the entire nation before as well as after the election. The strategies of the political campaigns with today's voting methods cannot be imagined as those with the majority judgment.

Ecclesiastes poses the question:

“Is there *any* thing whereof it may said, See, this *is* new?”

Indeed, one century ago, Sir Galton (1907) had the germ of the idea. He proposed the median as the solution to the *budget problem*:

A certain class of problems do not as yet appear to be solved according to scientific rules, though they are of much importance and of frequent recurrence. Two examples will suffice. (1) A jury has to assess damages. (2) The council of a society has to fix on a sum of money, suitable for some purpose. Each voter, whether of the jury or the council, has equal authority with each of his colleagues. How can the right conclusion be reached, considering that there may be as many different estimates as there are members? That conclusion is clearly *not* the *average* of all the estimates, which would give a voting power to “cranks” in proportion to their crankiness. One absurdly large or small estimate would leave a greater impress on the result than one of reasonable amount, and the more an estimate diverges from the bulk of the rest, the more influence would it exert. I wish to point out that the estimate to which least objection can be raised is the *middlemost* estimate, the number of votes that it is too high being exactly balanced by the number of votes that it is too low. *Every other estimate is condemned by a majority of voters as being either too high or too low, the middlemost alone escaping this condemnation.*³⁹

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³⁹ Our emphasis.

methods based on the 2007 Orsay experiment. The experience itself could not have been realized without the generous support of Orsay's Mayor, Mrs. Marie-Hélène Aubry, the staff of the Mayor's office, and our friends and colleagues who sacrificed their Sunday (a beautiful spring day) to urging voters to participate and explaining the idea: Pierre Brochot, Stéphanie Brochot Laraki, David Chavalarias, Sophie Chemarin, Clémence Christin, Maximilien Laye, Jean-Philippe Nicolai, Matias Nuñez, Vianney Perchet, Jérôme Renault, Claudia Saavedra, Gilles Stoltz, Tristan Tomala, Marie-Anne Valfort, and Guillaume Vigeral. Thanks to them, the experiment was successful and its expense limited to the costs of ballots, envelopes, and posters.

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Chapter 3

French Presidential Election: A Field Experiment on the Single Transferable Vote

Etienne Farvaque, Hubert Jayet, and Lionel Ragot

A number of electoral experiments have recently been conducted, notably in France, with the aim of testing current electoral systems, and showing the qualities of alternative ones. For example, Baujard and Higersheim (2007) conducted experiments on ranked choice voting and approval voting, which allow voters to express the intensity of their preferences. In addition, Balinski and Laraki (2007a, b) tested the majority judgment system, in which voters can judge the degree to which they believe a candidate would be suited to take up the role of president. Furthermore, Lewis-Beck and Wittrock (2007) show how a two-round electoral system can be more favorable to extremist candidates than a one-round system, confirming an interest in studying other electoral systems.

The results of the experiments confirm that no two electoral systems are equal. Thus, when there is only one seat to be filled (in a presidential election, for example), the use of a two-round majority electoral system leads voters to make a choice in the second round, based on a reduced political selection compared to the first round. Voters' powers are therefore largely reduced in this case, a fact that was initially signaled by Hare in 1873, defending an electoral system that we now know as the single transferable vote (STV). Under this voting procedure, in which only one round is necessary, the voter is asked to rank all candidates, or a selection of them, by order of preference. According to Hare (1873), this voting procedure brings "to the duty of voting reflection, judgment and moderation," and consequently, "by using the opportunity to separate, distinguish between and express every form of political opinion," gives strength to the representative mandate.¹

We can immediately note that it is possibly easier for a voter to have to rank several candidates by order of preference, rather than having to select one among all

¹For a detailed presentation, see Reilly and Maley (2000).

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those who present themselves. Grofman and Feld (2004) also show formally that the STV satisfies the simplicity criteria better than the alternatives.² Likewise, Farrel and McAllister (2000) show the practicality of such an electoral system, used in Australia since the beginning of the twentieth century, in Ireland (where it has been applied to the presidential elections since 1937) and at the heart of professional associations (including the *American Psychological Association*). Despite this, many opponents to the adoption of this system say that the STV appears too complicated. The advantages of the STV have again recently enabled its adoption elsewhere, in the city of Takoma Park (Maryland, United States, January 2007) and for the Scottish local elections in May 2007.

The first objective of this article is therefore, through an experiment on the French presidential election in 2007, to study whether the STV can offer a credible alternative to majority voting, in terms of simplicity from the voter's point of view.

Apart from simplicity, a certain number of other criteria have been put forward and discussed in the literature on the subject, attempting to evaluate different electoral systems (cf. Nurmi (2002), for a synopsis of electoral systems). Currently, among the most discussed criteria, selecting the Condorcet winner and the idea of *Condorcet efficiency* is probably fundamental. To recap, the Condorcet winner, if one exists, is the candidate against whom no other candidate is preferred. In bilateral opposition to each other candidate, he/she would be elected with a majority. An electoral system, which would systematically lead to the Condorcet winner being put at a disadvantage, would in all likelihood lead to a rapid reconsideration of the country's political institutions. If such a difference between voters' preferences and election results is not systematic with a majority vote, this electoral system does not, however, necessarily guarantee that the Condorcet winner will be selected (cf. Saari (1995), but this characteristic had already been shown in Black (1958)). Indeed, using a majority voting system, moderate candidates (potential Condorcet winners) are not necessarily an individual's first choice. A majority voting system therefore does not allow them to influence the voting issue, in contrast to the transferable voting procedure, which allows voters' preferences to be transferred from one candidate to another during the sequences (or repetitions) of the vote counting system.

However, the arguments regarding the selection of the Condorcet winner remain largely theoretical. The second objective of this article is also to use experiments to check whether the STV is effective in allowing the selection of the Condorcet winner, if one exists, and when the profile of people's preferences does not necessarily correspond to the theoretical ideal of unimodal preferences. The difficulty of an electoral system using the STV is the creation of two distinct vote-counting methods, which can be used to choose the elected candidate: The Hare method (or ranked-choice voting, Hare (1873)) and the Coombs' method (1964). Concerning the latter, Grofman and Feld (2004) demonstrate that the Coombs' method always leads to the Condorcet winner being elected, as long as the voters' preferences are unimodal.

² See Laslier and Van der Straeten (2004, 2008) for an experiment showing that, in practice, approval votes equally satisfy the simplicity criteria.

Our electoral experiment therefore aims to examine the qualities of an alternative electoral system, which has greater respect for the series of preferences expressed by the electorate, when the STV is applied. It is shown that the two criteria – simplicity and the selection of a Condorcet winner – can be checked for.

The article is organized as follows. In the first section, we present the STV and the counting methods in detail, along with the practical details of the electoral experiment. The second section confronts the results of the experimental vote under the two counting methods and the simplicity criteria. The third section studies the existence of a Condorcet winner. The conclusion summarizes our results and proposes future research possibilities.

The Single Transferable Vote: A Field Experiment

The term “single transferable vote” in reality refers to two different processes, which can only be distinguished by the vote counting methods: The Hare method (*ranked choice voting*) and the Coombs’ method. The first is used for the presidential elections in Ireland and Sri Lanka, and was organized for the national elections on the islands of Fiji and Papua New Guinea at the end of the 1990s and the beginning of the 2000s. Australia has used ranked choice voting for elections to the House of Representatives (or Lower House) since 1918, and finally, at a local level, this method has been employed for the San Francisco municipal elections since 2002. No examples exist showing the application of the Coombs’ method.

Whichever of the methods is applied, voters receive a single ballot paper, containing the names of each candidate, and they must rank them in order of preference. Number 1 refers to the voter’s first choice, number 2 to the second, and so on. The voter is not forced to rank all of the candidates.³ Considering that the vote can be transferred to each candidate that the voter gives a rank for, the voter refusing to give a rank to a candidate means refusing to give that candidate a say at any point in the vote counting process. If no candidate wins the majority of the votes when they are counted (the number of votes corresponds to the number of ballot papers placing the candidate as first choice), the candidate with the *worst result* is then eliminated, and votes for the second choice candidate on each paper ranking the eliminated candidate as first choice are then transferred to that candidate. This process is then repeated until one candidate obtains more than half of the votes cast. The distinction that can be made between the Coombs’ and Hare methods is based on the way of defining the candidate with the *worst result* (see below and Grofman and Feld (2004)).

Compared to a two-round electoral system, one of the advantages of this system is that it avoids voters going back to the polls, as all preferences are expressed

³ This point does however vary between elections. In the Australian case, the voter must complete the entire ballot, but in San Francisco, the voter only needs to rank three candidates.

from the first and only round. It thus allows the voter to fully express his or her preferences between all listed candidates. The STV is based on the largest possible electoral participation, avoiding supporters of lesser candidates refusing to take part in the second of a two-round system. On the other hand, ranked choice voting could potentially allow the election of a candidate representing the first choice of a small portion of the electorate. Therefore, it does not necessarily favor the “larger parties.” As it is based on initial preferences, voters’ choices are, by definition, not influenced by the first-round results, and therefore by the opinions of other voters which were expressed in the first round. As the voters have to make their choices just once and allow their vote to be transferred to the other ranked candidates, this electoral system greatly reduces voters’ incentives to not vote sincerely. However, this electoral system does not completely eliminate the possibility of manipulation (insincere voting, cf. Peress (2008)).

A final advantage to this voting procedure, whichever vote counting method is applied, is that, as the two-round electoral system, it produces a majority winner.

One has to note one inherent difficulty with this electoral process: vote-counting stations. The votes in this system, in contrast to the current two-round voting system, cannot be counted in local offices,⁴ with the national result being the aggregate results of all local offices. With the STV, the sum of all vote counts in each counting station does not lead to the same result as the count on the total number of ballot papers from the entire electoral district. The count should be made only once and at a district level, whichever counting method is applied. Furthermore, as all ballot papers ranking an eliminated candidate as first choice need to be reprocessed, the counting process is strongly facilitated through the use of information technology, as soon as the number of voters increases. Equally, voters could find this system more complicated than the current electoral system. On the face of it, choosing one single candidate can seem easier than selecting a list of candidates and ranking them by order of preference. However, as we will see, this suggestion seems to have only a weak empirical impact.

The Hare Method (Ranked Choice Voting)

According to this method, the *worst result* will be defined based on the way in which *support can be brought together*: The candidate with the lowest number of votes as first choice is eliminated, and these votes are then recounted and passed on to the candidate which the voter placed as second choice on the ballot paper. If a candidate receives the majority of votes as a result of this transfer, she is elected. Otherwise, the process will be repeated until a majority winner is identified (Hare 1873; Farrell et al. 1996).

⁴ Or simply for information, to know how voters in the area voted.

This electoral system is therefore based on relative opinions, as is the majority electoral system. In general, but not systematically, it leads to similar results, as the vote-counting method is actually very similar to that of a two-round electoral system. In the counting procedure, the later repetitions can be seen as another fictional voting round in the electoral process. The only task to be done between each of the virtual voting rounds is to alter the ballot papers, transferring the votes to the candidate immediately following the eliminated candidate, and to keep a score for each of the candidates who remain on the list. In the 2007 French presidential election, a two-round electoral system, the ten worst candidates were eliminated between the first and second rounds, but with the STV, candidates are eliminated one at a time. Such a difference is not only formal, in certain configurations it can affect the final results of an election. This was the vote-counting method that was outlined in the letter to voters, used to announce and present the experiment.

The Coombs Method

The Coombs' method (1964) is an alternative to that of Hare. The *worst* result, according to the Coombs' method, is defined by the *level of rejections* that a candidate and his manifesto accumulate. It uses a completely different philosophy to that which is prevalent in current electoral systems. The operating criterion is no longer the level of support, but the level of rejection. Concretely, during the first repetition, the candidate with the highest number of ballot papers where he/she is either not ranked or ranked in last position (the twelfth position in this case at the time of the first repetition) is eliminated, and votes in his/her favor are transferred to the candidates ranking in second position on those ballot papers. If a candidate receives the majority of votes as a result of this transfer, she/he is elected. Otherwise, a new repetition takes place and this process is repeated until a majority winner is found. Concerning this procedure, one of its main advantages is that it always leads to the Condorcet winner being elected, as long as the voters' preferences are unimodal, as shown by Grofman and Feld (2004).

Practical Details of the Electoral Experiment

The electoral experiment was conducted in two of the eleven voting districts in the town of Faches-Thumesnil: District no.1 (Ecole Pasteur-Curie) and district no. 6 (Centre Médico-social). The voters in the two districts received a letter, signed by the Mayor of the town and the Dean of the Economic and Social Science Faculty. The letter informed voters that the experiment would take place during the first round of the presidential election, and of its practical details, also inviting them to take part. On the back of the letter, an explanatory note presented the STV and how it works. After having voted, the voters were then invited to take part in the electoral

experiment in a voting office adjacent to the official office. The voters taking part in the experiment were reminded orally of the practical details, just before they filled in their ballot papers. We reconstructed all characteristics of a real polling station, including booths, boxes, and ballot papers.

The Results

The Single Transferable Vote and the Simplicity Criteria

If we look at the criteria, which are set out to define a “good” electoral system, it is clear that simplicity is essential if democracy is to work successfully. A relatively complicated electoral system could eventually hinder universal suffrage, in which case it would no longer be citizens that appear on a *census* who vote, but those who understand the *sense*, the practical details of an electoral system.

Analyzing the results of the experiment regarding the simplicity principle, we can attempt to confirm that the electoral system presented to voters was well understood, and the results have not been marred by misunderstandings. We can first note that 60.3% of the voters in the districts involved accepted to take part (cf. Table 3.1). Among the ballots completed by voters, a little less than 7% proved to be blank or spoilt.

Table 3.1 Participation in the electoral experiment

	Number	% of official votes
Voters	960	60.30
	Number	% of voters in experiment
Blank or spoilt	67	6.98
Votes cast	893	93.02
Number of ballots according to number of candidates ranked		
Number of candidates ranked	Number of ballots	In %
1	30	3.36
2	67	7.50
3	163	18.25
4	95	10.64
5	78	8.73
6	37	4.14
7	17	1.90
8	9	1.01
9	3	0.34
10	9	1.01
11	15	1.68
12	370	41.43

Table 3.2 Nature of blank and spoiled ballots

	Number	In %
Abusive	2	2.99
Blank	8	11.94
Cross	22	32.84
Ranking error	35	52.54
Total	67	100

However, to understand the participants' level of comprehension of the proposed electoral system, a closer analysis of the blank and spoiled votes was conducted (cf. Table 3.2). Among the blank and spoiled votes, around 3% were abusive, and around 12% were genuine blank votes. In total, these two categories represented 1.04% of votes, a rate which is, once again, very comparable with the complete sample of the two districts which took part, which received 1.51% of ballots as either blank or spoiled. The remainder of the blank and spoiled ballots (85% of the blank or spoiled papers in our sample) was those on which the voters expressed their choices with a simple cross, or contained a mistake in the ranking of candidates.⁵ These two error categories can be assimilated to a lack of understanding of this electoral system on the part of the experiment's participants. Therefore, mistakes made by participants represented a total of 5.94% of ballot papers. If this figure seems somewhat high, it is in fact relatively low when we consider that the experiment did not benefit from a strong mobilized campaign, explaining the new voting system to voters, which would be carried out if this electoral system were to be adopted. We can note that in Australia, a country where this electoral system has been used in legislative elections since the beginning of the last century and where voting is obligatory, blank and spoiled votes accounted for 3.8% of ballots in the 1998 election.

One characteristic of this electoral system, which can appear complex at first sight, is the requirement to rank (all or some of) the candidates. From this point of view, the results are again reassuring. Indeed, if we count the ballots in terms of the number of candidates ranked, we see a bimodal distribution, with a first peak between 3 and 4 ranked candidates (18.25 and 10.64% of ballots respectively, cf. Table 3.1) and a second peak at 12 candidates, with more than 41% of voters. This result shows that a large number of voters did not find it prohibitive to rank the candidates in this way.

Finally, it would appear that the level of mistakes and blank votes is relatively low, and that the need to rank candidates did not create a barrier against participation in this electoral system. Coupled with voters' high level of participation in this experiment, the results lead us to consider that the STV can be considered as a relatively simple, and therefore practical, electoral system. However, such a result is not surprising, given the fact that it is already used in several countries.

⁵ Some of the mistakes can be attributed to us. We neglected to precise in the letter addressed to the participants that ranking candidates with an equal number would not be allowed.

The Winner Under the Hare Method

The first candidate to be eliminated is Gérard Schivardi (cf. Table 3.3), as only a single voter cast him in first position (meaning that he received 0.11% of votes cast). This ballot indicated Olivier Besancenot as second choice candidate. With Schivardi eliminated, this voter's choice is therefore transferred to Besancenot. After counting the votes (cf. Table 3.3), Besancenot's result now improves (passing from 6.49% after the first repetition to 6.61% after the second), with all other candidates' scores remaining unchanged. In this second repetition, the candidate with the worst score according to the Hare method is Frédéric Nihous. After this candidate is eliminated, the ballots placing him in first position have the votes transferred from this candidate to the candidate ranked in second position. After this transfer, we recount the votes received by each candidate to identify the one with the worst score (third repetition), and so on.

Using this procedure, the candidates to be eliminated after Schivardi and Nihous, in order, are José Bové, Philippe de Villiers, Dominique Voynet,⁶ Arlette Laguiller, Marie-George Buffet, Jean-Marie Le Pen, Olivier Besancenot, and François Bayrou. In the tenth repetition, at which point only three candidates remain (Bayrou, 27.45%, Ségolène Royal, 32% and Nicolas Sarkozy, 40.55%), this method therefore eliminates Bayrou, who had received the least votes. After transferring votes cast in favor

Table 3.3 Vote count according to the Hare method

Candidate	Repetition (% of votes received)										
	1	2	3	4	5	6	7	8	9	10	11
Besancenot	6.49	6.61	6.72	7.17	7.17	7.74	8.98	10.59	12.42	–	–
Buffet	2.13	2.13	2.24	2.24	2.24	2.81	3.37	–	–	–	–
Schivardi	0.11	–	–	–	–	–	–	–	–	–	–
Bayrou	21.16	21.16	21.28	21.64	21.97	22.45	22.78	22.86	23.25	27.45	–
Bové	1.68	1.68	1.68	–	–	–	–	–	–	–	–
Voynet	2.02	2.02	2.02	2.24	2.24	–	–	–	–	–	–
De Villiers	1.90	1.90	1.90	2.02	–	–	–	–	–	–	–
Royal	22.28	22.28	22.28	22.53	22.53	23.12	23.23	24.44	25.17	32	45.85
Nihous	0.45	0.45	–	–	–	–	–	–	–	–	–
Le Pen	6.72	6.72	6.83	6.84	7.51	7.52	7.52	7.77	–	–	–
Laguiller	2.24	2.24	2.24	2.47	2.58	2.58	–	–	–	–	–
Sarkozy	32.81	32.81	32.81	32.85	33.74	33.78	34.12	34.35	39.16	40.55	54.15

⁶ We can see that in this fifth repetition, Voynet shares the worst score with Buffet. They are in a dead heat in terms of votes; therefore we need to determine which one should be eliminated. The electoral process should define these criteria before the vote takes place. We envisaged two possible criteria: eliminate the candidate with the worst initial score (in the first round), in this case Voynet; or eliminate the candidate with the least number of second place votes in this fifth repetition (Voynet 34, Buffet 46). Voynet is therefore eliminated, whichever of the criteria, which would have been upheld at the beginning, is applied.

of Bayrou, this counting method results in Sarkozy being elected with 54.15% of votes cast, against 45.85% of votes for Royal.

Therefore, *ranked choice voting* (the STV with the Hare method) leads to a result, which is very similar to the one obtained using the two-round system (the official vote). Both systems result in the same winner, Sarkozy, with very similar scores – Sarkozy achieving 53.38% in the official election (in these two voting districts) and 54.15% in the experimental election, and 46.62 and 45.85%, respectively, for Royal.

The Winner Under the Coombs Method

It could be interesting to test the influence that the vote counting method has on the election result. However, we should be very careful when applying the Coombs' method to the ballot papers completed during this electoral experiment. In truth, only the Hare method of vote counting was announced to voters, and nothing can ensure that the voters taking part in the experiment would not have altered their ranking if a different counting method had been announced. We therefore explicitly have to assume in this section that the ranking choices expressed by voters were not affected by the counting method, and that voters gave their true preferences (no manipulation or strategic voting).

Such an assumption is all the more acceptable as the subjects were certainly asked to rank candidates according to their preferences, given as an instruction in the explanatory note and on the ballot paper. This could be understood as asking voters to vote sincerely, as long as voters understand the instruction as being a necessity and not a guideline.

According to this procedure, and therefore accepting the hypothesis of voters' sincerity,⁷ the first candidate to be eliminated (cf. Table 3.4) is no longer Schivardi, but Le Pen. Of the 893 ballot papers, 549 voters did not rank him, or ranked him in 12th position. With this method, the two finalists are Bayrou and Sarkozy. Indeed, even though Royal collected more support than Bayrou, 32 vs. 27.45%, respectively (cf. Table 3.3 or 3.4), she is eliminated because she received more rejections, with 452 ballot papers, compared to 395 for Sarkozy and 215 for Bayrou. The latter appears to be the most consensual candidate, in other words the candidate collecting the least number of rejections.

Table 3.4 shows the percentages of votes received by each candidate over the duration of the repetitions. With this method, the two finalists are Bayrou and Sarkozy. In this configuration, it is Bayrou who is elected with 51.97% of the votes, against 48.08% for Sarkozy.

⁷ Testing the sincerity of voters in our sample is impossible in reality; our experiment takes place in the field, and not in a laboratory (in which case the initial allocations as well as participants' profiles can be defined, allowing one to measure the difference between their behavior and their "real" preferences).

Table 3.4 Vote count according to the Coombs' method – continued

Candidate	Repetition (% of votes received)										
	1	2	3	4	5	6	7	8	9	10	11
	Votes received as % of all votes cast										
Besancenot	6.49	7.62	7.74	7.85	7.96	8.53	9.89	11.39	12.42	–	–
Buffet	2.13	2.13	2.13	2.24	2.24	2.24	2.81	–	–	–	–
Schivardi	0.11	0.11	–	–	–	–	–	–	–	–	–
Bayrou	21.16	21.41	21.41	21.52	21.86	22.22	22.70	22.77	23.25	27.45	51.97
Bové	1.68	1.68	1.68	–	1.68	–	–	–	–	–	–
Voynet	2.02	2.02	2.02	2.02	2.02	2.24	2.36	2.59	–	–	–
De Villiers	1.90	2.13	2.13	2.13	–	–	–	–	–	–	–
Royal	22.28	22.76	22.76	22.87	22.87	23.12	23.37	24.24	25.17	32	–
Nihous	0.45	0.56	0.56	–	–	–	–	–	–	–	–
Le Pen	6.72	–	–	–	–	–	–	–	–	–	–
Laguiller	2.24	2.58	2.58	2.58	2.8	3.14	–	–	–	–	–
Sarkozy	32.81	37	37	37.11	38.45	38.5	38.88	39.01	39.16	40.55	48.03

The choice between vote counting methods, the Hare method *vs.* the Coombs' method, therefore appears to be pivotal in deciding which candidate is elected. In our experiment, the Hare method leads to a final run-off between Sarkozy and Royal, with the former being the winner, but the Coombs' method brings about a final confrontation between Sarkozy and Bayrou, with the latter being elected.

This result shows that this method favors consensual candidates in the vote counting process, the one that collects the least rejections. The vast majority of Sarkozy's supporters ranked Royal after Bayrou, and similarly Bayrou's supporters ranked Royal after Sarkozy, although in a smaller proportion, and it is therefore Royal who attracted the most rejections, and is eliminated according to this method. This result gives us an initial indication concerning the existence of an eventual Condorcet winner. If one exists, it cannot be Sarkozy, because he loses in a direct run-off against Bayrou, as indicated by the result obtained through the Coombs' method.

The Single Transferable Vote and the Condorcet Principle

Our analysis of the different procedures of the STV forms part of a debate on the choice of a voting system with satisfactory qualities, which goes back as far as the eighteenth century and the rivalry between Condorcet and Borda.⁸ The existence of Condorcet cycles prohibits the construction of a general procedure that, beginning with run-offs between candidates, would allow a relationship of collective preferences to be formed. Indeed, whenever a Condorcet cycle is present, the relationship formed by run-offs is no longer transitive.

⁸ For an introduction, see Truchon (1999) or Diamantopoulos (2004).

If the candidates cannot be ordered based on the results of run-offs, which candidate should be chosen? The answer proposed by Condorcet is a partial response: If at the very least one candidate exists, winning run-offs against each of the other candidates and is thus the Condorcet winner, he/she must be chosen. Consequentially, following Condorcet, many Social Choice Theorists consider a satisfactory voting system to be one, which identifies the Condorcet winner, as long as one exists.

In this context, it is interesting to examine whether there are Condorcet cycles in the votes that are studied here. The specific practical details of the transferable vote allow us to analyze the potential presence of a Condorcet winner, and to see whether or not the Condorcet winner is identified via one of the two transferable vote procedures.⁹ If there is no cycle, the candidates can be ranked based on the results of run-offs against one other. We can therefore compare the ranking orders produced by each of the two vote counting methods.

To this end, we have reconstructed the results of each run-off using the ranking order expressed on each ballot paper. More precisely, for any given ballot paper, we consider that the voter elects for candidate A in a run-off with candidate B if candidate A is ranked ahead of candidate B, or if candidate A is ranked and candidate B is not. We find the results of all the run-offs in the (symmetric) matrix of associated vote (Table 3.5).

Upon reading Table 3.5, we can see that there are no Condorcet cycles, which allow us to rank all of the candidates based on bilateral run-offs. Bayrou is the highest ranked, making him the Condorcet winner. He wins each of his 11 run-offs. Sarkozy comes next, winning 10 of his 11 run-offs (losing to Bayrou) followed by Royal, who is preferred in 9 out of 11 run-offs (losing to Bayrou and Sarkozy). In fourth place is Besancenot with eight victories (he loses against the three previous candidates), confirming his good performance under the counting process of the STV, as he finds himself in the final four using both the Hare and the Coombs' methods. On the other hand, Schivardi loses all of his run-offs, and Le Pen wins only the run-off against Schivardi.

All together, the ranking of candidates using Table 3.5 runs as follows:

Bayrou > Sarkozy > Royal > Besancenot > Buffet > Voynet > Laguiller > de Villiers > Bové > Nihous > Le Pen > Schivardi

We can compare this to the ranking orders that use successive eliminations, produced using each of the two vote counting methods. The reverse order of eliminations using the Coombs' method is as follows:

Bayrou > Sarkozy > Royal > Besancenot > Voynet > Buffet > Laguiller > Bové > de Villiers > Nihous > Schivardi > Le Pen

This order is very similar to that based on the ranking of candidates using run-offs. The Coombs' method successfully allows the election of the Condorcet winner,

⁹ As noted above, the theory gives a partial response to the question of whether the Coombs' method allows the Condorcet winner to be identified when preferences are unimodal (Grofman and Feld 2004). However, we can easily show that the preferences expressed in our sample are not compatible with unimodality.

Table 3.5 Voting matrix – run-offs (candidate in column vs. candidate in line)
 In % of cast (run-offs won by candidate in column shown in bold)

	Besancenot	Buffet	Schivardi	Bayrou	Bové	Voynet	de Villiers	Royal	Nihous	Le Pen	Laguiller	Sarkozy
Besancenot	–											
Buffet	62.8/37.2	–										
Schivardi	86.4/13.6	78/22	–									
Bayrou	25.3/74.7	18.6/81.4	8.6/91.4	–								
Bové	74/26	64.2/35.8	31.9/68.1	82.8/17.2	–							
Voynet	60.2/39.8	50.1/49.9	23.2/76.8	83.1/16.9	37.9/62.1	–						
De Villiers	63.4/36.6	55/45	39.1/60.9	83.8/16.2	49.1/50.9	55.6/44.4	–					
Royal	28.6/71.4	21.7/78.3	12.5/87.5	60.1/39.9	20/80	23/77	28.3/71.7	–				
Nihous	76.4/23.6	68.4/31.6	41.7/58.3	88.6/11.4	61.6/38.4	70.2/29.8	59.7/40.3	82/18	–			
Le Pen	62.1/37.9	56.6/43.4	47.1/52.9	79.9/20.1	52.2/47.8	56.4/43.6	59.3/40.7	72.9/27.1	50.2/49.8	–		
Laguiller	69.1/30.9	58/42	28.3/71.7	81.6/18.4	44.5/55.5	53.1/46.9	47.9/52.1	80.3/19.7	37.9/62.1	45.7/54.3	–	
Sarkozy	35.3/64.7	29.3/70.7	18.9/81.1	52/48	27.5/72.5	29.2/70.8	17.2/82.8	45.9/54.1	21/79	16.6/83.4	28.4/71.6	–
Run-offs												
Won	8	7	0	11	3	6	4	9	2	1	5	10

and beyond this, it ranks the first four candidates in the same order (Bayrou, Sarkozy, Royal, and Besancenot). There are three instances where differences between the two ranks occur, where consecutive candidates swap positions: between Buffet and Voynet, between de Villiers and Bové and, at the bottom of the list, between Le Pen and Schivardi. However, we see far greater differences in the reverse order of eliminations expressed by the Hare method:

Sarkozy > Royal > Bayrou > Besancenot > Le Pen > Buffet > Laguiller > Voynet > de Villiers > Bové > Nihous > Schivardi

One now goes through nine swaps between consecutive candidates to pass from one list to the other, with two major changes. The first concerns Condorcet winner Bayrou's ranking in only third position according to the Hare method, behind Sarkozy and Royal. As a result of this, the Hare method does not respect the Condorcet principle. The second major difference is based on the ranking position of Le Pen. Despite losing all bilateral run-offs, apart from one against Schivardi, Le Pen is ranked in fifth position according to the Hare method, just behind Besancenot.

As a consequence, if the Coombs method appears largely compatible with preferences using bilateral votes, based on this experiment, this is not the case with the Hare method.

Conclusion

A "good" electoral system must be simple, select the Condorcet winner (if one exists), and should limit the possibility to manipulate as much as possible (through insincere voting). Based on the preferences of voters taking part in this experiment, we have shown that the STV can lead to differing results, depending on the vote counting method that is used. With the Hare method, based on the capacity to unite support to eliminate candidates, the winner is Sarkozy (opposed in a final run-off by Royal). However, the Coombs' method, based on the rejection level, gives victory to Bayrou (opposed by Sarkozy at the end of the process).

Whichever vote counting method is proposed, the practical details of the system remain the same, and our experiment showed that they do not form an insurmountable barrier for the voters. The STV is therefore considered to be a relatively simple electoral process. However, regarding the Condorcet principle, only the Coombs' method, and its profile for identifying voters' preferences, led to the Condorcet winner being elected, namely Bayrou. As for the Hare Method, the winner was deemed to be Sarkozy, who was equally the candidate to be elected by the two districts involved in the experiment in the two-round electoral system. Moreover, in this experiment, the use of the run-off results between candidates enables us to construct a system to rank candidates, which is much closer to the results of the Coombs' method than that of the Hare method.

In this article, we have shown that the STV responds well to the simplicity criteria, and it can identify the Condorcet winner, if one exists, as long as the adopted counting method is that recommended by Coombs (1964).

Among the research paths, which we intend to explore, is to test the hypothesis of nonmonotonicity and unimodality of preferences which could, at least in theory, affect an electoral system's qualities (cf. Laslier 2004). Our topic in this article was not to support or condemn the current electoral system, but more modestly to contribute to the Marquis of Condorcet's recommendation in his *Mémoires sur l'instruction publique*, according to which: "The more a population is enlightened, the more difficult its votes are to surprise."

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Chapter 4

Framed-field Experiment on Approval Voting and Evaluation Voting. Some Teachings to Reform the French Presidential Electoral System

Antoinette Baujard and Herrade Igersheim

Introduction

Democracy is strongly associated with voting rights; for this reason, voting rules are the technical tool to implement democracy. A bad voting rule should imply poorly democratic processes and conversely. It is hence extremely surprising that the public debate almost never tackles this issue as such, and that the scientific study of democracy most often ignores the mechanical effects of voting rules.

The role of a voting method on the kind and the form of a democracy is correlated with the fundamental debate of which properties a voting rule should or should not exhibit on the one hand, and with some knowledge about how voters use this rule to express their electoral preferences through their vote. As this book is all about, the President of the French Republic is elected by direct universal suffrage, on the basis of a two-round system. In other words, the two-round system guarantees by construction that the elected President always obtains an absolute majority. On each round, each voter can vote for one and just one candidate. If no candidate receives a majority of votes in the first round of voting, the two highest-scoring candidates arrive at a runoff. The winner of this latter round is the winner of the election. Henceforth, each round is determinant for the result and considered as an important source of information of citizens' political preferences. The results of the first round of the 2002 French presidential elections were a shock for a large part of the population: contrary to what every opinion poll claims, the candidate of the extreme Right, Jean-Marie Le Pen, and the sitting president, Jacques Chirac, have been selected for the second round. This surprise has contributed to give rise to some serious public debates on the mechanisms of the two-round system. These discussions particularly focus on the dilemma "tactical vs. true voting": many citizens plead for a voting method, which would allow more expression of their true preferences.

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Besides the public debates, voting rules have been, since the works of [Borda \(1781\)](#) and [Condorcet \(1785\)](#), the subject of extensive theoretical studies. Theoreticians of voting systems have developed numerous results which enlighten the properties of such or such voting rule. For instance, [Brams and Fishburn \(1983\)](#) have showed that approval voting (henceforth, AV) is endowed with many interesting properties (strong incentive to true voting, high probability of electing the Condorcet's winner, etc). Let us briefly recall the principle of AV: AV is a voting rule in which voters can approve of as many candidates as they want. The winner of the election is the candidate who obtains the highest number of approvals. At first sight, AV's principle seems quite simple to understand and to apply. Besides, AV could meet the expectations of voters since it theoretically allows them to give their opinion about all candidates, contrary to the two-round system, which constrains them to pick just one single candidate.

Only field experiments, i.e., in the voting posts, with real voters and citizens, could check whether AV is accepted by them, confirm (or invalidate) theoretical properties in political contexts, and, above all, show that voters' aims and scientific results can meet and be combined to elaborate better operational voting rules and hence a better democracy. Even though laboratory experiments are of obvious interest to learn about the properties of AV and about voters' rationality since they provide the only suitable protocol to control preferences, it proves hard to convince the public and policymakers of the relevance of the lab findings for political elections, in which the context determines not only strategic information and beliefs, but also the expression of voters' rationality. More generally, conventional lab experiments indeed are often criticized, first, for providing biased and unrepresentative results, since mostly students participate, and second, for ignoring the context when 'the context itself is relevant to the performance of subjects'. Now, large field experiments can hardly be conducted in a real political context. [Harrison and List \(2004\)](#) stress that a main feature of natural field experiment is that "the environment is one where the subjects naturally undertake these tasks and where the subjects do not know that they are in an experiment". But conducting such a field experiment would imply that the voting system would depend on the experiment rather than on the Constitution, that different voting rules are used for different voters in a national election (due to the difference of rule applying to control groups or treated groups), and that the voters do not know in advance and for sure what rule is chosen: at least for constitutional reasons, all these traits straightforwardly rule out large-scale natural-field experiment in the political context. Yet ranging from lab to natural field experiments, there exists a bridge: the framed-field experiments, as defined by [Harrison and List \(2004\)](#), undertaken "in naturally occurring settings in which the factors that are at the heart of the theory are identifiable and arise endogenously, and then to impose the remaining controls needed to implement a clean experiment. In other words, rather than impose all controls exogenously on a convenience sample of college students, [Harrison and List \(2008\)](#) find a population in the field in which one of the factors of interest arises naturally, where it can be identified easily, and then add the necessary controls." In the political context of the presidential elections, identifying the relevant population is straightforward: all official voters are good candidates for the experiment; besides, as in natural field experiments, the

experimental circumstances (site, date, and progress, etc) should here mimic exactly the official voting circumstances.

What we could now call a French school of large-scale framed-field experiments in political context has started in 2002. During the 2002 French presidential elections indeed, a framed-field experiment was conducted over 5,000 voters by M. Balinski, R. Laraki, J.-F. Laslier, and K. van der Straeten to test AV. A similar design, though slightly modified and completed by the test of the evaluation voting rule (henceforth, EV), conducted by A. Baujard and H. Igersheim, has been used during the 2007 French presidential elections, over 5,500 voters. In each case, first a whole team of researchers and helping students have been working on the realization of the experiment. The objectives were first to evaluate the feasibility of this kind of large-scale experiment in political elections. Second, it was meant to check whether AV (and EV) is(are) understandable and accepted by a large public. Third, comparing the results obtained under AV (and EV) to those of the official elections might provide some important clues to identify how AV (and EV) behave(s) statistically with real electoral preferences, and to show whether different voting rules may yield to different outcomes. Fourth, the collected data allow to lead extended analyses on voters' behavior facing AV (and EV) or on the French political supply. In this paper, our purpose is to bring about the implications of our experiment for the French presidential electoral system.

The remainder of the paper is organized as follows: "Experimental Design" is a presentation of the experimental design; "Main Results" gives participation rates and the main results for the two experimented voting rules; "Implications for the French Presidential Electoral System" discusses the implications of such an experiment to reform the French presidential electoral system thanks to the analysis of the experimental data and of the questionnaires filled in by the participants after their experimental vote; "Concluding Remarks" concludes the paper.

Experimental Design

This section describes the experimental design of our experiment: first, the two tested voting rules, Approval Voting (AV) and Evaluation Voting (EV), are precisely defined. Second, the protocol we have followed is presented: its cleanness should testify that the collected data are reliable and relevant.

The Tested Voting Rules

For our experiment, we chose to test two different voting rules: Approval Voting and (+2,+1,0) Evaluation Voting. With this choice, our aim was twofold: first, we wished to improve and to complete the protocol initiated by [Balinski et al. \(2003\)](#); second, the double valuation of each candidate by each participant to the experiment

allows to make comparisons between these two voting methods and to show that the voters' rationality changes according to the voting rule they face.

Let us explain the two voting methods. With AV, either a voter approves one candidate, either she does not. The outcome of an election can be represented by a matrix A with as many rows as there are voters and as many columns as there are candidates, with $A_{v,c} = 1$ if voter v has approved candidate c and $A_{v,c} = 0$ if voter v has not. The number of supports for candidate c is the column sum $\sum_{v \in V} A_{v,c}$. Under AV, the winning candidate is the one who obtains the most supports.¹

With EV, a voter assesses all candidates by giving them a grade g on a predefined scale, for instance integers from 0 up to 99 (as in <http://rangevoting.org/>), from 0 to 20 (as in French school notes), or from -2 up to $+2$ (as in <http://votedevaleur.info/>), and so on. Hence, the outcome of an election can be represented by a matrix N with as many rows as there are voters and as many columns as there are candidates, with $N_{v,c} = g$ if voter v has given the note g to candidate c . The score for candidate c is the column sum $\sum_{v \in V} N_{v,c}$. Under EV, the winning candidate is the one who obtains the most votes.² Among the large scope of EV, we have chosen to test the rule based on the $(+2, +1, 0)$ scale since it appeared to be the most simple one, to avoid major problems of interpersonal comparisons of notes, and to prevent any problem of confusion between being indifferent and disliking some candidate (see [Baujard and Igersheim \(2007a\)](#) for all arguments in favor of this choice).

The Protocol

The idea of conducting a large-scale experiment on AV by M. Balinski in the context of presidential elections goes back to 1995. In France, the presidential elections are indeed the appropriate ones to run such an experiment. First, they aim at selecting one candidate from the same list of candidates with the same official voting method – the two-round system – all over France. Second, it reaches the highest rate of participation (and, thus, the most representative reaction to the experiment) compared with all other official ballots. The first large-scale experiment on AV was conducted in 2002 during the first round of the French presidential elections by a team of researchers of the Laboratoire d'Econométrie of the Ecole Polytechnique: [Balinski et al. \(2003\)](#). This 2002 seminal experiment has given birth to an original protocol from what every other large-scale experiments' protocols proceed ever

¹ For an extensive presentation of AV, see, between others, [Brams and Fishburn \(1983, 2005\)](#). See also [Sanver and Laslier \(2010\)](#) for an updated analysis.

² For a theoretical presentation of EV, see [Felsenthal \(1989\)](#); [Hillinger \(2004a,b,c, 2005\)](#); [Smaoui \(2007\)](#). Let us specify 10 points-EV has been tested in a pilote experiment conducted in the school Sciences Po Paris in 2002. See [Balinski et al. \(2002\)](#).

since, among which the 2007 Baujard and Igersheim's experiment. Yet, our protocol comprises little, but significant, differences. That is the reason why we focus on its description in the rest of this section.³

Let us present our protocol (for an extended presentation of the protocol, see [Baujard and Igersheim \(2010\)](#)). On April 22, 2007, we have run a field experiment during the first round of the French presidential elections in six polling stations located in three different towns of three regions: Illkirch-Graffenstaden (Alsace), Louvigny (Basse-Normandie), and Cigné (Pays de Loire). They belong to a wide scope of political patterns, in terms of their respective electorate, social and economic class, size and rural/urban characteristics. The experimental design adapted for AV and EV has been tested and confirmed through a pilote-experiment conducted in University of Caen over more than 400 participants on March 20, 2007, which has induced few improvements (see [Baujard and Igersheim \(2007b,c\)](#)). For our experiment, all voters were aware of it before the ballot thanks to three complementary ways: a personal information letter they had received by post; invitation to some information meetings in their town; mention of the event by local newspapers, radios, and television. Once registered voters had voted in official polling station with the official two-round system, they were proposed to vote in an experimental polling station where they would find very similar conditions. The test of voting rules indeed reproduced the exact same *modus operandi* as for real elections. Namely, we have respected a similar rhythm (with similar opening and closing hours, reduced waiting time), a similar staff (president of polling station and assessors), a similar voting equipment (envelopes, ballot papers, polling booth, ballot box), and the same rules to guarantee the anonymity conditions (first voter of the day checking the empty box, locked box, opening the box at closing time in front of voters, checking for silence in the polling station). According to [Harrison and List \(2004\)](#), these conditions were essential to mimic as close as possible the real elections and hence to guarantee the success of this framed-field experiment and the cleanness of our protocol. Let us add that the two experimented ballots, AV and EV, were registered on the same sheet of paper. Voters were asked to indicate with a cross the grade (0, +1 or +2) they wished to attribute to each candidate in EV and they were requested to circle the names of the candidates they wanted to approve of in AV. Finally, after their experimental ballot, we invited participants to fill in a questionnaire with questions about the experiment itself and the tested voting rules. These questionnaires provide rich information about participants' reactions to AV and EV in comparison with the official voting system.

³ For a detailed description of the 2002 protocol, see [Laslier and van der Straeten \(2004, 2008\)](#); for a description of the other 2007 experiments, see the papers of M. Balinski and R. Laraki and of H. Jayet, E. Farvaque, and L. Ragot in this book.

Main Results

Now we have established the protocol was robust in itself, participation and expression features and results per candidates can be presented.

Participation and Expression

As stressed above, according to our experimental design, only voters who turned out in the official vote could participate in the experiment. Hence, the participation rate in the experiment is defined as the ratio of the number of participants over the number of official voters who actually voted.

Table 4.1 presents the participation rates for the 2007 experiment in Cigné, Louvigny, and Illkirch-Graffenstaden. They are rather high, around 60% in average over the six polling stations; as expected, the higher rate was for Cigné, which is a small village. Yet, the participation of the 2002 experiment conducted by the Laboratoire d’Econométrie was higher (around 77.6%). Several points explain why the rates were lower in 2007. Among others, the official participation rate was much higher in 2007 (83.8% in 2007 against 71.6% in 2002); for those “unusual” voters, taking part in the official voting might have been enough of an effort. Second, the 2007 official elections were characterized also by a very high rate of proxies (for instance, it was during the school vacations for Illkirch), which made quite tricky the participation of away voters to the experiment. Third, the 2007 design was longer and more demanding than the 2002 one, since we also tested EV; this could put some participation off.

Tables 4.2 and 4.3 describe the expression rates for each test. Under AV or EV, a ballot paper is null when there were annotations that were not in accordance with the rules. Under AV, it is blank when it is entirely blank; under EV, when it is entirely blank or just contains zero. What is interesting is that expression is higher under EV than AV, for which blanks are more numerous. Different explanations can be proposed. First, some voters decided to fill in the experimental voting ballot just for one voting method rather than two, whatever by error, irritation, or lack of time.

Table 4.1 Participation rates per polling station

	Cigné	Louvigny		Illkirch			Total
		1	2	2	8	10	
Official vote							
Registered electors	378	940	1,008	1,160	1,291	760	5,537
Votes cast	318	859	901	929	1,022	575	4,604
Experimental vote							
Participants	233	516	547	606	584	350	2,836
Participation rate (%)	73.27	60.07	60.71	65.23	57.14	60.87	61.60

Table 4.2 Expression rate under AV.

	Cigné	Louvigny	Illkirch	Total
Participants	233	1,063	1,540	2,836
Spoiled (blank/null)	18 (17/1)	75 (63/12)	50 (40/10)	143 (120/23)
Votes cast	215	988	1,490	2,693
Votes cast (%)	92.27	92.94	96.75	94.96

Table 4.3 Expression rate under EV

	Cigné	Louvigny	Illkirch	Total
Participants	233	1,063	1,540	2,836
Spoiled (blank/null)	6 (0/6)	41 (24/17)	51 (21/30)	98 (45/53)
Votes cast	227	1,022	1,489	2,738
Votes cast (%)	97.42	96.14	96.69	96.54

Second, our questionnaires confirm that voters have preferred EV over AV.⁴ Third, we observed that most blank AV ballots correspond to poorly enthusiastic EV ballots (no grade 2 and a little number of grades 1); this shows something about those voters' political opinion: most likely, some disillusion about the French political supply rather than mixed reactions to the experimented voting rules.

Results per Candidates

The results of the experiment (AV and EV) are given in Table 4.4. As we can quickly point out, the two final AV and EV orders of the candidates are significantly different from those obtained with the two-round system. Yet, these rankings cannot be directly compared since there is at this stage a participation bias (only 60% of the official voters take part in the experiment) plus a sampling bias (for a comparison with national official results). The raw data need to be corrected to be really meaningful (see [Laslier and van der Straeten \(2004\)](#), and [Baujard and Igersheim \(2007a\)](#)) as in Table 4.5: it focuses on AV's results and provides the proportion of voters who approved of or voted for each candidate, and the ranks for the three towns in which the experiment has been conducted. Besides, it comprises an extrapolation to France, which is obtained with the method developed by [Laslier \(2004\)](#): here both participation and sampling biases have been corrected and thus AV's and official rankings can be compared at any level. The correction of the biases reveals that N. Sarkozy's voters were overrepresented and F. Bayrou's underrepresented in our data.

Let us briefly comment these results. The first conclusion is obvious: rankings under AV and EV and official voting are totally different, not only for details, but even for the winning candidate. Indeed, in 2007, the winner with AV for France (François Bayrou) is not the one of the official ballot (Nicolas Sarkozy, the current French president).

⁴ We will come back on this issue in "Implications for the French Presidential Electoral System".

Table 4.4 AV's and EV's results (2,693 valid AV ballots, 2,738 valid EV ballots)

	Approval Voting (AV)			Evaluation voting (EV)				Official ballot		
	Number of approvals	Percentage of ballots	Percentage of approvals	Nb of grade 2	Nb of grade 1	Score	Percentage of scores	Average grade	Number of voices	Percentage of ballots
N. Sarkozy	1,216	45.15	19.41	1,049	544	2,642	15.96	0.96	1,551	34.11
S. Royal	1,176	43.67	18.77	903	771	2,577	15.57	0.94	1,073	23.60
F. Bayrou	1,340	49.76	21.39	979	987	2,945	17.79	1.08	1,045	22.98
J.-M. Le Pen	312	11.59	4.98	205	345	755	4.56	0.28	346	7.61
O. Besancenot	637	23.65	10.17	417	821	1,655	10.00	0.60	184	4.05
P. de Villiers	242	8.99	3.86	165	433	763	4.61	0.28	77	1.69
M.-G. Buffet	198	7.35	3.16	122	650	894	5.40	0.33	37	0.81
D. Voynet	456	16.93	7.28	280	909	1,469	8.87	0.54	97	2.13
A. Laguille	250	9.28	3.99	202	695	1,099	6.64	0.40	46	1.01
J. Bové	309	11.47	4.93	188	678	1,055	6.37	0.39	50	1.10
F. Nihous	91	3.38	1.45	58	296	424	2.56	0.15	29	0.64
G. Schivardi	38	1.41	0.61	24	227	275	1.66	0.10	12	0.26
Total	6,265	233.64	100	4,598	7,357	16,553	100	6.05	4,547	100

Table 4.5 AV's results, extrapolations to France – 2007. For France, the official results of the second round were : Nicolas Sarkozy (53.1%) and Ségolène Royal (46.9%)

	Cigné		Louvigny		Illkirch		France									
	Approval	Official	Approval	Official	Approval	Official	Approval	Official								
N. Sarkozy	37.2	3	29.6	1	37.9	3	28.5	2	51.1	1	38.6	1	35.9	3	31.2	1
S. Royal	49.8	1	26.3	2	51.3	1	30.7	1	37.7	3	18.3	3	41.6	2	25.9	2
F. Bayrou	40.5	2	20.8	3	49.8	2	23	3	51	2	23.2	2	42.8	1	18.8	3
J.-M. Le Pen	7	10	4.6	5	7.2	10	4.1	5	15.2	6	10.4	4	13.9	7	10.4	4
O. Besancenot	26.1	4	4.2	6	28.1	4	5	4	20.3	4	3.4	5	27.9	4	4.1	5
P. de Villiers	12.6	7	5.8	4	8	9	1.7	7	9.1	9	1.2	7	11.1	9	2.2	6
M.-G. Buffet	9.3	8	2	7	10.1	7	1.3	8	5.2	10	0.4	10	9.8	10	1.9	7
D. Voynet	14.9	6	0.3	12	18.3	5	2.2	6	16.3	5	2.3	6	16.6	5	1.6	8
A. Laguiller	7.9	9	2	7	9.6	8	1.2	9	9.3	7	0.8	9	11.4	8	1.3	9
J. Bové	19.1	5	2	7	13.3	6	1.1	10	9.2	8	1	8	15.2	6	1.3	10
F. Nihous	6.1	11	2	7	4.5	11	1.1	10	2.3	11	0.2	12	4.4	11	1.2	11
G. Schivardi	3.7	12	0.7	11	1.3	12	0.2	12	1.1	12	0.2	11	1.9	12	0.3	12
Total	234		100		239.4		100		228		100		232.5		100	

Second, some political parties receive numerous approvals and positive grades (mostly, the “little” candidates of the alternative Left-wing – O. Besancenot, D. Voynet, J. Bové, A. Laguiller – plus the Green candidate, D. Voynet), whereas they are almost nonexistent in the official results. Conversely, some other candidates (J.-M. Le Pen especially, the candidate of the extreme Right) lose from the two new methods. For instance, J.-M. Le Pen falls from the 4th position in the official vote to the 7th position in AV's national data. EV's ranking is even more unfavorable to him (10th position).

Third, we observe that no candidate attracted an absolute majority of approvals at the national level. But one must note that such a score is possible since F. Bayrou has been approved of by 51% of voters in Illkirch, by 49.8% in Louvigny. As such, these very high proportions of supports are very meaningful.

In a nutshell, it is obvious that AV's and EV's results largely differ from the official ones. Both in AV and EV voters seem to support and to give strictly positive grades to some candidates that can appear as nonexistent if we analyze the results of the official ballot only. Besides, since they allow the voters to give their opinion on each candidate, both AV and EV lead to select the same winner, which is not the one of the two-round system.

Implications for the French Presidential Electoral System

In this last section, we attempt to bring about the teachings of our experiment as regards its implications for the French presidential electoral system. We first show that the so-called advantages of the current voting rule, the two-round system, are not really based on facts. The analyses of our data and questionnaires lead to the determination of two criteria, which appear essential for a voting rule. Finally, we

claim that AV in particular would be a more adequate voting method than the current system.

The Properties of the French Presidential Electoral System

The two-round system is said to have two advantages. First of all, it keeps a large number of candidates in the first round, which is possible thanks to the two rounds, while Duverger's law establishes the contrary for one round elections. The second advantage is to guarantee an absolute majority to the winner. The analyses that we have conducted with our experimental data strongly shake these two common beliefs about the two-round system.

The first advantage is that the two-round system guarantees the existence of many candidates in the first round: it is supposed to testify a wide and lively political debate in the country; it also provides the opportunity for an extensive analysis of the voters' preferences, which is much poorer in the context of a one round election in which a very limited number of candidates participates. The robustness of this first advantage is shaken by the three following arguments.

Firstly, the presence of many candidates in the first round does not imply the participation of many viable candidates. A viable candidate may be defined in two ways: either she is the one who is likely to win the first round and run the second one; either she is the one who is likely to win. Most often, they are the same but there may be some exceptions. Some may win the first round and are not likely to win the elections (for instance J.-M. Le Pen during the 2002 French presidential elections); some others may be a potential winner but could not win the first round (F. Bayrou may be considered as such an example in 2007). Let us consider the set of viable candidates as the union of these two definitions. Further, one can admit that problems – namely paradoxes – occur when the number of viable candidates exceeds two, which is not rare during national elections. The 2002 presidential elections is the most obvious example of such a malfunctioning. The exclusion of F. Bayrou from the second round in the 2007 presidential elections, whereas he is supposedly the Condorcet winner is also an interesting illustration. In other words, the presence of many candidates in the first round does not mean that they are all viable, but in spite of this, voting paradoxes still occur since the number of viable candidates often exceeds two.

Second, with the work down on experimental data, we can observe (see Baujard et al. (2009) Baujard et al. (2011)) a sequence of two overlapping framing effects induced by voting rules, and by the two-round system in particular. As voters learn to vote strategically, they tend to vote less and less for certain candidates they otherwise appreciate when the latter are not viable. Then political parties react strategically to voters' strategies. They intend to maximize their chances to convert a support (expressed through an approval or a strictly positive grade) into a vote in the two-round system: they want to attract the wider electorate and to dilute as less as possible their supports with close political parties. This would explain the

reduction down to a single candidate in the wide rightist space (namely N. Sarkozy in our experiment) and his eventual victory. If this argument is taken to its extreme, political parties would rationally organize their political positioning and coalitions or splits with other parties. As a consequence, elections after elections, the number of candidates in the first round should eventually reduce to the number of viable candidates, i.e., around two or three. This would eventually amount to the same results as what Duverger's law anticipates in the case of one round system. For a candidate, in a nutshell, "not viable" today might even mean "not existing" tomorrow.

Last but not least, people appreciate the presence of numerous political parties in the first round of the two-round system because the debate is much richer. This richer debate provides extensive information on voters' political preferences and about the French political landscape. This argument is again very controversial, since the analysis based on official data is often partial. This has been clearly shown by [Laslier \(2006\)](#), [Baujard and Igersheim \(2007a\)](#), and [Baujard et al. \(2011\)](#). In these works, it is shown that we learn different and more nuanced information on voters' preferences from ballots when the voting rule is multinominal rather than uninominal. We should indeed make a clear-cut difference between voters' preferences and votes: votes are just an expression of preferences, which strongly depend on the voting rule. Among other framing effects, let us remind some of them. Uninominal voting rules compel voters to select one candidate even when they are hesitant: imagine you are indifferent between two top-candidates A and B, while you need to vote just for one of them. Then the vote you attribute to A rather than B does not mean much more than the mechanical effect induced by the uninominal rule. Besides, the results obtained for uninominal rules are sensitive to cases of similarities between candidates. Recall that the two candidates L. Jospin and C. Taubira in the 2002 French presidential elections were considered very much alike; it is very likely that votes for C. Taubira would have been attributed to L. Jospin if she had not run the elections. We can call her a clone candidate to L. Jospin. The presence of such clone candidate in this election was a sufficient factor for excluding L. Jospin from the second round and from winning the elections. This paradox is clearly annoying. Conversely, notice such paradoxes would not occur with multinominal voting rules. Furthermore, the two-round system, as any other rule but more strongly than many of them, is inducing strategic voting: a strategic vote does not reveal individual preferences or dis-preferences for candidates they do not vote for, but clearly just a part of voters' preferences. The experiments have indeed confirmed that official ballots convey a distorted information on preferences.

Let us summarize our conclusions about this first so-called advantage of the two-round system: very few candidates are viable even if the number of viable candidates is often sufficient to lead to paradoxes; the participation of many candidates does not mean much; it does not teach much. Eventually, the problem at stake is certainly not one or two rounds – in favor of the two-round system – but uni- vs. multinominal rules – in favor of the latter.

Political scientists, politicians, and citizens seem to appreciate the fact that the two-round system selects a winner with an absolute majority. This should be the second definitive advantage of the two-round system. Absolute majority is indeed

considered as the guarantee of the legitimacy of the winner, a condition for a good mandate.⁵ Some would defend it, by saying that, even if they acknowledge absolute majority is a mere consequence of the two-round system, it is above all necessary: as we say in French, “nécessité fait loi”. And no need to discuss further. A last series of argument proceeds from the historical tradition of the French electoral system: legitimacy has been historically associated with absolute majority and this is the way citizens still consider the former (see [Tanchoux \(2004\)](#)).

Now, it should be made clear that the absolute majority of the second round of the two-round system is absolutely artificial since it is the result of the construction of the voting rule. In other words, this absolute majority does not mean much about voters’ preferences, it is just a property of the rule. Let us show it by contradiction. The only way that there would not be an absolute majority in a two-round system is that no voter would participate to the elections, or that all voters would be indifferent and vote blank when participating. The last case, a little bit more realistic, would be an exact tie between the two winners of the first round. In every other case – i.e., always –, the absolute majority is just a characteristic of the rule.

In other words, the second advantage attributed to the two-round system is based on two primary assertions: absolute majority is the core of legitimacy; absolute majority is the characteristic of the voting rule. Henceforth, the winner does not get this legitimacy from voters’ preferences, but from the choice of the voting rule which mechanically generates the conditions for legitimacy. To avoid this disturbing conclusion, some had pretended that the truth on the winner is based on Reason or on some uncontroversial mathematics.⁶ After more than 50 years of development of social choice theory, the experiment has confirmed that there exists no mathematic truth in the collective representation of individual preferences, and that the distinction between majority and legitimacy is compelling. Once it is acknowledged that the result of an election is strongly dependent on the voting rule, there just remains the necessity of a full debate on the properties a society wishes for its voting rule.

⁵ See, for instance, [Ihl \(2000\)](#): “dans des conditions de régularité et de transparence indiscutables, la première fonction du vote dans nos démocraties représentatives est d’obliger les participants par le résultat qu’il produit, de soumettre les votants au verdict qu’il rend. Pour une élection politique du type de l’élection présidentielle, le vote légitime incite donc le gagnant de l’élection à agir sur ceux qui l’ont élu, lesquels électeurs se soumettent au résultat électoral. Seconde fonction du vote, dans une démocratie représentative, l’élection a pour mérite de départager des individus ou équipes en compétition en vue de désigner un chef ou un gouvernement; elle permet de choisir entre plusieurs programmes de gouvernement par le biais des programmes électoraux. Dans cette même logique, pour que l’élu puisse agir légitimement sur la communauté politique, les résultats électoraux doivent traduire un choix indiscutable de ses membres”.

⁶ See, for instance, [Tanchoux \(2007\)](#): “Cette règle majoritaire non seulement confère la force du nombre à la décision adoptée, mais postule surtout que le plus grand nombre de voix est assimilable à la saniorité du résultat et légitime ainsi la décision comme étant la plus conforme à la raison. Renforcé symboliquement à partir de 1848 dans le cadre d’un suffrage universel où chaque citoyen est incorporé dans la collectivité nationale par le poids d’une voix, le sens de cette somme s’est étendu comme étant également l’agrégation des volontés individuelles. Par là même, la puissance du nombre surenchérit encore sur l’évidence de la raison”.

Legitimacy lies in the quality of this debate and the adequacy of the election system, not only in historical grounds, but also in voters' assessment of what they expect from a voting rule.

French Voters' Assessment of Experimented Voting Rules

Both 2002 and 2007 framed-field experiments have been conducted over a very large scope of voters. In particular, the 2007 pilote experiment has implicated 500 persons, and the 2007 experiment around 5,500 voters – among which more than 2,800 participants. Much information on the voters' assessment of voting rules have been derived from direct interactions or systematic questionnaires that we have had with the numerous participants. As this was patent in the public debate since 2002, a large part of them appeared clearly frustrated by the Presidential electoral system, in which they feel their political preference is hardly heard, well interpreted, or even taken into account. Yet very few of them said they thought of questioning the voting rule; the experiment has hence come to open such an opportunity for a debate. Let us show what we have learnt about the criteria voters expected from a voting rule, and how they behave in front of different voting rules. In judging a voting rule, two criteria have been found decisive for participants: the ability to express oneself on the one hand, simplicity and transparency on the other hand. This importance of expression is testified by the analysis of two kinds of data: (1) the actual use of the ability to give wider information about voters' preferences through the experimental ballots; (2) the answers to questionnaires.

First, the global statistics of AV and EV testify that the participants to the experiment actually use the possibility of broader expression generated by the two tested voting methods. The first example of this behavior is given by Table 4.6 and Fig. 4.1. Each voter approves 2.33 candidates on average. However, one can note that even if they can give their opinion on all the candidates, around one quarter of the participants (27.33% or 736 participants) approve of one candidate only, as if they were in the official ballot. This faithfulness to the uninominal logic is less marked in EV. Indeed, only 6.56% or 175 voters gave one grade 2 to a candidate only and 0 to the other ones. Therefore, the voters modify their political expression even more with EV than with AV. Let us consider the distribution of grades of EV. Approximately 2,738 voters gave 32,856 grades ($32,856 = 12 \times 2,738$), which are distributed into grades 0, 1, or 2 as shown in Table 4.7 and Fig. 4.2. The average total sum of grades for a valid ballot is equal to 6.05 (with $6.05 = (7,357 + 2 \times 4,598)/2,738$). If a

Table 4.6 Number of approved candidates

Approvals	1	2	3	4	5	6	7	8	9	10	11	12
Ballots	736	905	673	264	75	23	13	1	1	1	0	1
Percentage of ballots	27	34	25	10	3	1	0	0	0	0	0	0

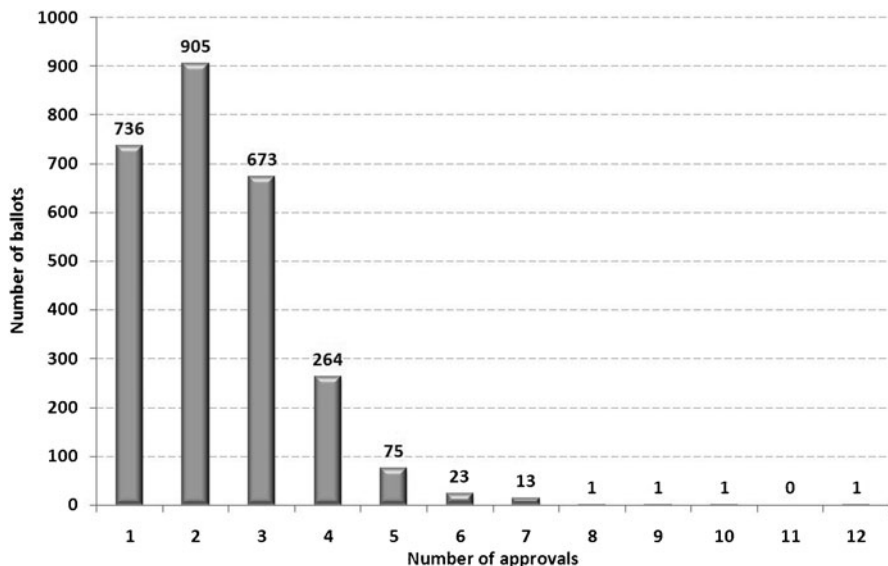


Fig. 4.1 Number of approved candidates

Table 4.7 Distribution of grades

Grade	0	1	2	Total
Number of ballots	20,901	7,357	4,598	32,856
Percentage of given grades	63.61	22.39	13.99	100

voter does not give a grade 0 to a candidate, she grants her a grade 1 in 61.5% cases and a grade 2 in 38.5% cases. This result confirms the intuition according to which assessing a candidate with a grade 2 is more rare, more exceptional than any other grade or approval. The comparison of the global statistics of AV (2.33 approvals in average per valid ballot) and those of EV (6.05 as the average total sum of grades per valid ballot) clearly shows that the voters adopt a different behavior facing one or the other voting method. In particular, they did not mechanically convert an approval for a candidate in AV into a grade 2 for this candidate with EV. Hence, giving a strictly positive grade to a candidate does not mean the same thing as approving of a candidate. Let us examine further this issue thanks to Table 4.8. It can be read as follows: 149 ballots include no grade 2, 1,345 include it once, 728 twice, and so on; 306 ballots include no grade 1, 528 include it once, and so on. We notice that an almost absolute majority of voters give only one grade 2 (49.12% of them) and two grades 1 (20.1%). Besides, the distribution of the variable grade 2 is much less diluted than the one of grade 1, which includes high values from 0 to 6 times. On average, 1.68 grade 2 and 2.69 grade 1 per ballot are given by voters and the variances are respectively equal to 0.6 and 5.30. The average number of approvals per ballot is higher than the average number of grade 2 per ballot (2.33 against 1.68):

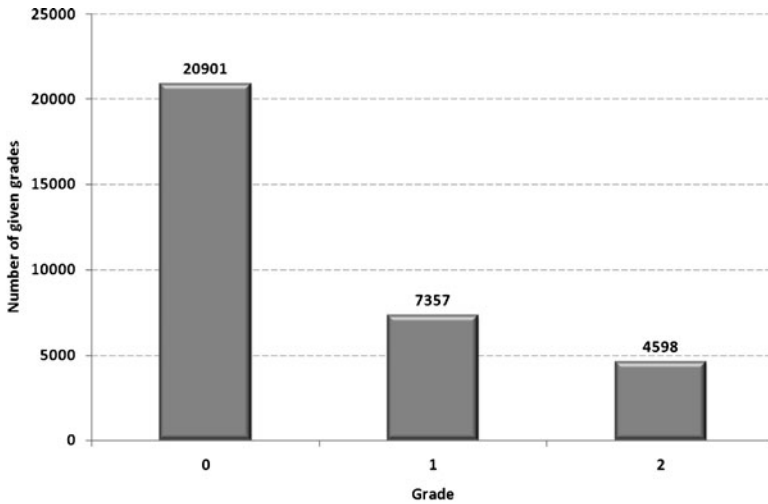


Fig. 4.2 Histogram of the distribution of grades

Table 4.8 Number of grades (0,1 or 2) per ballot, for 2,738 valid ballots

Number	0	1	2	3	4	5	6	7	8	9	10	11	12
Grade 2	149	1,345	728	335	124	32	10	4	1	0	0	0	0
Grade 1	306	528	550	496	379	268	135	48	17	8	2	1	0
Grade 0	2	5	27	57	121	270	360	367	483	448	366	232	0

Table 4.9 Answers to the opened question: “What did you appreciate in this experiment?”

Items (several items per answer)	Nb. occurrences
Initiative of such an experiment, its consequences	305
Possibilities of extended expression in both voting methods	247
Concrete procedure of the experiment	75
Simplicity of both voting methods	48
Number of positive answers (for 1,275 questionnaires)	626

again, it confirms that voters have not systematically converted their approval into a grade 2, but have used the possibility of giving a grade 1 as well to express a moderate support for a candidate.

Second, the answers to the 2007 questionnaire testify too that voters really have used all the possibilities given by the two voting methods to express their political opinion. Let us analyze Tables 4.9 and 4.10. More than 600 participants have answered the opened question “What did you appreciate in this experiment?” and 247 of them have explicitly stressed the extended expression’s possibilities these two voting methods make it possible. Conversely, let us observe that a small number of participants (75) have informed us that they did not appreciate the experimented voting rules.

Table 4.10 Answers to the opened question: “What did you dislike in this experiment?”

Items (1 item per answer)	Nb. occurrences
Experimented voting methods	75
Lack of anterior information	37
Initiative of the experiment, its organization	34
Disappointment regarding the small scale of the experiment	4
Number of negative answers (for 1,275 questionnaires)	150

Finally, all these analyses allow us to conclude that a quasi-unanimity of the participants to the 2007 experiment appreciate the wider possibility of expression of AV and EV.

On the other hand, simplicity and transparency also seem to be fundamental requirements for a voting rule. Simplicity describes the fact that any citizen, whatever her intellectual ability and qualification, may understand the voting rule easily so that she may use it.⁷ We could check it by the following text: let her vote with the experimental ballot, then ask her what she has done. If she did analyze what she has done properly, the rule is supposed to be simple enough. Transparency comes after, it requires that the computation of the election outcome should be obvious and reproducible by any voter, which leads to two conditions. First, any voter should be able to compute herself the outcome of the election whatever her mathematical knowledge. Second, it should not rely to machines, which excludes any complicated rule based on long counting or computer counting of the outcome. Thanks to the questionnaires, it can be shown that the participants have appreciated the simplicity of the experimented voting rules: indeed, 48 of them have explicitly stressed the simplicity of both voting methods (see Table 4.9), whereas a recurrent remark was that too sophisticated rules would plead in favor of electronic voting or electronic counting, which are clearly condemned by the participants because of their lack of transparency.

Comparing Voting Rules

We pointed out above that according to the numerous participants of our experiment two criteria – ability to express oneself and simplicity and transparency – are essential properties for a voting rule, especially for national elections. Besides, we attempted to prove that both AV and EV share these two important properties, whereas the two-round system only satisfies simplicity and transparency, but

⁷ The understanding of a rule may be considered at different levels. See J.F. Laslier’s paper, in this book, on this subject.

Table 4.11 Answers to the question: “Are you satisfied with having taken part in this experiment?”

	Nb. occurrences	Percentage
Yes	1,041	88.7
Rather yes	87	7.4
Rather no	6	0.5
No	6	0.5
Don’t know	34	2.9
Total	1,174	100

Table 4.12 Answers to the question: “Do you consider that the rules of approval voting are easily understandable?”

	Nb. occurrences	Percentage
Yes	826	66.9
Rather yes	205	16.6
Rather no	80	6.5
No	98	7.9
Don’t know	25	2.0
Total	1,234	100

Table 4.13 Answers to the question: “Do you consider that the rules of evaluation voting are easily understandable?”

	Nb. occurrences	Percentage
Yes	987	78.6
Rather yes	133	10.6
Rather no	41	3.3
No	76	6.1
Don’t know	19	1.5
Total	1,256	100

falls down through a lack of possibility of expression. It should logically lead from these two observations that the participants have appreciated the experimented voting rules. Again, the questionnaires give rich information on this subject.

It can be easily checked that a quasi-unanimity of participants feel satisfied with having taken part in the experiment since 96.10% of the voters who answered the question “Are you satisfied with having taken part in this experiment?” have said “yes” or “rather yes” (see Table 4.11). One can suppose that at least a part of this satisfaction comes from the satisfaction voters got from the voting rules themselves. But more specific questions allow us to support this assumption. Almost 83.5% of voters said they have well understood or rather understood AV – notice that this is slightly more for EV (89.2%) – see Tables 4.12 and 4.13. Further, 75.1% of participants claim that AV could be used for official elections (presidential, legislative, etc) against 87.9% for EV – see Tables 4.14 and 4.15. One can observe a strong stance of voters in favor of AV and EV, with a preference for EV. This can be explained by the principle of EV in itself, i.e., giving a positive grade to each candidate is very well known (school, sporting events, etc), thus very easy to understand and to adapt.

Hence, EV is a voting method which combines the two essential criteria and which seems to be preferred by the voters. Besides, this kind of voting rule

Table 4.14 Answers to the question: “For which official election do you think that approval voting could be used?”

	Nb. occurrences	Percentage
Presidential election	503	32.4
Legislative election	567	36.5
Other election (council, etc.)	97	6.2
No election	387	24.9
Total	1,554	100

Table 4.15 Answers to the question: “For which official election do you think that evaluation voting could be used?”

	Nb. occurrences	Percentage
Presidential election	720	40.2
Legislative election	723	40.4
Other election (council, etc.)	130	7.3
No election	216	12.1
Total	1,789	100

includes many good theoretical properties as stated by [Felsenthal \(1989\)](#), [Hillinger \(2004a,b,c, 2005\)](#) and [Smaoui \(2007\)](#). But, as the two-round system even if in a slightly different way, it gives rise to a very serious difficulty since some levels of grades are not strategic. For the three levels of grades (+2,+1,0), the grade +1 is not strategic, only giving 0 or +2 to a candidate is. Why? Suppose, for instance, that a voter strongly preferred O. Besancenot (in other words, she would like to see him winning the elections), then she weakly prefers S. Royal and F. Bayrou, and finally she strongly disagrees with the nine other candidates. For this voter facing EV, the natural tendency would be to give a grade 2 to O. Besancenot, a grade 1 to S. Royal and F. Bayrou, and 0 to the other candidates. But she knows that (1) among the candidates to which she gives 0 N. Sarkozy is a very serious candidate (or a viable candidate); (2) O. Besancenot might be not a viable candidate, whereas S. Royal and F. Bayrou are. Thus, by giving the latter a grade 1 only, she risks to see N. Sarkozy being selected and this would amount to allow a candidate she does not like to be the winner against two other candidates she prefers (even weakly). Finally, according to her strategic reasoning, she would give a grade 2 to all the candidates she prefers (strongly or weakly) and a grade 0 to every other. EV thus incites the voters to vote strategically or at least it compels them to make a decision about voting strategically or not. But this implies another difficulty, possibly more annoying: the strategic reasoning described above might be not accessible to every voter. Some of them might not understand that EV is sensitive to strategic behaviors and hence it leads to a real problem of equity between the voters who understand it and vote accordingly – or not – and the others.⁸

Besides, EV encounters other drawbacks. On the one hand, some participants (pilote and April 22nd) have expressed the wish of giving no grade to a candidate,

⁸ We thank F. Maniquet for having pointed out this important issue. See, on this argument, [Abdulkadiroglu et al. \(2006\)](#).

i.e., to vote blank for this candidate. But as regards the computation of the outcome of the elections, the wish to take into account blanks differently than zero grade is very difficult to meet, since, first, the number of valid ballots would differ from one candidate to another; second, one cannot be sure that the voters would interpret the same way this possibility (for some of them, giving the grade 0 could amount to the same thing).⁹ On the other hand, the chosen levels of grades are always questionable. (+2,+1,0) could be criticized for voters' interpretation of +1 could differ (indifference or weak preference). The levels (+1, 0, -1) proposed by C. Hillinger are maybe more intuitive. But a negative grade brings about another difficulty: in some circumstances, the winner of the elections could have a negative average, which strongly weakens from the start her legitimacy.¹⁰

Finally, EV is a method the voters like but which induces numerous problems they do not think of at first sight. Now, we have noticed previously that AV satisfies as well the two essential criteria of a voting rule: possibility of expression plus transparency and simplicity. In "Main Results", we pointed out that the final rankings of AV and EV are very close from each other. Besides, the selected candidate – F. Bayrou – is the same for both methods. Since AV is not subject to the drawbacks of EV (especially strategic voting and difficulty in choosing "good" levels of grades), one can conclude that AV seems to be an adequate voting rule which combines the two essential criteria as EV without its disadvantages.

A last claim should be added before concluding. Many people would criticize the pluri-nominal rules on the following basis: F. Bayrou would have been elected, whereas he did not appear as a good president to them.¹¹ Let us remind that this experiment is not saying that F. Bayrou would have been elected with AV neither EV if they were the current electoral systems. The usual "*ceteris paribus*" assumptions would indeed not hold here. The electoral results depend on the political landscape, which itself depends on the electoral system: it has been shown in Baujard et al. (2011) that the political parties choose their positional strategies on the constraints of the forces of the two-round system. In other words, if AV was the current voting rule for the French presidential elections in France, we could imagine that somebody else would have been elected, or, that, if F. Bayrou would have been elected, he would have then most likely kept the political support in assembly. Henceforth, the critic does not hold. The winner would be somebody who would attract most approvals from voters, and that is the only reliable guess we could make.

⁹ Note that AV faces the same problem: not approving of a candidate has two meanings, either the voter does not like this candidate, or she is indifferent.

¹⁰ Further, most of the internet sites enumerated in "Experimental Design" plus the majority of questionnaires are not in favor of negative grades.

¹¹ This argument is not strictly led by political preferences – which would be an irrelevant remark to our problem–; they argue that he does not have the political support, in assemblies among others, to conduce viable policies.

Concluding Remarks

On April 22nd, 2007, we have run a framed-field experiment on Approval Voting and Evaluation Voting during the first round of the French presidential elections.

Numerous teachings are directly induced by this experiment: they give rise to some implications for the French presidential electoral system. (1) The principle of AV and EV are easily understood and accepted by the voters. (2) Within the observed political context, compared to the official first-round vote, AV and EV modify the overall ranking of candidates. With AV and EV, the winner of the French presidential elections is François Bayrou, and not Nicolas Sarkozy, the incumbent president. (3) According to the participants to our experiment, two criteria are essential for a voting rule: possibility of expression; simplicity and transparency. AV and EV satisfy these two criteria, whereas the two-round system falls down through a lack of possibility of expression. (4) In spite of EV's numerous advantages, including the fact that the voters seem to prefer it, AV shows the same properties, without EV's difficulties.

In a nutshell, we can conclude that AV seems to be an adequate voting method for official elections. Our data and analyses testify this claim for a better democracy.

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Chapter 5

Lessons from In Situ Experiments during French Elections

Jean-François Laslier

Introduction

In 2002 and 2007, during the French presidential elections, several experiments have taken place, designed to test the reaction of the public to new voting rules. What have we learned from them so far? These experiments are of a rather original nature and raise several methodological issues with respect to their design and to the analysis of their results. To assert what can be learned and what cannot be learned, I will discuss the methodological issues at stake. I will in particular show that the conclusions to be derived from such experiments are very sensitive to some details of the protocol and also to some details of the voting rules under scrutiny.

The main goal of these experiments is the comparative study of voting rules. Therefore, the closest precedents are (a) comparative studies of voting rules across countries/time; (b) some rare comparative studies of voting rules within one election; (c) laboratory experiments on voting rules. Point (a) is a major trend in Political Science. It mixes the questions of voter behavior and party behavior, which is certainly a virtue from the point of view of realism but a problem for scientific analysis. By definition, (a) is not interested in nonexistent voting rules. Point (b) is rare, one example being the study done during the election of the council of the Social Choice and Welfare society in 1999.¹ Point (c) is also rare but we now have some studies of this type: Forsythe et al. (1993, 1996), Blais et al. (2007, 2010), Béhue et al. (2009), Kube and Puppe (2009), Van der Straeten et al. (2010).

¹ See Brams and Fishburn (2001), Saari (2001) and Laslier (2003). The survey Brams and Fishburn (2005) contains discussions of various instances of Approval Voting, which can be considered as somehow in between observation and experimentation.

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A complete description of the protocol of these “live experiments” will be provided in the next section² but two main points should be mentioned now:

- Participating to such an experiment has no direct consequence. Such is also the case in opinion survey, and experiments are a priori facing the same methodological difficulties as survey research. In particular, the participation bias might be important. Correcting for the bias is more difficult than in a survey because we do not know the personal characteristics of each respondent, see “Conclusions”. At that point, these “live” or “in situ” experiments should be contrasted with laboratory experiments that follow the standards of experimental economics, in which participants incentives are controlled through monetary rewards.³
- The experience uses the decorum and etiquette of a true election. In particular, open participation, anonymity and confidentiality are guaranteed to the participants. This is different from pool surveys and from laboratory experiments. The event is also presented like a scientific test of a voting rule, and not like an exit poll. It seems reasonable (although we have no absolute proof of that) to think that this framing lowers the participation and observation biases.

This kind of experiments raises several methodological problems:

1. There is obviously no control of the political supply. The situation is similar to comparative analysis since the political situation can only be the real one, but the political situation does not vary and thus no comparison is done!
2. There is no control of the sample. The protocol described above imposes that participants cannot be selected, so the only selection is self-selection.
3. Each observation is relatively poor, because an observation is just one anonymous ballot from a pooling station. Even if ballots are complex as are ballots of approbation, ranking or evaluation, no other individual characteristic is known.⁴
4. We do not know exactly what is the voter’s understanding of the voting rule. If the voting rule on test is complex, then some voters may not know how the ballots will be counted.
5. There are potential ethical problems in case some voter understand incompletely or even wrongly the voting rule itself or the goal of the experiment.

The methodological problems are related, on one hand, to difficulties for the voter to complete the task and to understand the voting rule and the experiment; and, on the other hand, to difficulties for the researcher to reach sound conclusions on

² The original papers are: Balinski et al. (2003), Balinski and Laraki (2007), Baujard and Igersheim (2007), Laslier and Van der Straeten (2002, 2004, 2008). See also a similar experiment on Approval Voting made in the town of Messel (Germany) by Alós-Ferrer and Granić (2010), during the 2008 state elections in Hesse.

³ Principles of experimental economics are explained in Davis and Holt (1993). For experiments in Political Science, see Green and Gerber (2002). Examples of experiments on voting include Fiorina and Plott (1978), McKelvey and Ordeshook (1990), Wantchekon (2003).

⁴ Baujard and Igersheim (2007) slightly move away from this methodology by asking participants to fill questionnaires.

the basis of the collected data. The next section describe the experiments. The two following ones are devoted to the problems on the voters side (“Voter’s Difficulties”) and to the analytical difficulties (“Analyzing the Results”).

Description of the Experiment

I here describe the experiment made on April 21, 2001, during the first round of the French presidential election. Recall that the French presidential election is a runoff system. If a candidate gets at least 50% of the votes in the first round, he or she is elected. If no candidate gets at least 50% of the score (which is usually the case), the first two candidates meet in a runoff round. Who gets the majority of the votes in this second round is elected. In 2001, 16 candidates were vying. Jacques Chirac (*Rassemblement pour la République*, conservative) came first. He was followed by Jean-Marie Le Pen (*Front National*, nationalistic law-and-order movement) and the former prime minister Lionel Jospin (*Parti Socialiste*) came third. This event was a big surprise. I first describe the experimental protocol, and then provide some elementary statistics about the obtained data.

The Protocol

The experiment was run in six voting places: the single voting post of the village of Gy-les-Nonains (Loiret) and five (out of 12) voting posts in the city of d’Orsay (Essonne). Gy has 482 registered voters and the five voting posts in Orsay include 4,237 registered voters. We were kindly helped by the people locally in charge of the organization of the election.

One week before the election day, we sent to each registered voter a letter at his/her personal address. The voting rule to be tested (Approval Voting, with no runoff) was explained, we carefully explained that the experiment was done for scientific purpose and would not interfere with the official vote, and we asked for their kind participation. The same information was provided in the municipal bulletin.

On the day of the election, we set specific voting booths, tables, and urns, in the same room (or in an adjacent room) where the official vote was taking place. After voting for the official vote, the voter was invited to proceed to participate to the experiment. He or she received an approval voting ballot paper with the names of all candidates and could fill it and return it anonymously. Everything in fact was designed to mimic the official voting procedure. Note that only the voters who turned out for the official vote were able to participate to the experiment.

Some Statistics

In France, almost every citizen above 18 is registered as a voter. The ratio of votes to registered voters measures the turn out, and turn out may be high for the presidential

election. Participants to the experiment all came to vote for the official vote, so the participation rate at the experiment is defined as the percentage of participants among the voters who were present on this day. Voters’ reaction to the experiment was generally favorable and high participation rates were observed: about 75% in Orsay and more than 90% in Gy-les-Nonains. Table 5.1 provides these figures.

On average, a voter approved of 3.15 candidates out of 16. The distribution around this value is rather smooth, as can be seen in Table 5.2. One can notice that one-name ballots are not overrepresented.

To give a flavor of the data obtained from this experiment, Table 5.3 provides the “association matrix” for one voting post (Gy-les-Nonains). In this symmetric matrix, candidates are in line and in column. The cell corresponding to candidates *A* and *B* indicates the number of voters who approved both *A* and *B*. In the diagonal are the candidates’ approval scores. For instance, 139 participants approved Jacques

Table 5.1 Participation at the experiment

		Gy	Orsay	All
Official	Registered voters	482	4,237	4,719
	Votes cast	395	2,951	3,346
	Turn out rate	82.0%	69.6%	70.9%
Experimental	Participants	365	2,232	2,597
	Participation rate	92.4%	75.6%	77.6%

Table 5.2 Number of approved candidates

Average number : 3,15 out of 16											
0	1	2	3	4	5	6	7	8	9	10	>10
36	287	569	783	492	258	94	40	16	6	1	5

Table 5.3 Association matrix at Gy-les-Nonains

	Jc	Lp	Lj	Fb	Al	Jp	Nm	Ob	Js	Am	Rh	Bm	Ct	Cl	Cb	Dg
Jc	139	51	15	47	10	28	11	10	36	48	3	31	5	9	6	3
Lp	51	119	10	22	18	17	9	13	21	22	5	44	3	5	4	4
Lj	15	10	87	14	21	17	40	24	11	5	26	0	23	9	5	4
Fb	47	22	14	85	10	25	13	9	10	33	3	13	8	14	7	2
Al	10	18	21	10	64	13	19	24	10	3	18	6	11	11	7	12
Jp	28	17	17	25	13	67	10	11	10	19	2	7	8	11	4	3
Nm	11	9	40	13	19	10	67	32	7	9	15	3	15	10	4	12
Ob	10	13	24	9	24	11	32	62	10	8	16	9	16	13	3	15
Js	36	21	11	10	10	10	7	10	74	18	5	13	5	6	6	4
Am	48	22	5	33	3	19	9	8	18	77	2	15	4	10	6	3
Rh	3	5	26	3	18	2	15	16	5	2	37	0	5	4	3	7
Bm	31	44	0	13	6	7	3	9	13	15	0	62	1	2	4	4
Ct	5	3	23	8	11	8	15	16	5	4	5	1	33	7	4	3
Cl	9	5	9	14	11	11	10	13	6	10	4	2	7	36	5	4
Cb	6	4	5	7	7	4	4	3	6	6	3	4	4	5	21	1
Dg	3	4	4	2	12	3	12	15	4	3	7	4	3	4	1	26

Table 5.4 Candidate scores at Gy-les-Nonains. Average number of approval per ballot is 2.90

	Experiment “approval voting”		Official score
	Percentage ballots	Percentage approvals	Percentage ballots
J. Chirac	38.19%	13.16%	19.64%
J.-M. Le Pen	32.69%	11.27%	19.64%
L. Jospin	23.90%	8.24%	11.11%
F. Bayrou	23.35%	8.05%	6.72%
A. Laguiller	17.58%	6.06%	13%
J.-P. Chevènement	18.41%	6.34%	4.65%
N. Mamère	18.41%	6.34%	4.65%
O. Besancenot	17.03%	5.87%	2.84%
J. Saint-Josse	20.33%	7.01%	9.56%
A. Madelin	21.16%	7.29%	5.17%
R. Hue	10.16%	3.50%	3.10%
B. Mégret	17.03%	5.87%	2.84%
C. Taubira	9.07%	3.12%	0.52%
C. Lepage	9.89%	3.41%	2.84%
C. Boutin	5.76%	1.99%	0.78%
D. Gluckstein	7.14%	2.46%	1.81%
Total	290.11%	100%	100%

Chirac (Jc), and the number 51 at the intersection of the line Jc and the column LP means that 51 participants approved both Jacques Chirac and Jean-Marie Le Pen.

Table 5.4 provides the relative candidate scores in the experiment and the official vote. Notice that the approval scores can be expressed either in proportion of the number of ballots or in proportion of the total number of approvals. In the second case, the sum of percentages is 100. The two computations are equivalent up to the ratio of total approvals to total ballots, that is the average number of approvals per ballot.

Tables like these ones are the data obtained from in situ experiments. This kind of data has been used by [Laslier and Van der Straeten \(2002, 2004\)](#), [Baujard and Igersheim \(2007\)](#), or [Laslier \(2006\)](#); see “Analyzing the Results”.

Replications

This protocol had first been fine-tuned and tested in a pilot experiment with students at Sciences Po Paris by Balinski et al. in January 2002, where we tested for two voting rules: Approval Voting and Range Voting with the 0–10 scale. It was then used by Balinski, Laraki, Laslier, and Van der Straeten during the 2002 presidential election, as explained above.

During the 2007 presidential election, several teams more or less replicated the same protocol. Baujard and Igersheim tested for Approval Voting and for Range Voting with grades 0, 1, and 2. They also had some participants filling a

questionnaire about the experiment (Baujard and Igersheim 2007). Balinski and Laraki tested for an evaluative method they call the “majority judgement.” Farvaque et al. (2009) asked voters to rank-order the candidates as a test of Single Transferable Vote. In Germany Alós-Ferrer and Granić (2010) tested Approval Voting using a very similar protocol.

Voter’s Difficulties

The question of the voter’s understanding of a voting rule is delicate because it must be raised at different levels. The first level is: How to materially fill the ballot? The second level is: How will the paper ballots be counted? The third level is: What are the implications of that particular balloting procedure? During the experiments, participants ask for explanations at these different levels. Some participants claim that “they do not understand.” Nevertheless, the vast majority, if asked, answer that “they understand.” Further discussion shows that any of the three above questions can trigger a positive or negative answer to the question “Do I understand the experiment?”

Difficulties to Complete the Task

Almost all voters understand that they are asked to make marks, give points, or chose adjectives. In many cases, this knowledge will be sufficient to trigger an affirmative answer to the question “Do you understand?”

A specific problem arises for voting rules in which voters grade candidates, with ordinal or cardinal grades. In the pilot experiment at Science Po made by Balinski et al. on January 23, 2002, the average evaluation of candidates on the 0–10 scale was 2.21 points, but that figure may be misleading since many grades were 0. Out of the $408 \times 15 = 6,120$ recorded grades, about half of them are 0. Many ballots included simultaneously candidates with the 0 grade and candidates without any grade. This seems to indicate that giving a 0 grade and not grading may have two different meanings for the voter. We, nevertheless, had precisely indicated on the ballot that not grading a candidate will be counted as a 0 grade. The same problem potentially arises in the experiment of Baujard and Igersheim (2007) with the 0–1–2 scale and the additive rule.

How to solve this problem? A possibility is computing not exactly the sum of the points obtained by the candidate (or, equivalently, the average with respect to the total number of voters) but the average with respect to the number of voters, who have effectively graded the candidate. This is mathematically equivalent to replacing the missing grades of a candidate by the average of the observed grades of the considered candidate. This is impossible to justify. It might have in practice the

odd consequence that candidates who are almost unknown will have the best grades because they tend to be known by their supporters rather than by their opponents. Therefore, this is clearly not a good solution.

A reasonable solution to this problem is to explain to the voters that they are not asked to evaluate the candidates but to give points to the candidates. This is what happens in Approval Voting, and it apparently causes no misunderstanding. More detailed grading systems can be presented in the same manner if the electoral rule is that a candidate finally receives the total of points given to him or her by all the voters, such as the case in “cumulative” voting, in “range” voting, or in “le vote par note.”

The difference between saying “You are to evaluate the candidates. The candidate who will receive the largest average evaluation will be elected” and saying “You are to give points to candidates. The candidate who will receive the most points will be elected” is obsolete but is relevant. The second formulation is more concrete, which is always a good thing for an explanation. It is also neutral because it is purely factual and does not pre-suppose or impose any interpretation of the voter’s action. The word “evaluation” is closer to a particular interpretation of the meaning of the vote. But the voter is free to give any meaning to her/his vote. She/he might want to give many points to a candidate she/he does not value much. Why not? That is obviously her/his right and the legislator must not make a confusion between the statement of the electoral rule and the interpretation of people’s action. Therefore, as well as for the practical reason mentioned above, explanations should be as factual as possible. [Baujard and Igersheim \(2007\)](#) have carefully analyzed the spoiled ballots and missing grades in their data. They conclude that with the 0–1–2 scale and the simple counting rule, voters have no difficulties in completing the task.

When voters are asked to rank-order all candidates, they usually have no problem in ranking the main candidates, but have a problem for the other ones. This may cause serious problems for the Borda rule and other rank-based methods such as Alternative vote (STV) with the Hare or the Coombs system of transfers. Another problem is that, in practice, to rank-order a large set of candidate is a complicated task. This is a well-known problem in countries where these systems are in use. A practical solution to this “over-long ballot paper” problem is to let the voter follow some pre-specified ranking agreed by political parties, as done for instance for the Australian Senate election (see [Farrell 2001](#)).

When grades are presented as adjectives, as in [Balinski and Laraki \(2007\)](#), the confusion between a missing grade and the worst evaluation is not justified since the use of adjectives is intended to impose “true” meaning to the grades on top of what they actually are: being counted in the maximum-median calculus.

Voter’s Understanding of the Voting Rule per se

One may conclude that, apart from the (potentially important) question of the missing grades, participants have no difficulties completing the material task asked. In that sense, voters can answer “Yes” to the question “Do you understand”. But

of course one should not infer from such an answer that the voter has understood correctly how the ballots will be counted. The voter may be unaware that there are different, nonequivalent, ways to count complex ballots. This fact is seldom known in the general public. And even if she/he is aware of this fact, for instance because she/he has read documents about the experiment before the election day, she/he may have nevertheless failed to grasp the details, for different reasons.

This problem is of variable importance for different voting rules. At one extreme, there can hardly be any misunderstanding with simple counting procedures such as FPTP or AV, so that one-sentence explanations are sufficient to avoid any misunderstanding. At the other extreme, complex ballots demanding ranks, scores, or grades can be counted in many different ways so that one cannot trust that the participants to the experience have understood the voting rule.

The solution to this problem, following the standard good practice in experimental economics, is to show very concretely how ballots are counted before proceeding to the experiment, and to make sure that participants have assimilated the counting process. This is possible in the laboratory even with rules as complex as Alternative Vote with the Hare system of transfers, as noticed by [Blais et al. \(2010\)](#). But this is unfortunately not feasible during the kind of “live” experiments at hand. Consequently, we must face the possibility that many voters who participated to the 2007 experiments on STV or “le jugement majoritaire” were simply not understanding how ballots were counted. Two questions emerge: Why would individuals participate to something they do not understand? Is that so important?

Anyone who participated in 2002 or in 2007, as a voter or as an experimentalist, to these events, noted that they are quite pleasant. The atmosphere is rather friendly, most people seem rather happy to participate and, in addition, such an event is a positive social event. We know from the experiments of [Gerber et al. \(2008\)](#) that the social pressure is a very important determinant of turnout. Indeed positive social pressure seems to have been high during these experiments, in particular in some places (it may explain the extraordinary 92.4% participation rate in the small village of Gy-les-Nonains). It is therefore very likely that some voters participate to the experiments even without a good understanding of the voting rule at stake, when the voting rule is complex.

Is it important, for these experiments, that voters have an exact and clear understanding of how ballots are counted? Obviously yes, this point is crucial, for at least two different reasons.

1. Voting behavior may be different depending on the voting rule. Political science has taught us that people may not use single-name ballots the same way in One-round FPTP, Two-round, or PR elections. Economic theory has explained that rational behavior in voting is also sensitive to the details of the voting rule. Therefore, from the methodological point of view, if the objective is to learn about voters' behavior, and later to compare voting rules, it is essential to make sure that the voting rule itself is well understood.
2. If some participants do not understand clearly the voting rule and realize that they do not, they may have the impression that the scientists have hidden something on purpose. The same thing happens for a voter who first thinks she/he has

well understood and later discover that she/he had not. Deceiving the participants when doing experiments about democracy should certainly be avoided. The risk is a loss of trust toward scientific work in politics. The worst thing that could happen is that scientists present themselves as “those who understand a complex voting rule” in front of “those who do not have to understand” but are asked to cooperate.

Not cheating is here important with respect to both professional ethics and methodology.

Voter's Understanding of the Consequences of the Voting Rule

A third level of comprehension has to do with the implication for Politics of the proposed voting rule. It is noticeable that some participants immediately skip to this level. For instance, one participant would comment (about Approval Voting) “Yes, I understand what you do. This is to give voice to the small candidates.” In that case, we are facing a problem opposite to the previous one: overconfident participants believe they know, or believe we know, something which is far from being established.

The same mechanism may result in a negative opinion with respect to the idea of experimentation following a “You are playing with fire” comment of argumentation. I heard this reasoning several times in 2001 from scholars and officials when looking for places to perform the 2002 experiment. Generally, we experiment to learn things we do not know. The fact that we do not know in advance the result of an experiment should obviously not be considered as a problem, as long as we do not try to make the public believe that we already know what is good and what is not.

On that issue, there is no doubt that all these experiments are very positive. The general public seems both reasonable and respectful when it comes to the idea of experimenting new voting rules, even more reasonable and respectful than learned scholars.⁵ This is one more reason not to deceive.

Analyzing the Results

The collected data is difficult to analyze because of possibly important biases due to the specific experimental protocol. This point is discussed in the next section. But this difficulty should not hide the richness of the collected data, which is amenable to original and insightful analysis, as explained in “The political Space”.

⁵ In 2002, a priori negative opinions about these experiments were held by some colleagues, and some elected officials. They predicted very low participation rates, based on their own claimed experience in organizing public consultation on local issues. Some were reluctant to the very idea of experimentation in the field of politics, arguing that, by principle, one should not mix serious political matters with adventurous ideas.

The Participation Bias

The participation bias in those kind of events may be huge. In the pilot experiment of January 23, 2002, the approbation rate of Chirac was 33.58%, whereas the approbation rate of Jospin was 61.76%, which probably reflects a strong leftist bias among participants.

Table 5.5 deals with the six voting stations where the experiment was done in 2002. It provides the number of voters at the official vote, the number of Le Pen's official votes. Voting stations are ordered according to Le Pen's score in percentage. The two last lines indicate the participation rate at the experiment, and the number of approvals in favor of Le Pen. We can see in Orsay an inverse correlation between the participation rate and Le Pen's support. it is for instance remarkable that in Orsay 12, 88 voters voted for Le Pen at the official vote but 63 voters approved Le Pen at the experimental vote. In that respect, the results obtained in the small village of Gy-Les-Nonains are important because the participation is almost complete here, even if the extreme right vote is more important in this village than it is in the city of Orsay.

Some apparent conclusions from gross figures, such as the idea that some voting systems like approval voting, favor the center and are detrimental to extreme candidates, may be highly sensitive to participation bias. To tackle this problem, Laslier and Van der Straeten (2004) have built a model that relates single-name ballots to approval ballots. The idea is that voters never vote for a candidate they do not approve, and that the probability that a given voter votes for the candidate c when she approves the set B of candidates including c is proportional to some parameter which depends on c only. This parameter is called the *single-name lever of c* . This model can be estimated and used to correct, as much as possible, for participation bias, and then extrapolated to the entire country to draw general conclusions.

The second column of Table 5.6 shows estimates for the candidates' levers (normalized to 1 for Chirac). These values show how some candidates, in particular Jean-Marie Le Pen and Jacques Chirac were more than the others able to convert the voters' approval into a first round vote.

Knowing the probability that a voter who voted for candidate i in the official election approved of candidate j in the approval voting experiment, and given national scores in the official election, one can extrapolate the result of the experiment to the national level. The last two columns of Table 5.6 shows extrapolations of the results

Table 5.5 Participation bias in 2002 experiments

(2002)	Gy	Or. 12	Or. 6	Or. 7	Or. 1	Or. 5
Voters	395	622	607	635	522	565
Le Pen	76	88	49	45	35	35
Votes	19.2%	14.1%	8.1%	7.1%	6.7%	6.2%
Participation	92.4%	66.7%	75.8%	55.3%	78.3%	84.2
Le Pen	119	63	55	38	52	51
Approvals	32.6%	15.2%	12.0%	8.1%	12.7%	10.7%

Table 5.6 France: Candidate first round levers and estimated approvals

	France		
	Levers	Approval	First round
Chirac	1	36.7% (1)	19.9% (1)
Le Pen	1.16	25.1% (4)	16.9% (2)
Jospin	0.73	32.9% (2)	16.2% (3)
Bayrou	0.49	27.1% (3)	6.8% (4)
Laguiller	0.38	16.8% (9)	5.7% (5)
Chevènement	0.43	22.4% (6)	5.3% (6)
Mamère	0.39	24.3% (5)	5.2% (7)
Besancenot	0.19	17.6% (8)	4.2% (8)
Saint-Josse	0.88	13.5% (11)	4.2% (9)
Madelin	0.36	20.4% (7)	3.9% (10)
Hue	0.53	11.3% (14)	3.4% (11)
Mégret	0.28	13.8% (10)	2.3% (12)
Taubira	0.08	12.6% (13)	2.3% (13)
Lepage	0.52	13.4% (12)	1.9% (14)
Boutin	0.17	6.7% (15)	1.2% (15)
Gluckstein	0.16	5.5% (16)	0.4% (16)

from Gy and Orsay to France, and the candidates' true national scores. It is to note that the main political event of this election was the Extreme Right candidate Le Pen defeating the former prime minister Jospin. While Jacques Chirac would have still been elected president, the striking observation in Table 5.6 is that the extrapolation predicts that, under approval voting, Le Pen would have fallen from the second place to the third or fourth place.

The conclusions are that the hierarchy of candidates is modified, even if Jacques Chirac remains quite clearly the winner. The detail of who is winning and who is losing in this game is complex and requires candidate-specific explanations related to the particular political situation for this election. For instance, the analysis confirms that many voters who approved Jospin decided to vote for Chevènement at the official first round; maybe the main direct cause of Jospin's defeat (Jaffré 2003).

Analysis performed by Baujard and Igersheim after the 2007 election also concludes in the same direction: compared with two-round majority voting, Approval Voting, and Range Voting with the 0–1–2 scale favor the centrist candidates.

The method of the single-name levers is far from being totally satisfactory when applied – as we did – to a small number of voting stations. It should be improved but it hopefully corrects part of the important biases, which are inherent to the “field test” methodology.

The Political Space

A ballot designed to approve, to rank, or to grade candidates contains more information than a single-name ballot. For instance with approval voting, one knows after

the election not only the candidate scores, but also how many voters approved both candidates A and B. With voting rules based on individuals ranking candidates, we know how many voters rank A above B. This data set is thus worth analyzing.

Such an analysis has been done on the data collected in 2002 with approval voting (Laslier 2002, Laslier 2006) using ad hoc variants of Multidimensional Scaling.⁶ The basic idea is that two candidates are close one from the other if they tend to be approved by the same voters. This is a very meaningful – and simple – notion of political proximity among candidates, which can be expressed on the basis of the votes only, without reference to some exogenous “issue space.”

The question of the participation bias is still important, so some analyses are restricted to the study of Gy-Les-Nonains, where the almost complete participation makes the data set particularly valuable. Of course extrapolation is not meaningful but at least, we learn about French politics, as seen from this village, and that is interesting by itself. The results are not surprising to those who know the political landscape in France in 2002: a strong Left-Right separation, with Jacques Chirac in the middle of the galaxy of the right-wing candidates and the so-called “center” being in fact one component of this galaxy.

The remark that those kind of analysis can be made on the basis of real voting ballots can be considered as another argument in favor of the use of voting rules in which the voter officially provides more information than the name of a unique candidate. The fact is that an election does not only serve to chose one or several winners. The results are also analyzed and commented on by academics, journalists, and citizens because it is a privileged occasion to learn about the country or the district. In that perspective, who could argue against obtaining a more detailed information?

Conclusions

Our objectives when running these experiments were manifold.

Public reaction to experimentation in political science. It is interesting to know how the public would react to the use of experimentation about politics and elections. In that respect, there is no doubt that these experiments are very successful. People are curious about it and ready to take part. They show very little hostility toward the idea of experimenting in politics.

Understanding voting rules. People who accept to take part in such an experiment understand the instructions, with a possible difficulty, in some cases, with incomplete ballots. Unfortunately, we do not learn from these experiments whether they

⁶ Laslier (1996, 2003) developed the same tools for analyzing ranking ballots. LeRoux and Rouanet (2004) is a modern introduction to the methods of Geometric Data Analysis. Chiche et al. (2000) is an application.

understand the way ballots are counted. This is not a problem for rules using simple counting schemes, but it is a problem for complex evaluative or ranking ballots.

Learning about voter behavior. The theory of how people vote under different voting rules is far from complete; so, one goal of the experiments should be to observe voters' behavior at the individual level. The experimental elections on the field are not well suited for this goal because we cannot relate to the voter's vote any personal characteristic, whether her/his true vote, or her/his true ranking (or evaluation) of candidates, or her/his social and economic characteristics.

Learning about aggregate results. Many authors insist on the fact that different voting rules may yield different outcomes. Yet, little empirical evidence is provided to support this idea on large-scale elections. After eliminating (important) sample bias Laslier and Van der Straeten, and Baujard and Igersheim have shown that Approval voting and 0–1–2 range voting tends to favor consensus candidates.

Learning about French politics. The low approval rates and the low evaluations obtained by candidates show that even elected candidates (Chirac, Sarkozy) do not have a huge support in the population. Under Approval Voting, no candidate is able to be approved by half of the electorate. More detailed information can be obtained on the structure of the political space. For instance, with Approval Voting, since each voter could select the names of several candidates on the same ballot, we know how many voters approved each group of candidates. We can infer some information on "correlations" between candidates – two candidates being "close" when voters treat them alike: the same voters vote for both of them or for none of them.

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Chapter 6

Measuring Duvergerian Effects of the French Majority Runoff System with Laboratory Experiments: Duverger's Laws Under the Microscope

The Contribution of Laboratory Experiments to the Study of the Psychological Effects of Voting Systems

Bernard Dolez and Annie Laurent

Introduction

The study of the effects of voting systems started before Maurice Duverger, but the credit goes to him for systematizing the analysis (Riker 1986) and for stating firmly the “laws”, which are still used by contemporary political scientists to describe the relationships between election rules and party system: the plurality system favours bipartism (Duverger 1951, p. 306); the runoff system and proportional representation tend to favour a multiparty system (Duverger 1951, p. 331). He can also be credited for bringing into light the theoretical foundations on which these “laws” are based, by making a clear distinction between the “mechanical effects” of voting systems, i.e., the conversion of votes into seats, and the “psychological effects” of voting systems, i.e., the tendency of voters to anticipate the mechanical effects of electoral rules and to adapt their behaviours to the chances of winning of the various parties running, to maximize the utility of their votes (Duverger 1951, p. 315). In this case, we talk about “strategic voting” (Downs 1957; Cain 1978; Cox 1994, 1997) of “sophisticated voting” (Banks 1985; Shepsle and Weingast 1984; Abramson et al. 1992) or even of “tactical voting” (Johnston and Pattie 1991; Niemi et al. 1992) or, in France, of “vote utile” (Parodi 2002).

Contemporary researches about the study of the effects of voting systems are quite extensively based on Maurice Duverger's work and can roughly be divided into two categories (Shugart 2005): at the “macro” level, studies aim at understanding the mechanical and psychological effects of voting systems on party system

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(Taagepera and Shugart 1989; Lijphart 1994) by taking into account the institutional environments in which they are embedded (Bowler and Grofman 2000); at the “micro” level, studies try to identify the individual rationalities, which are hidden behind the psychological effects (Cox 1997). The way voters evaluate the chances of the various parties running plays a decisive part (Blais et al. 2001). According to Duverger himself, under the plurality system, the small parties’ supporters are encouraged to vote for one of the two strongest running parties, if they do not want their votes to be lost. The anticipations of the mechanical effects of the plurality voting system, thus hastened the decline of the Liberal Party when the Labour Party suddenly appeared on the electoral arena in Great Britain in the middle of the 1920s.

But Duverger’s laws are only an illustration of an even more general “law”, the “ $M + 1$ ” law, a special case of which was first proposed by Reed (1991) based on his study of factions in the Japanese case and generalized and given a game theoretic explanation by Cox. The number of viable parties cannot exceed the magnitude $+1$ or, under the runoff system, the number of candidates able to advance to the second round $+1$: consequently under the plurality system, there can only be two candidates; under the French presidential runoff system, three; and under the PR system with a magnitude of 5, there cannot be more than six candidates.

Under the plurality system, it is often easy to spot the two candidates likely to win. Under the runoff system, it is somewhat more complicated to guess who will be the “third man” liable to take part in the second round. Under the proportional system, when six seats, for example, are at stake, knowing what lists are going to get a seat or not and guessing what are the lists liable to get the sixth seat is far more difficult. Duverger thought that neither the proportional system nor the runoff system encourages voters to desert their favourite parties and to vote strategically. Cox shows, on the contrary, that strategic vote does exist whatever the voting system but he considers that “as a practical matter voters under runoff rules do not vote strategically very often (or as often as they do under plurality)” (Cox 1997, p. 137).

Twenty years ago, Taagepera and Shugart concluded their book “Seats and Votes” by underlining that science, contrary to philosophy or any artistic work, involved both experiments and a theoretical effort (Taagepera and Shugart 1989). They noted that, depending on the scientific field, either the theoretical or the empirical dimensions were emphasized. But for some sciences, such as astronomy, direct experiments are impossible; researchers have to be content with just observe and model and calculate. For Taagepera and Shugart, political science was somewhat like astronomy, except that astronomy is based on experimentally demonstrable concepts. The study of voting systems, which fortunately relies on numerical data, could nevertheless become the “Rosetta Stone” of political science, by encouraging its methodological development, particularly from a quantitative standpoint.

Since then, Taagepera and Shugart’s message has been widely applied (Taagepera 2008). The experimental approach, and more precisely laboratory experiments, which were not long ago exclusively reserved for hard sciences, are no longer unfamiliar to social sciences, not even to political science. Since the 1990s, researchers in political science have more and more often resorted to laboratory experiments (Mc Dermott 2002; Morton and Williams 2008; Wittrock 2008), particularly because

this approach provides the opportunity to test rival hypotheses while controlling the other variables (Lijphart 1971, p. 682). They have been used, for example, to study the variations in voter turnout (Levine and Palfrey 2007), the influence of information on voting behaviour (McKelvey and Ordeshook 1985), the psychological effects of various electoral systems (Lewis-Beck and Wittrock 2007; Blais et al. 2007; Dolez et al. 2007) and the effects of changes in voting systems (Wittrock 2008). Of course, the external validity of their results may sometimes be at issue (McDermott 2002). But due to the elimination or at least minimization of contextual effects they make possible, as well as their reproducibility and their capacity to unveil causal inferences, laboratory experiments have an undeniable superiority over the other methodologies researchers can use to establish theoretical propositions which can be applied generally (Lijphart 1975). Laboratory experiments are especially well suited to studying the effects of voting systems on party systems, especially their psychological effects. They offer researchers the opportunity both to study individual voters' behaviours in various voting systems and to measure the effects of each electoral system itself. They allow the researcher to vary only one parameter during a given session, while controlling for other variables. They provide an immediate assessment of a number of "micro" parameters (the level of strategic voting, for example) and macro parameters (the "effective" number of parties), allowing us to relate the latter to the former. Moreover, experiments can be reproduced in different settings, thus allowing greater confidence in the results; while multistage experiments give the opportunity to trace changes in the voters' (the "subjects") behaviours through time, as can usually only be done with panel-surveys – and these lack experimental controls and are usually quite costly.

The generalizations advanced more than 50 years ago by Maurice Duverger, and since that time considered as real "laws" (Riker 1986) – in the physical (or sociological) sense of the word, seem particularly suited to laboratory experiments.

The first part of this paper describes our experimental protocol. The second part gives details about the experimental results while the conclusion uses the experimental results to illustrate the more general virtues of the experimental approach for understanding the psychological effects of voting systems.

The Experimental Protocol

The experiments to compare voting rules on which this paper is based were performed in two waves between December 2006 and October 2008. The first, which was conducted in three places, Lille, Paris and Montréal, gave us the opportunity to test two voting systems: the plurality system and the runoff system – like the one used in France for presidential elections. Previously reported results have shown various specific effects of the two voting systems on voters' behaviour (Blais et al. 2007; Dolez et al. 2008). The second wave, conducted in Lille, extended the experiments: two voting systems were tested: the runoff system used for French presidential elections, and proportional representation (d'Hondt list PR), where six seats had to be filled (see Appendix). During each wave, experiments

started randomly with one of the two voting systems being used. The protocol for each voting experiment was otherwise identical, facilitating comparisons across the experiments.

Our experiments aimed to highlight the degree of rationality of participants and, more precisely, their tendencies to maximize the utility of their votes, in accordance with the Downsian paradigm (Downs 1957). In particular, we wanted to see whether participants did or did not desert their most preferred candidate(s) for another candidate, politically more distant but with seemingly better chances of winning. And we wanted to see how strategic voting varied across the two election types, since the chances of winning election, and the chances that voters can cast a decisive vote, vary by voting system.

The aim of the experimental protocol was not to reproduce the complexity of the real world, but, on the contrary, to simplify in a controlled fashion to illuminate the effects of the two voting systems. The choices we made are as follows.¹

The Participants

Laboratory experiments are usually carried out on small groups. In this case, our experiments involved 16 groups, each with either 21 or 63 participants.

Eight sessions were organized, each with two groups, to which participants were randomly assigned.² All the recruits were students in social sciences, allowing for greater comparability of results across sessions. Altogether, 503 persons have taken part in these laboratory experiments.

The Distribution of the “Candidates” and of the “Voters” on a Unidimensional Ideological Axis

Regardless of voting system, a set of five candidates (or lists) was proposed to the participants. These “abstract” candidates, without any imputed connection with the real world, were called A, B, C, D, and E.

Each candidate was always assigned the same position on a unidimensional “ideological” axis with (integer) locations ranging from 0 to 20: A was in position 1; B, in position 6; C, in position 10; D, in position 14 and E in position 19. This created a broad distribution on the political spectrum (Fig. 6.1). These locations were communicated to the participants, but they had no other information about the candidates.

¹ The protocol was jointly established by several researchers: A Blais (Université de Montréal), B. Dolez (Université de Paris 13 – CERAPS), E. Dubois (CERAPS – University of Lille 2), J.-F. Laslier (Laboratoire d'économétrie – Ecole Polytechnique, Paris), A. Laurent (CERAPS – University of Lille 2), Michael Lewis-Beck (University of Iowa), N. Sauger (CEE, Paris) et K. Van des Straeten (GREMAQ, Toulouse).

² See Appendix.

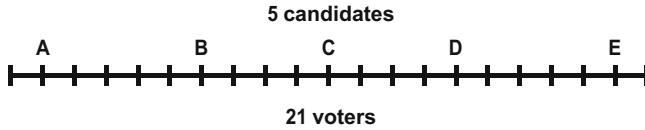


Fig. 6.1 The distribution of the “candidates” and of the “voters” on a unidimensional ideological axis

Table 6.1 Structure of the competition by group (21 voters by group and five candidates or lists)

	Position of the candidates and of the participants on the axe			Participants close to a candidate		
	Position of the candidate	Position of the participants close to one candidate only	Position of the participants equidistant from several candidates	Number of participants	% min/ % max	Average %
Candidate A	01	00, 01, 02, 03		4	19	19.0
Candidate B	06	04, 05, 06, 07	08	4 or 5	19–24	21.5
Candidate C	10	09, 10, 11	08, 12	3 or 4 or 5	14–24	19.0
Candidate D	14	13, 14, 15, 16	12	4 or 5	19–24	21.5
Candidate E	19	17, 18, 19, 20		4	19	19.0

The participants were assigned to one of the 21 positions on this axis (Fig. 6.1) according to two principles. (a) Participants were assigned to positions by the experimenters, and participants were informed that they could not choose their position, but that these had been randomly allocated. (b) There was a uniform distribution of the participants on the axis, so that each of the 21 positions was occupied by a single participant in the 21 person groups and by exactly three participants in the 63 person groups.

Since participants and candidates had been assigned to one of the 21 positions on the axis, except for a few tied situations, every participant was “closest to” one of the five candidates (Table 6.1). For example, by assignment, 19% of the persons (the ones assigned to the positions 0, 1, 2, or 3) were “closest to” candidate A (posted to 1). In the same way, 19% of the participants were “closest to” candidate E (assigned to 19), etc.³

Each time, two experiments were run in which the two voting systems were successively tested. The participants were randomly reassigned ideological locations for the second experiment.

³ In every group, there were nevertheless “equidistant” participants: the participants on position 8, exactly halfway between candidate B (position 6) and candidate C (position 10), and the participants on position 12, exactly halfway between candidate C and candidate D (position 14). If we assume that equidistant participants (on position 8 and 12) randomly divided themselves between the two candidates which were the closest to their positions, it can be estimated that, in every group, 21.5% of the participants were “closer to” B and D and 19% “closer to” C.

The Assessment of the Chances per Candidates

Before every vote, participants were invited to fill in a questionnaire giving information on their expectations about the chances of winning of the various candidates running. These chances were to be rated on a scale from 1 to 10. For the plurality system, they had to rate the chances of each candidate of winning. For the runoff system, they had to rate both the chances of each candidate making it into the second round and his chances of winning. For the proportional representation system, they had to rate the chances of each list of winning at least one seat.

The Remuneration of the Participants

The random assignation of every participant to one of the 21 positions on the ideological axis sometime led them to be on a very different position from their personal ideological position. To encourage them to “play the game”, that is to say to possibly desert their preferred candidates for other ones with better chances of winning, and thus to maximize the utility of their votes, financial incentives were offered.

Financial incentivization has often been used for laboratory experiments. In our experiments, participants had been told at the beginning of the session that they would take part in several elections and that at the end of the experiment, one of the elections, chosen by lot would be used to calculate their remuneration. More exactly, they had been informed that they would be paid depending on the position occupied on the ideological axis by the elected candidate in that experiment according to the following rule: they would get 20€(or Canadian dollars) minus the distance between the position of the elected candidate and their own position. For example, under the plurality system, if candidate B (on position 6) was elected, the payment for the participant on position 8 was 18€, that is to say the difference between the maximum remuneration, 20€, and the ideological distance between him and the elected candidate ($8 - 6 = 2$).

For the proportional representation system, the payment was calculated on the basis of the distance between the participant’s position and the position of the closest list with at least one seat.

For the runoff system, two modes of remuneration were tested: in the first variant, participants were remunerated according to the elected candidate, as in the case of the plurality system; in the second variant, according to the candidate qualified for the second round. The aim was to check whether the mode of remuneration, in other words the mode of calculation of vote utility, had an influence on the participants’ behaviour. As no meaningful difference between the results of the two variants was observed, the results of the two are aggregated in subsequent analyses of runoff results.

Repeated Votes

Over the course of each experiment, participants voted successively eight times: either four times under the plurality system and four times under the runoff system;

Table 6.2 Number of votes per voting system

	1-round system	2-round system	Proportional system
1-round and 2-rounds systems (12 groups)	1,676	1,676	
2-round system and PR (4 groups)		336	336
Total (16 groups)	1,676	2,012	336

or four times under the runoff system and four times under the proportional representation system. After every vote, the result was made public. The decision to make the participants vote four times for every voting system was aimed at assessing the effects of learning and information on the vote. Each of the 503 participants having experimented with two voting systems on four occasions, 4,024 votes form the corpus of the analysis, among which 3,997 valid votes were cast⁴ (Table 6.2).

Organization

The first wave of lab experiments were carried out manually using pencil and paper (ballot papers distributed, and then collected/counted after every vote). A session ran about 1 h and a half. During the second wave, participants were asked to use a computer terminal, with a software program we had developed for this purpose.⁵ This shortened the time needed to conduct experiments so that the whole process now lasted for only 1 h.

The Results

Our experiments enable us to illustrate the psychological effects of each voting system. At the macro level, they give the opportunity to measure the impact of each electoral rule on party vote shares. At the micro level, they show the relationship between the voting system, on the one hand, and the way the participants perceive the various candidates' chances of winning, on the other hand, as this relationship is reflected in strategically motivated vote choices.

⁴ Thirteen spoiled ballot papers on the first round, 12 on the second round and 2 with the proportional voting system had to be eliminated.

⁵ Development made at the CERAPS (Centre d'études et de recherches administratives, politiques et sociales), a research laboratory of the CNRS (National Center for Scientific Research), University of Lille 2.

Electoral Rules Have an Impact on Party Systems

The use of various voting systems causes different distributions of the votes. Laboratory experiments give the opportunity to verify *in vitro* well-known results from analyses of actual elections, and look at their robustness.

Our experimental results show that, whatever the voting system, looking at the set of experiments as a whole, combining data across different voting rules, the final vote distribution differs from the initial distribution of the voters' preferences induced by the assigned position of each participant. The deviation between induced preference and actual vote varies according to the voting system used. Measured by the Loosemore and Hanby index,⁶ the deviation reaches only 14 under the proportional representation voting system, but rises to 24 under the runoff system and 27 under the plurality system (Table 6.3).

Second, whatever the voting system, some parties get a higher proportion of votes than the expected one, i.e., the proportion of voters who had been assigned on a position close to theirs on the unidimensional ideological axis. Others get a lower proportion of votes (Table 6.3). And, regardless of which voting system is used, the locations which get "better" results than expected and the ones which get "lower" results are always the same: the parties located at each of the two ends of the unidimensional ideological axis get systematically a lower proportion of votes than the proportion of voters who are close to them. But the vote loss they suffer varies according to the voting system. For example, by hypothesis, 38% of the participants were on a position close to either A or E. But the total amount of votes gathered by A and E reaches only 29% with the proportional representation system, 13% with the runoff system and 11% with the plurality system. On the other side of the coin, the parties located in a more central position are advantaged, regardless of voting method. The amplitude, i.e., the vote percentage difference between the

Table 6.3 Results for candidates (lists) per voting system (% of the valid votes)

Candidates	Distribution of preferences ^a	Plurality system	Two-round system	PR
<i>N</i> = 4,024		1,663	2,000	334
A	19	5	7	16
B	21.5	35	30	27
C	19	28	27	14
D	21.5	26	30	30
E	19	6	6	13
Total	100.0	100	100	100
Deviation according to the distribution of the preferences (D)		27	24	14

^aPreferences here are defined by the position allocated to each participant

⁶ $D = (1/2)[V_i - P_i]$ in which V_i is the % of votes gathered by party i and P_i the % of participants "close to" i .

Table 6.4 Effective number of parties per voting system

	1st vote	2nd vote	3rd vote	4th vote	Total
Plurality system (12 groups)	4.1	3.4	3.0	2.5	3.2
Tworound system (16 groups)	4.1	3.6	3.4	3.3	3.6
Proportional representation (4 groups)	4.1	4.2	4.3	4.2	4.2

Table 6.5 The plurality system: evolution of the vote shares on each iteration – (% of the valid votes)

<i>N</i> = 1663	1st vote	2nd vote	3rd vote	4th vote
A	10	5	3	2
B	27	34	39	41
C	27	27	26	30
D	26	28	27	23
E	10	6	5	4
Total	100	100	100	100

leading party and the one in the last position, reaches 17 points under the proportional representation system, 24 points under the runoff system and 30 points under the plurality system.

Third, the average effective number of parties (ENPs), measured at the level of groups with the Laasko and Taagepera index,⁷ is always lower than the number of parties running. It is 4.2 under the proportional representation system, 3.6 under the runoff rule and only 3.2 under the plurality system (Table 6.4). A 3.2 ENP is not, of course, identical to saying that the plurality voting system leads to bipartism. But it must be underlined that this 3.2 ENP is only an average. With experimental reiterations, the average ENP constantly decreases: it is 4.1 when the plurality voting system is used for the first time, 3.4 on the second time, 3.0 on the third and 2.5 on the fourth (Table 6.4). Moreover, as time goes by, the vote-share gathered by the candidates located at the two ends of the unidimensional axis constantly decreases: A gets only 2% of the votes when the plurality voting system is used for the fourth time and E gets only 4% (Table 6.5). If the experiment had indefinitely been repeated, it seems quite likely that the average ENP would have continued to decrease again (down to 2.0?). On the other hand, with the proportional voting system, the average ENP remains stable around the mean, in this case 4.2. The plurality voting system tends to produce a two-party system, but the proportional representation tends to lead to a multiparty system, in accord with the expectations of Duverger.

Finally, the repeated use of the plurality voting system gradually leads to the desertion of the third candidate. During the first vote, the “second first ratio” or “SF ratio” (Cox 1997), the ratio between the percentage of votes gathered by the

⁷ This index is traditionally used to measure the deviations from votes to seats (Laasko and Taagepera 1979). Here, we have “twisted” it to our advantage to measure the deviation between the votes and the preferences by applying the formula: $ENP = 1 / \sum v_i$ in which v_i is the % of votes gathered by party i .

“second loser” of the election and the percentage of the votes gathered by the “first loser”, was more than 0.67 in more than 80% of the cases; during the fourth vote, it is under 0.33 in nearly three quarters of the groups. In other words, the candidate coming third constantly loses ground as the vote is repeated. His voters abandon him to, more and more massively, vote strategically. This result is a good illustration of what is called a “Duvergerian equilibrium” (Cox 1997), with an SF ratio moving towards zero. More rarely, we find a few cases in which the two candidates coming just behind the leading one are too close to one another to give the voters of either of them a good reason to desert. These cases result in an SF ratio close to 1, and are good examples of a “non Duvergerian equilibrium” (Cox 1997).

These results demonstrate that voting systems affect voters’ choices. Now we look to see what are the mechanisms leading the voters to vote “sincerely”, that is to say to vote for the candidate who is the closest to them, or, on the contrary, to vote strategically?

Assessment of the Chances of Winning, and of the Amount of Sincere and Strategic Voting

Data from individual experiments give us a fuller insight. They show clearly the psychological effects of voting systems, i.e., the participants’ adaptation to the voting systems: sincere voting is weaker under the runoff voting system than under the proportional representation and even more so under the plurality system. But the way they voters adapt is also connected to the way they estimate the chances of winning of the running parties/lists, since that perception is key to what choice maximizes the utility of their votes.

First, whatever the voting system used, the level of sincere votes for a given party is closely connected to the way its voters estimate its chances of winning: correlation index 93.6 (all voting systems taken into account).⁸ In spite of the uniform distribution of the participants on the unidimensional ideological axis, the chances of winning of the two extreme candidates (A and E) seem systematically weaker than those of the candidates located in a more central position (B, C, and D). The level of sincere voting for the extreme parties is also systematically lower. The candidates whose chances of winning seem weaker are therefore more often deserted by “their” voters than the others, whatever the voting system (Table 6.6). In other words, strategic voting still exists, whatever the voting system.

Second, the perception of the candidates’ winning chances and, consequently, the level of sincere voting varies according to the voting system. This is particularly true for the candidates whose chances seem the weakest, i.e., A and E. For example, participants close to A evaluate at an average 4.4/10 his chances to get at least one

⁸ To calculate the levels of sincere voting, we have removed from the analysis the answers of the participants situated in positions 8 and 12, in other words the participants who were, respectively, equidistant from either B and C or C and D.

Table 6.6 Assessment of the candidates' winning chances and of the amount of "sincere" voting in each voting system

	Plurality system		Runoff system		PR	
	1,502		1,802		303	
<i>N</i>	Chances/10	% of sincere votes ^a	Chances/10	% of sincere votes	Chances/10	% of sincere votes
A	1.8	26.0	2.0	34.0	4.4	76.0
B	6.6	85.0	6.8	86.5	8.1	89.0
C	6.8	77.0	7.0	88.5	7.3	88.0
D	6.3	68.0	6.5	81.0	7.5	100.0
E	1.9	28.0	2.0	31.0	4.6	66.0
Average		56.0		63.0		83.0

^aSincere voting here is defined as voting for the closest candidate from the allocated position

seat under the proportional representation system, at 2.0/10 his chances of qualifying for the second round, under the runoff system, and at 1.8/10 his chances of winning under the plurality system. A different perception of the chances of winning of a candidate has an obvious influence on the way the participants behave: from one voting system to the other. Thus, the level of sincere voting in favour of A varies considerably. It reaches 76% under the proportional representation system, 34% under the runoff voting system and only 26% under the plurality voting system. On the whole, when the proportional representation system is used, 83% of the participants vote for the candidate who is the closest to the position to which they have been assigned randomly. Under the runoff system, this figure falls to 63% and under the plurality voting system, it is down to 56%. In other words, the strength of strategic voting varies with the voting system: it is minimal with the proportional representation system and maximal with the plurality voting system.

Third, the perception of the various candidates' winning chances evolves as the experiment is repeated, very much in the same fashion as the level of "sincere" voting evolves with experience. The evolution is particularly obvious for extreme parties. Under the plurality voting system, participants close to A evaluate, on average, his chances of winning at 3.1/10 before the first ballot, that is to say without any information on the results of the vote of the group (Table 6.7). But A gets only 11% of the votes. With the successive reiterations of the ballot, and the opportunity of taking into account previous results, the chances of winning of the candidate A grow weaker and weaker and the proportions of voters "close to" him who remain loyal to him (sincere voting) gradually dwindles. And consequently, his estimated likelihood of winning gradually decreases. Before the fourth repetition, the participants close to A evaluate, on average, his chances of winning at 0.8/10. Only 13% of the voters closest to A remain loyal to him (sincere voting). His vote share falls, down to 2%. On the other hand, a strictly opposite phenomenon can be observed under the proportional voting (Table 6.8). Before the first vote, A's chances of getting at least one seat are estimated at 3.8/10. With the repetition of the ballots, his chances are constantly reappraised. Before the fourth vote, they are estimated at 5.5/10. At this round, 88% of the people close to him remain loyal (sincere voting) and he gets 19% of the valid votes.

Table 6.7 Impacts of vote reiteration under the plurality rule on the perceptions of candidates' chances, on the amount of sincere voting, and on candidate results

N	1st vote		2nd vote		3rd vote		4th vote	
	Chances/10	% votes	Chances/10	% votes	Chances/10	% votes	Chances/10	% votes
A	3.1	11	2.0	5	1.2	3	0.8	2
B	6.3	26	6.6	33	7.0	38	7.4	40
C	7.2	26	7.2	27	6.4	26	6.2	30
D	6.3	26	6.6	28	6.5	27	5.7	23
E	3.4	10	1.7	6	1.2	5	1.1	4

Table 6.8 Impacts of vote reiteration under the proportional representation rule on the perceptions of candidates' chances, on the amount of sincere voting and on candidate results

N	1st vote		2nd vote		3rd vote		4th vote	
	Chances/10	% votes	Chances/10	% votes	Chances/10	% votes	Chances/10	% votes
A	3.8	11	3.4	15	4.7	20	5.5	19
B	7.4	31	8.0	27	8.4	24	8.4	24
C	7.1	18	7.2	15	8.0	13	6.9	11
D	6.8	29	7.1	31	7.8	27	8.4	31
E	3.5	11	3.9	11	4.9	14	5.9	14

Table 6.9 Prediction of sincere voting (a): logistic regression

	A	Sig.	Exp(B)
Position of the candidate (<i>median position: reference</i>)	-1.049	0.000	0.350
Extreme position			
Voting system (<i>PR: reference</i>)			
Voting system (plurality)	-1.253	0.000	0.286
Voting system (runoff)	-0.859	0.000	0.424
Chances of the closest candidate (note from 0–10)			
(<i>note 5: reference</i>)			
0	-1.945	0.000	0.143
1	-1.626	0.000	0.197
2	-1.191	0.000	0.304
3	-0.404	0.060	0.668
4	-0.229	0.294	0.795
6	-0.054	0.808	0.948
7	0.380	0.085	1.462
8	0.526	0.013	1.692
9	1.125	0.000	3.081
10	1.726	0.000	5.618
Reiteration (<i>2nd vote: reference</i>)			
1st vote	0.259	0.106	1.295
3rd vote	-0.323	0.044	0.724
4th vote	-0.433	0.008	0.648
Constant	2.486	0.000	12.015

^aThe depending variable is coded 1 for sincere voting and 0 for non-sincere voting

In sum, the level of sincere voting depends on four factors: the voting system, the position of the candidates on the ideological axis, the participants' perception of the candidates' winning chances and, finally, the reiteration of the vote. A logistic regression, based on all the experimental data, shows that, compared with the proportional representation system, sincere voting is lower when the runoff system is used and even more so when the plurality system is used; that a candidate at an extreme position has less chances to keep his voters than a candidate at a median position; that the better the chances of the candidates seem to the voters who are close to them, the higher the probability of their casting a sincere vote gets. Finally, holding voting system constant, the probability of sincere voting decreases as the experiment is repeated (Table 6.9).

Discussion and Conclusion: The Seven Virtues of the Laboratory Experiments

1 *It is possible to obtain experimentally the main results found by political scientists about the relationships between voting systems and party systems.* In particular, after several uses of the plurality voting system, the ENPs is indeed “near” or

“close to” 2; under the proportional representation rule, it is significantly higher. In the lab experiments, as in the real world, the plurality voting system creates something close to a two-party system at the district level; the proportional representation rule creates a multiparty system.

- 2 *With respect to the effects of runoff systems, experiments partly favour Duverger’s claims.* Duverger contrasts the plurality voting system which favours bipartism, on the one hand, with the runoff voting system and the proportional representation which favour multi-party system, on the other hand. Blais (2004b) is generally in agreement with him. On the other hand, Rae (1967, p. 143) and Lijphart (1994, p. 20) consider that the runoff system belongs to the same family as the plurality system. In yet another view, Cox predicts that the runoff system produces more than two parties, but not as many as the proportional representation system. Laboratory experiments bring a useful contribution to the discussion. In our experiments, the runoff system seems closer to the plurality system than to a magnitude 6 proportional representation, either from the point of view of the deviation (Loosemore and Hanby index) or from the point of view of the ENPs (Laasko and Taagepera index), but it is clearly intermediate in effects between plurality and proportional representation.
- 3 *To an even greater extent than drawing on real world data, experiments make it possible to see Duverger’s laws at work.* Duverger himself notices that introducing abruptly a plurality voting system in a country where a multi-party system prevails does not lead all of a sudden to a two-party system (Duverger 1951, p. 318). As Rein Taagepera underlines this point (Taagepera, RIPC to be published), even if the mechanical effects of the voting systems can instantaneously be perceived, their psychological effects develop slowly. Under the plurality voting system, the ENPs decreases vote after vote, to tend towards 2. Our experiments give the opportunity to observe developments in a compressed time framework and to calculate speed of convergence.
- 4 *Experiments give the opportunity to combine the macro and the micro approaches. and to observe the role of individual choices in the building of collective choices.* Every voter has to choose between two alternatives, sincere voting or strategic voting, and his choice depends on both the voting system and the assessment of the election chances of the candidates he is close to. If the same voting system is used, the lower is a voter’s estimate of the chances of the candidate she is close to, the stronger her tendency to abandon him is. But the plurality voting system is more conducive to strategic voting than the runoff system and, above all, than the proportional representation rule. Experiments give the opportunity to understand, in particular, how the evolution of individual choices influences the collective choices. The assessment of the candidates’ chances of winning changes vote after vote, the result of the previous vote being a piece of information on which the participants rely to assess the each candidates’s election chances. These results confirm the importance of information for the voting decision (Cox 1997; Blais 2004a; Lau and Redlawsk 2006).
- 5 *Experiments help highlight phenomena which are difficult to observe in the real world.* Sartori (1994) considers, for example, that extreme parties are

disadvantaged by the runoff voting system because they are not in a good position to negotiate between the two rounds. Laboratory experiments suggest that in fact extreme parties suffer from a more general disadvantage. Whatever the voting system, the extreme parties' chances of winning seem weaker to their own voters who, consequently, are not as loyal as the voters of the central parties. In the end, extreme parties get fewer votes than the parties located in a more central position. Under the plurality voting system as well as under the runoff rule, they go on getting weaker and weaker, vote after vote, until they are nearly marginalized.

- 6 *Experiments can give rise to new hypotheses.* The study of the psychological effects of voting systems takes first into account the "size" of the parties. But laboratory experiments suggest that their position on the political spectrum also plays a part. This issue is particularly important for the runoff system. At the time of the first round of the 2002 French presidential election, only 2 points separated Jacques Chirac and Jean-Marie Le Pen, but the former won the second round with a 64-point margin. During the 2007 presidential election François Bayrou would probably have beaten either Nicolas Sarkozy and Ségolène Royal on the second round because he appeared to be a "Condorcet winner" (Sauger 2007; Bréchon 2008, p. 182). But he did not succeed in becoming one of the top two candidates on the first round. Qualification depends on the first preference support of the parties/candidates. On the second round, victory depends almost entirely on their position in the political space. Minors parties located at the centre of the political arena have to convince their voters that they stand a chance of being qualified for the second round. Strong parties located at the ends of the political spectrum have to convince their voters that, if they qualify, they have a good chance of winning at the second round. Both types of parties are threatened by abandonment, for strategic reasons, if they fail to convince their voters. So, under the runoff system, the experiments results suggest that the position of the parties on the political scene is as important as the number of voters who are closest to them.
- 7 *Experiments give the opportunity to test new hypotheses.* Experimental protocols can easily be modified, for example, to vary magnitude of proportional representation rule and to calculate the resulting variation of the ENPs; or to introduce information, such as on the probable coalitions formed by the competing political parties, either before the vote (as in France) or after the vote (as in Germany).⁹ Protocols can also be modified for methodological reasons, to provide more precise controls. Some who heard our initial experimental results questioned the impact of the mode of remuneration on results: wasn't the "position" effect we noticed when the runoff system was used simply the consequence of an artefact tied to the mode of remuneration of the participants? Because remuneration was initially calculated only on the results of the second round, this mode of remuneration could push the voters in the first round to assess the final chances of winning of the candidates. To test this possible artefact, the protocol was modified. In the

⁹ For a discussion of laboratory experiments about coalitions see e.g., Gschwend and Hooghe (2007).

second session of experiments, the mode of remuneration was calculated on the basis of the first round results only, in other words on the chances of the candidates of being on the second round. The results were similar, and we chose to consolidate the two sets of data from the two different remuneration rules. In an experiment, every parameter can be modified, in the real world, the elements of context cannot be as easily controlled.

Fifty years ago, Georges Lavau contested Maurice Duverger’s analyses, saying that Duverger was omitting the social realities which would be reflected in the party system (Lavau 1953). Nowadays, this dispute between “sociologists” and “institutionalists” is quite out of fashion (Farrell 2001, p. 162): the increasingly sophisticated explanatory models proposed in political science take into account, for example, the number of divisions in the social fabric to explain how the party system develops (Taagepera and Shugart 1989, p. 92). But laboratory experiments also have an important role to play. By controlling for context effects, laboratory experiments can lay bare the key effects of any voting system, and how these effects differ from one system to another. If it cannot be claimed that history has proven Maurice Duverger right against Georges Lavau, at least laboratory experiments help rebut the criticisms the latter made to the former.¹⁰

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Appendix: Overview of Experiments

Date of the sessions	Place	Number of participants	Voting systems tested
11 December 2006	Paris	21	Plurality and runoff systems
	Paris	21	Plurality and runoff systems
13 December 2006	Paris	21	Plurality and runoff systems
	Paris	21	Plurality and runoff systems
18 December 2006	Lille	21	Plurality and runoff systems
	Lille	21	Plurality and runoff systems
18 December 2006	Lille	63	Plurality and runoff systems
	Lille	63	Plurality and runoff systems
20 February 2007	Montréal	21	Plurality and runoff systems
	Montréal	21	Plurality and runoff systems
22 February 2007	Montréal	63	Plurality and runoff systems
	Montréal	63	Plurality and runoff systems
29 October 2008	Lille	21	Runoff and PR systems
	Lille	21	Runoff and PR systems
30 October 2008	Lille	21	Runoff and PR systems
	Lille	21	Runoff and PR systems

¹⁰ For an opposite point of view, see Seiler (2006).

Chapter 7

French Double Ballot Effects: American Experiments

Jill Wittrock and Michael S. Lewis-Beck

Electoral rules matter, especially so today as many emergent nations select hybrid electoral systems (Birch 2003). For a new state, being a democracy is not enough to guarantee the will of the people. Different election rules, all ostensibly democratic, produce different, perhaps suboptimal, results (Shepsle and Bonchek 1997; Jackman 1987). Empirical research on the effects of particular electoral rules has examined a range of outcomes, e.g., number of political parties (Laakso and Taagepera 1979; Lijphart 1994; Taagepera and Shugart 1989), proportionality of the seats–vote relationship (Gallagher 1991), interaction effects (Amorim Neto and Cox 1997), and the role of ethnicity (Ordeshook and Shvetsova 1994). Further, the rational choice literature has provided insights into how electoral systems can alter the incentive structures voters face (Cox 1997; Downs 1957). Understanding the long-term, and possibly unintended, consequences of a particular electoral arrangement is important not only to new democracies but also for established polities contemplating reform to long-standing electoral rules.

The case of presidential elections in France speaks to constitutional engineers in new democracies and also reform advocates across the globe. The first elections for president in Fifth Republic France were held in 1965 and have not changed much since. Presidential elections by direct universal suffrage were not part of the original conception of the Fifth Republic, but since that time, “presidential elections by direct universal suffrage have become the most important in the Fifth Republic – in terms of deciding the configuration of power and in terms of public involvement and interest” (Frears 1991, pp. 142–143). There is no universal consensus on the long-term political consequences – especially in regards to democratization – although the double ballot has been adopted in states on various stages on the path to democracy (e.g., Bulgaria, Poland, Romania, Russia, and Ukraine).

In addition, in France itself the double ballot has sometimes been challenged. There is perhaps no advanced democratic system, which changes its electoral rules more (Martin 2000; Safran 2009, pp. 146–147). The ballot rules for the different geographic levels of election can change, e.g., they may be proportional representation or not, direct or indirect, one-round or two-round. It is common for the government,

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whether on the left or on the right, to propose an electoral reform to the National Assembly, for the purpose of achieving political advantage (Emeri 2001, p. 794). The experiments conducted herein will help establish exactly what those political advantages are, if any, that accrue to the incumbent when the number of ballot rounds change from one to two.

Until quite recently, scholars relied on game theoretical and observational methods to evaluate the long-term consequences of different electoral arrangements. But to evaluate fully the impact of electoral rules, it is important to expand the testing to experimental methods, the focus of the research on hand. Experimental methods are more and more used to understand American political behavior (Druckman et al. 2006; Lau and Redlawsk 1997, 2001; Morton and Williams 2001), but they are adopted to a lesser degree in comparative politics. A growing exception is the work coming out of the joint American-Canadian-French venture examining the impact, in particular, of French-style electoral rules (e.g., Blais 2004a, b; Blais et al. 2009; Dolez and Laurent 2005; Laurent and Dolez 2009; Lewis-Beck and Wittrock 2007). These investigations are unique in the study of French politics, in that they aim to apply “true” experimental design – the completely randomized design (Campbell and Stanley 1963). The specific research question here concerns the system impact of the double ballot. For instance, does two-round voting, as opposed to one-round voting, alter the ideological linkages between candidates, parties, and voters? Our aim is to test this question experimentally, building on our previous investigations, and in the process, begin to evaluate how a double ballot election would function in countries with long-standing electoral rules for presidential contests (e.g., the United States).

The paper proceeds as follows. First, we discuss the previous research on electoral systems, focusing on the impact of the double ballot on voting behavior generally, with supporting evidence from the French Fifth Republic. Second, based on our previous experiments, we develop and test several hypothesized relationships that pertain to political behavior and the double ballot. Third, we explain the design and procedure for our experiment, conducted in the United States. Fourth, we present the data analysis, with a discussion of the results. We conclude that the double ballot appears to stretch the linkage between voters and candidates, making them ideologically more distant from each other. Two rounds of voting, rather than one seems, after all, to breed ideological extremism.

The Double Ballot

Three basic electoral rule categories – plurality, majority, and proportional representation – can be used to distinguish how candidates get elected in democracies.¹ The French electoral system is somewhat unusual in that it normally requires two

¹ Several scholars add mixed electoral systems to this list, which include a combination of PR rules with either plurality or majority formulas (Bawn 1993; Blais and Massicotte 2002; Jesse 1988; Moser 2001). The general consensus is that mixed systems tend to behave like PR because of the tendency to drive up the number of parties, suggesting less strategic behavior on behalf of voters.

rounds of balloting on two different polling days. This is due to the requirement that candidates receive a majority of the votes cast, which rarely happens on the first round. [For a current discussion of the working of the double ballot in contemporary France, see the papers by Grofman and Lewis-Beck (2005).] Moreover, with the double ballot system, there are two important variables: the second ballot signal and the second ballot candidate number. For both presidential and legislative elections, the second ballot is signaled when no majority is received on the first ballot. On that second ballot, in a presidential contest, only the top two candidates with the largest votes share may compete. This is considered the “majority run-off” version of the double ballot (Farrell 2001, p. 51).

Careful examination really began with Duverger (1964, pp. 239–241), and his discussion of the multiparty tendencies of two ballots. Because there are few incentives to vote strategically on the first round, Duverger argues the double ballot under simple majority rules tends to produce multiple parties with results similar to proportional representation.² He concludes that “simple majority second ballot” avoids the problems of polarization and underrepresentation on the first round; further, parties have time to regroup before the second ballot so that the attenuation due to strategic voting is not as great as under the “simple majority single ballot” systems. Empirical tests of his proposition have produced conflicting results (Rae 1967; Lijphart 1994).

At the theoretical level, the arguments also differ. Shepsle and Bonchek (1997, p. 168) classify the French voting system, in particular for president, a “plurality runoff,” where the top two candidates on the first ballot compete in a second. Cox (1997) contends the consequences of this system should be similar to a “simple plurality,” rather than a PR, system. According to Cox (1997, pp. 123–138), when voters are only concerned with the outcome of the current election, voters behave strategically in a manner similar to single ballot plurality, thus limiting the viable number of first round candidates. This limit theoretically is applied to the number of first round candidates and is represented as $M + 1$ (where M equals the number of first round candidates that can legally qualify for the second round). However, Cox contends that strategic voting is not observed frequently because the information demands are much greater than under other rules. He concludes that the fourth and lower candidates (in percentage) are ruined by strategic voting in the first round, and the expected vote share for the first and second candidates tend to be equal in large enough electorates. If this is not the case, the first place candidate tends to lose votes because voters will desert the candidate on the second ballot (129–130).

According to Farrell (2001, p. 54), voters are able to select their highest preferred candidate on the first round. The benefits of the double ballot include the “simplicity” of SMD during the first round, and this encourages a “politics of centrism” (i.e., requiring parties to cooperate and form alliances). Farrell also argues that this helps maintain a coherent party organization. Thus, the double ballot system tends to produce results similar to SMD; smaller parties tend to be disadvantaged due to

² However, he concedes it is more difficult to characterize the double ballot effects.

the second round of voting, and larger parties or parties with a strong geographic concentration in support tend to perform better. As a result, smaller parties have nothing to lose by sending in candidates. So, in fact, the majority run-off double ballot system, as in the French case, does not produce this politics of centrism. Even with this “politics of centrism” Farrell concedes there are negative consequences to the double ballot. For one, after a close first round election, there is considerable electoral uncertainty following the announcement of the results. In addition, voting twice places additional burdens and costs on electoral administrators, parties, politicians, and voters. Sometimes, lower turnout on the second round reveals an “orphaned electorate” whose votes for their first choice are automatically excluded in the second round (Farrell 2001, p. 65).

Conducting an observational analysis, André Blais (2004) takes issue with Farrell’s (2001) argument that the French system is essentially SMD. Instead, he argues that the French two-round procedure is similar in practice to a PR system, in terms of outcomes. As Grofman (2006, p. 7) contends, “it is common to lump majority runoff procedures with plurality, due to having identical thresholds of exclusion”. In an effort to resolve the issue, Fauvelle-Aymar and Lewis-Beck (2008) designed a natural experiment to see whether two groups of voters are alike under different electoral systems – one with double balloting and the other without. Two basic election procedures have operated in the Fifth Republic France – double ballot and proportional representation – respectively, under regional (PR) and cantonal (double ballot) contests. The regional and cantonal elections investigated were held at essentially the same time and place for three elections – 1992, 1998, and 2004. Group 1 consisted of the regional voters operating under PR rules, while Group 0 comprised cantonal voters operating under double ballot rule. The results indicate that, compared to the double ballot system, the PR system tended to bring about more extremist party voting, higher voter turnout, and more party competition. Thus, these results contradict Blais. In an effort to answer, with more confidence, this question of the nature and presence of double ballot effects, we turn to a different methodology – laboratory experiments.

Experimental Research: Preliminary Evidence

This paper follows the laboratory experiments design such that subjects are recruited to a common location, the experiment takes place in the same location, and the researchers control all aspects of the conditions of that location with the important exception of the subjects’ behavior (Morton and Williams 2008). The laboratory experiment design permits the researcher to control the environment in which the subjects participate in the experiment. This control grants the researcher more ability to discern causal effects. In addition, the laboratory design allows for researchers to create an environment that does not exist in nature. This is the situation with the double ballot experiment; controlling for ballot rules allows creation of new ballot rules and voting environments to test for a range of outcome factors. The researcher, as Morton and Williams (2008) note, may “induce a wider range of variation” than is possible under field and natural experimental conditions. This experiment adopts

an implicitly cross-national replication approach, in that the experimental design and procedure could, in principle, be carried out equally well in different cultural settings.

The structuring of the actual experiment is guided by two pilot laboratory experiments, done earlier. [For a complete discussion of both, see [Lewis-Beck and Wittrock \(2007\)](#).] In the first, a small number of students ($N = 23$) were randomly assigned to Group 1 and Group 2. The subjects, who were given a left-to-right policy position, voted on five presidential candidates (arrayed along a left-to-right policy position). The closer the voter's policy position to the presidential winner, the more reward the subject received. In Group 1, they voted one round; in Group 2, in two rounds. Seven dependent variables were measured: number of viable candidates, party ideological distance, voter ideological distance, supporter ideological distance, turnout, number of sincere voters, and number of accurate forecasters. In a simple one-way ANOVA, treatment achieved statistical significance, in the expected direction, on voter ideological distance.

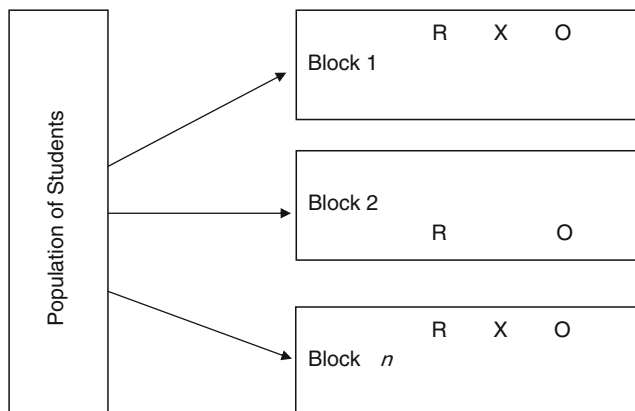
The second pilot built upon the first, but attempted to improve upon the procedures. Sample size was increased to 66 students, who were randomly assigned to Group 1 and Group 2. Students were not allowed to talk among themselves about the candidates and issues. The same seven dependent variables were measured. In a one-way ANOVA, treatment achieved statistical significance, in the expected direction, on the following two dependent variables: party distance from the winner to the runner-up (or to the median voter) is farther under the double ballot.

Thus, these pilot results imply that the ballot structure makes a difference. Further, the difference is in the direction of extremism, moving the winner away from the center (of the candidates or the voters). We explore these possibilities further in the full experiment, described below.

American Experiment: Design

The experiment was conducted in February of 2007, using undergraduate students from an introductory political science course at the University of Iowa. The experiment was run in fourteen sections of an American politics class. The design was straightforward: the sections were randomly assigned to one of the two treatments (i.e., single ballot or double ballot elections). This is similar to a randomized complete block (RCB) experimental design. In the RCB, the sample of subjects is divided into subgroups to create less variability within groups than would be otherwise found in the entire sample (Cook and Campbell 1979). The purpose of the RCB is to create estimates of the treatment effect within a block that is more efficient than estimates across the entire sample. When these blocks are pooled, the estimates should be more efficient than without the creation of subgroups. In the double ballot experiment, the individual class sections of the larger introductory seminar are the blocks, and each section has an equal chance of receiving one of the two experimental treatments (Fig. 7.1).

The outcomes of interest, also measured in the two pilots, are as follows: number of viable candidates (i.e., number of candidates receiving 15% or more of the



where Block n = subsection of the lecture, R = random assignment, X = treatment (i.e. exposure to double ballot rules), and O = observation.

Fig. 7.1 Randomized block design: double ballot experiment

vote); party ideological distance (i.e., the left–right policy distance between the candidate with the most votes and the second-most votes); voter ideological distance (i.e., the left–right policy distance between the winner and the median voter); supporter ideological distance (i.e., the left–right policy distance between the supporters and the winner); the number of sincere voters (i.e., the number of voters who voted for their first preference on the first ballot) and the number of accurate forecasters (i.e., the number of voters who voted for the winning candidate). The expectation would be that, on all these dependent variables, Group 2 (the double ballot) will receive significantly different mean scores than Group 1 (the single ballot). That is, the experiment should demonstrate that two-ballot presidential election rules generated more candidates, greater ideological distance between the top candidates, and greater ideological distance between the median voter and the winner. The French presidential election rules were used in the experiment to facilitate greater control of the laboratory setting, and also to keep the experimental protocol as simple as possible for the subjects. In comparison, the French legislative rules would have required a 12.5% threshold as an additional manipulation to the experimental design. In Table 7.1, these hypotheses are summarized for double ballot vs. single ballot presidential contests.

Several of these hypotheses derive from Cox's (1997) analysis of strategic and sincere voting under single-member single ballots and single-member dual ballot systems. Cox assumes that when voters are only concerned with the outcome of the current election, voters behave strategically in a manner similar to single ballot plurality; however, their ability to behave strategically is more difficult because the information demands are much greater under double ballot rules. Thus, we expect voters to behave more sincerely under the double ballot rules. This expectation suggests that smaller parties may be more likely to field candidates when operating under double ballot rules; therefore, we expect double ballot rules to produce

Table 7.1 Double ballot vs. single ballot experiment hypotheses

	Independent Variable	
	Double ballot	Single ballot
Outcome		
No. of sincere voters	>	
No. of candidates	>	
Party ideological distance	>	
Voter ideological distance	>	
Supporter ideological distance	<	
No. of accurate forecasters	<	

more candidates than under single ballot rules. Because the number of candidates increases under double ballot rules, voters have more choices to vote closest to their preference ordering. As a result, we expect the party ideological and voter ideological distance to be greater under double ballot than single ballot rules. Because voters select from a wider ideological range of candidates, the expectation is that double ballot rules decrease the supporter ideological distance between the voter and the winners on the first ballot. Finally, as one of the consequences of increased informational demands on the voter, we expect voters to be less accurate in predicting the winner under double ballot rules.

American Experiment: Procedure

Two hundred subjects were recruited from the university student population through in-class participation of the experiment. They were asked to participate in a voting experiment, for which they were compensated.³ For experimental control, the students were simply told the study was about “voting in a democracy” and they would have the opportunity to participate in a series of presidential elections. The students filled out a brief background questionnaire, covering basic socioeconomic and political characteristics, including questions regarding left–right ideology and party affiliation. The subjects then acted as voters, having the opportunity to select from an array of five presidential candidates across four presidential elections. A new election began following the announcement of the previous election winner, and the experimenter conducted a total of four presidential elections. Total time for the experiment was approximately 30 min.

The subjects read a brief statement from each of the five presidential candidates (A, B, C, D, and E). The statements varied in the degree of commitment to government assistance for the unemployed.⁴ Each candidate had a distinct position, from a very left-wing position (i.e., strong support for government economic intervention) to a very right-wing position (i.e., strong opposition to government economic

³ The students received candy and office supplies to compensate for their time.

⁴ Refer to Appendix for the experiment materials.

intervention). Numerically, their positions were represented on a scale (with 0 indicating the most support for government intervention, 5 = neutral, and 10 indicating the most opposition to such government intervention). Specifically, the assigned candidate scores were as follows: A = 1, B = 3, C = 5, D = 7, and E = 9. They were also informed that they themselves, as a group of voters, had the opportunity to place themselves on the same scale (A considered improvement over the procedure followed in the pilots). The subjects self-selected their own policy position regarding government assistance for the unemployed and wrote this number on the background questionnaire. Once the subjects completed the background questionnaire, the experiment began and the elections ran concurrently.

As mentioned previously, seven electoral outcomes were measured: number of viable candidates (i.e., number of candidates with more than fifteen percent of the vote on the first ballot); party ideological distance (i.e., the left–right policy distance between the candidate with the most votes and the second-most votes); voter ideological distance (i.e., the left–right policy distance between the winner and the median voter); supporter ideological distance (i.e., the left–right policy distance between the supporters and the winner); the number of sincere voters (i.e., the number of voters who voted for their first preference on the first round); the number of accurate forecasters (i.e., how many correctly forecast the winner).

American Experiment: Results

The general analysis approach is ANOVA under general linear model (GLM) assumptions, which reduces to a simple F-test to determine whether mean election outcomes differ significantly from one another after ballot manipulation (Rutherford 2001). GLM's flexibility allows it to handle many types of experimental design, and, in particular, the randomized block design used in this experiment. The statistic of interest is the F-test for difference of group means. This evaluates whether the means of the groups formed by the factor (i.e., double ballot or single ballot) are statistically different. For this experiment, the factor is the manipulation of ballot number – Group 1 is the single ballot, and Group 2 is the double ballot. If the group means do not differ significantly, then one assumes the experiment treatment did not have a discernible effect on the outcome variable.

To analyze the experimental data, we use two types of ANOVA procedures: two-way ANOVA and repeated measures ANOVA. First, a two-way ANOVA is used to compare the mean scores of the outcome variable by the treatment factor (i.e., single or double ballot experiment group) with a focus on the results of the first election. The two-way ANOVA permits the inclusion of the blocks (i.e., individual sections of the undergraduate course) as an additional factor. The data from the first election are treated as a single-shot randomized block experiment. The second ANOVA procedure takes into account the repeated measures nature of the data. As with any ANOVA, the repeated measures ANOVA is used to test the equality of means between groups (Girden 1992). However, repeated measures are when

Table 7.2 Single-shot election: between-subjects effects affecting mean of the outcome variables^a

	Sincere voters	Viable candidates	Party ideological distance	Voter ideological distance	Supporter ideological distance	Accurate forecasters
Between Groups	0.025 (01.08)	11.041*** (21.702)	0.236 (0.267)	35.785*** (59.462)	16.899** (8.005)	3.045*** (15.241)

N = 198

^aType III Sum of squares reported with F-statistics in parentheses

*Significant at $p < 0.10$; **Significant at $p < 0.05$; ***Significant at $p < 0.01$

subjects are measured under different conditions. In this experiment, the subjects are exposed to four elections with their responses captured after each election. Thus, the measurement of the outcome variables (e.g., sincere voters, voter ideological distance, etc.) is repeated for four rounds. In this situation, a standard ANOVA is unsuitable because it does not model the correlation between the repeated measures, and the data violate the ANOVA assumption of independence. The data from all four elections are treated as a repeated measures randomized block design.

For the first election, the results of the two-way ANOVA for the dependent variables are reported in Table 7.2.⁵ The difference in means for sincere voters was far from statistical significance, although the coefficient is in the hypothesized direction: greater numbers of sincere voters appear under double ballot treatment groups. However, the difference in mean scores for the number of candidates is statistically significant based on the results of the first round of elections.

On average, the number of viable candidates (i.e., candidates receiving 15% or more of the vote) was greater in elections with subjects exposed to the double ballot treatment. This result tentatively supports the expectation that the number of viable candidates should be greater in an election when voters receive a second chance to vote.

The third outcome variable, party ideological distance, is not statistically significant, but it is in the hypothesized direction. This null finding suggests that party ideological distance does not differ in a significant manner in the first election. This could be attributed, in part, to the self-selection of policy positions by the students prior to the beginning of the experiment. However, the third dependent variable, voter ideological distance, shows high significance in the hypothesized direction. This suggests that, at least in the first election, subjects exposed to the double ballot treatment had a mean score significantly larger than subjects operating under the single ballot rules. The fifth outcome variable, supporter ideological distance, is also significant for the first election. This implies that subjects are likely to be more distant from the winner under double ballot rules after the first voting trial. The final

⁵ The subjects were asked to fill out a background questionnaire prior to the experiment. The results were correlated with the group type to test the degree linear dependence between group type and the demographic and/or the political ideology variables. The correlation matrix did not reveal a significant relationship between group placement and the questionnaire.

Table 7.3 Repeated measures: between-subjects effects affecting mean of the dependent variables^a

	Sincere voters	Viable candidates	Party ideological distance	Voter ideological distance	Supporter ideological distance	Accurate forecasters
Intercept	278.518*** (346.227)	6164.574*** (4799.051)	6265.729*** (1994.449)	1885.640*** (955.431)	637.444*** (82.653)	289.891*** (908.680)
Group	0.852 (0.852)	0.271 (0.211)	15.790** (5.026)	112.256*** (56.879)	30.869** (4.003)	4.633*** (14.522)
Partial η	0.005	0.001	0.025	0.225	0.045	0.069
<i>N</i> = 200						

^aType III Sum of squares reported with F-statistics in parentheses

*Significant at $p < 0.10$; **Significant at $p < 0.05$; ***Significant at $p < 0.01$

outcome variable, number of accurate forecasters, is also statistically significant, although it is not in the expected direction. This could be due to lack of information under the single ballot rules, because the single round players received no information regarding the distribution of the votes. Under the double ballot rules, subjects received marginally more information based on the results of the first voting round. In general, the results of the two-way ANOVA analyses indicate support for four of the six hypotheses. However, are these trends maintained after four rounds of voting?

The results of the repeated measures ANOVA are in Table 7.3. As in the single-shot election, the mean score for the number of sincere voters is no different under single ballot or double ballot treatments. The mean number of sincere voters, defined as a vote for the candidate closest to the subject's self-selected policy position, is not significantly different for subjects in the double ballot or single ballot treatment groups. The difference between the estimated marginal means is revealed in Fig. 7.2. Each line represents the mean score for the experiment group in a given election. One notable trend is that the estimated marginal mean for sincere voters decreases as the number of voting rounds increase.

For example, the estimated marginal mean is approximately 0.65 for both groups in election 1; however, by the fourth election this estimate has dropped to 0.60 for single ballot subjects and 0.52 for double ballot subjects. Although not statistically significant, these results hint that subjects in the double ballot groups are voting more strategically as the number of elections increase. This trend is also occurring among single ballot subjects, but not at the same rate. One possible explanation for this unexpected trend could be attributed to the nature of the experimental environment. Without the complicating factors of news reporting and public polling information, subjects in the double ballot may have realized the payoff for departing from sincere voting earlier than voters in the single ballot treatment.

The outcome variable for the number of viable candidates is not statistically significant across the four elections. This finding contradicts the result of the

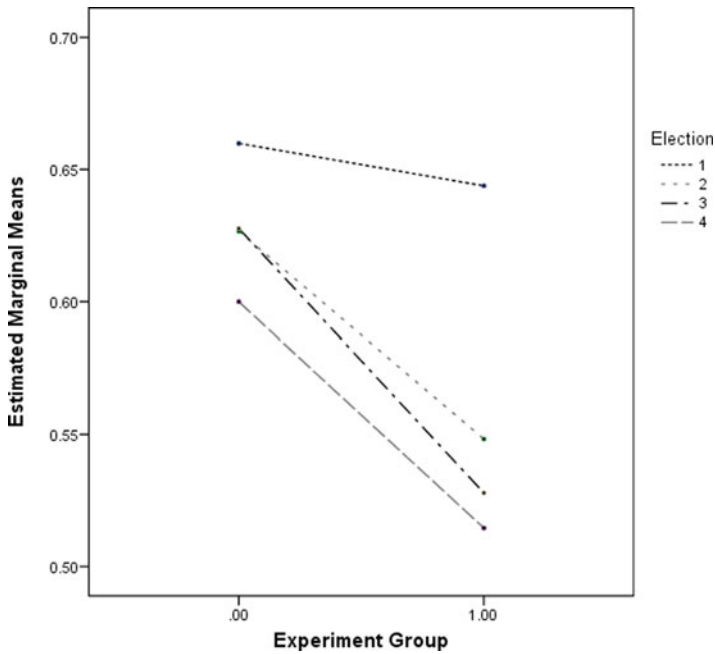


Fig. 7.2 Estimated marginal means of sincere voters

two-way ANOVA results.⁶ In Fig. 7.3, the estimated marginal means decreases as the elections continue for the single ballot group, but the scores vary marginally for the double ballot treatment group. These results suggest one possible explanation – the outcome variable does not differ between exposure to single ballot or double ballot treatments.

The results for party ideological distance become statistically significant under the repeated measures ANOVA. As indicated in the results of Table 7.3 and Fig. 7.4, the distance is greater under exposure to the double ballot treatment, and this distance increases as the number of elections increases. This result suggests that party ideological distance is marginally greater in the first election for subjects exposed to double ballot voting, but this distance increases at a faster rate for double ballot subjects and becomes significant as the number of elections increases.

The fourth outcome variable, voter ideological distance, is statistically significant for both the single-shot and repeated measures analysis. As revealed in Fig. 7.5, the estimated mean for the double ballot treatment is smaller compared to the score for the single ballot treatment. In addition, the figure reveals the opposite of what was hypothesized: the estimated marginal mean is larger for single ballot subjects across

⁶ However, the results of two pilot experiments conducted in June and September 2006 also found null results for the number of viable candidates.

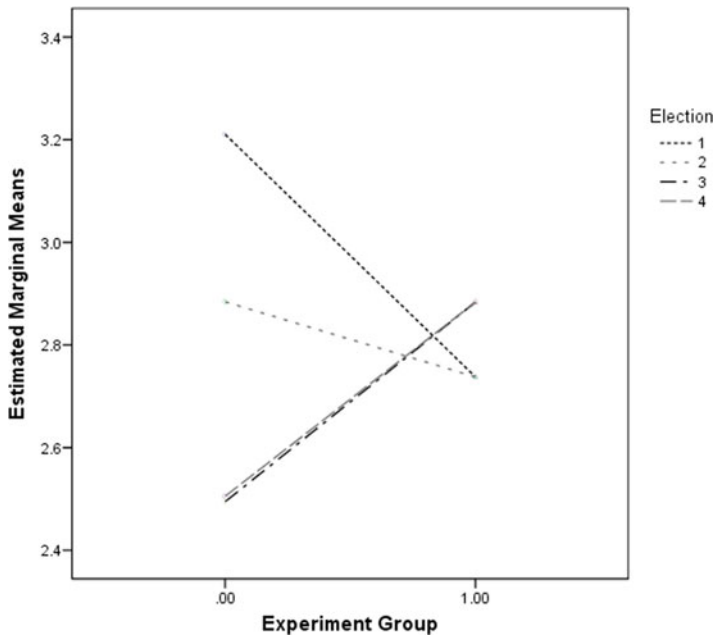


Fig. 7.3 Estimated marginal means for number of viable candidates

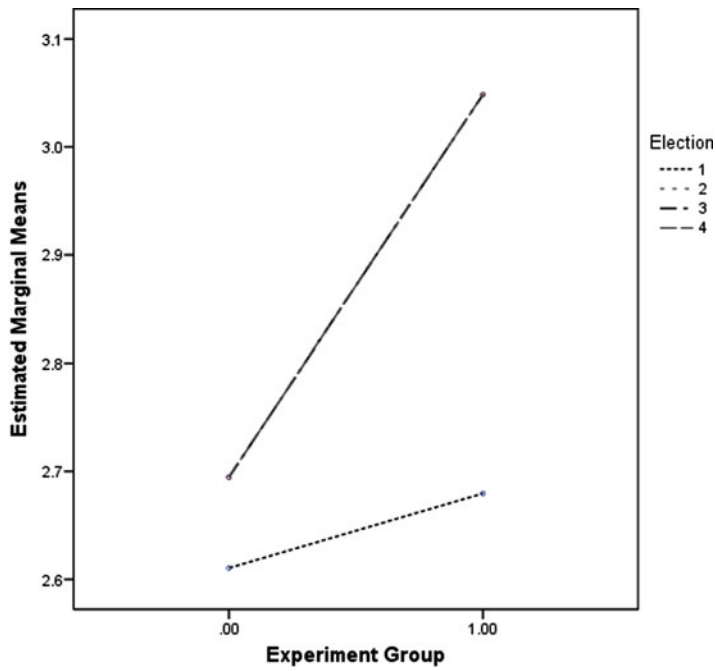


Fig. 7.4 Estimated marginal means for party ideological distance

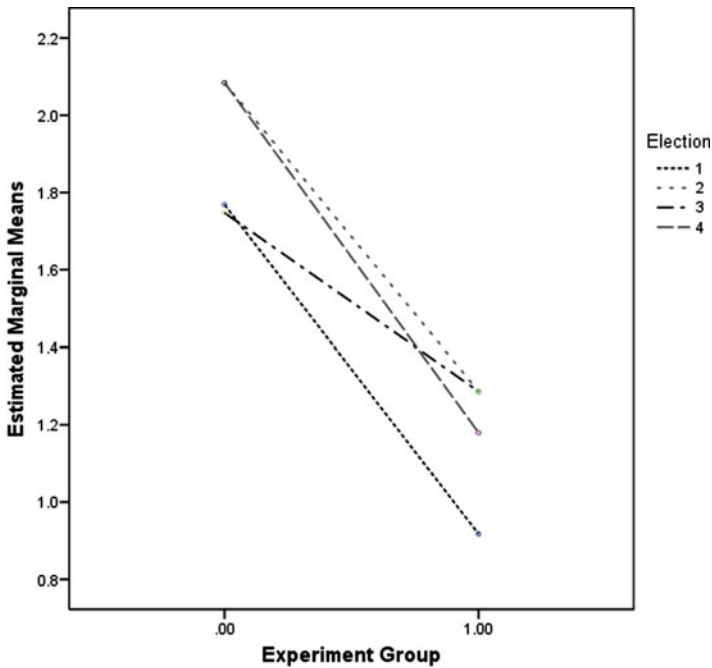


Fig. 7.5 Estimated marginal means for voter ideological distance

all elections, and this score fluctuates from one election to the other. One possible explanation for this finding is that the distance between the winner and the median voter is bigger under single ballot treatments due to the distribution of the voters’ self-selected policy scores.

The results of supporter ideological distance are significant for both the single-shot and the repeated measures analysis. The group mean scores for the single ballot treatment are generally smaller than for the double ballot treatment. In addition, the estimated marginal mean remains the same in three of the four elections for single ballot treatment (Fig. 7.6). In general, the distance between the supporters and the eventual winner remains the same, and the supporters are ideologically closer to the winner than in the double ballot treatment. The supporters exposed to the double ballot treatment tend to be further away from the eventual winner. Therefore, the results of the single-shot and repeated measures analyses are statistically significant and in the hypothesized direction for the supporter ideological distance variable.

The accurate forecaster results are statistically significant for both the single-shot and the repeated measures elections. In the first election, the double ballot treatment tends to produce subjects that are more accurate in predicting the winner than under single ballot conditions (Fig. 7.7). However, this difference between the estimated marginal mean decreases with each subsequent election, although the estimated mean is always larger under the double ballot treatment. Although the mean

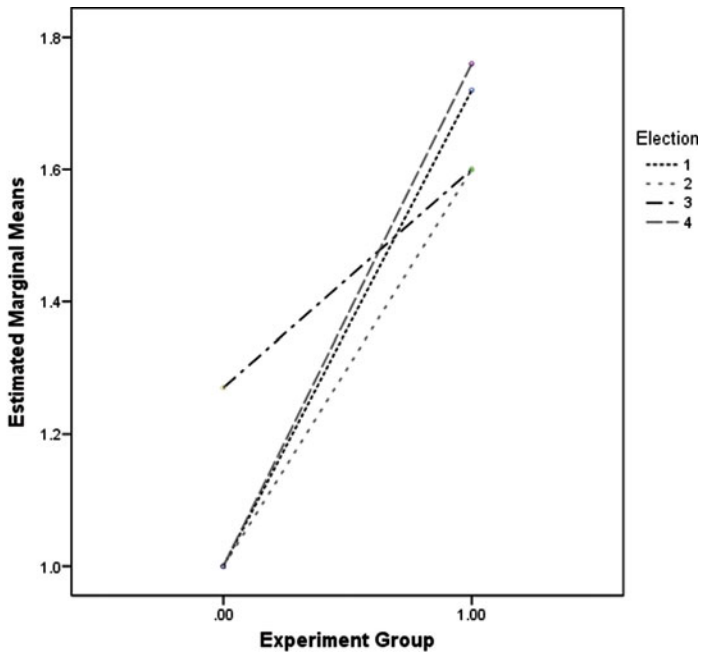


Fig. 7.6 Estimated marginal means for supporter ideological distance

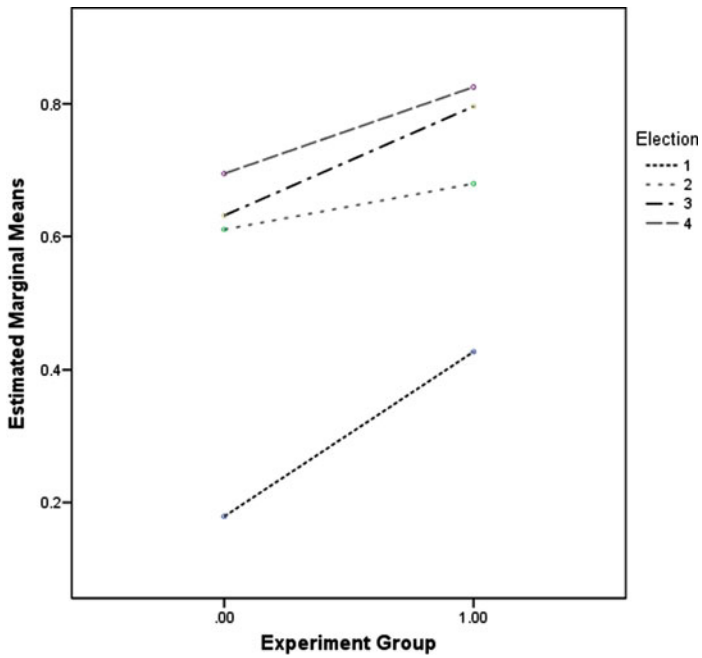


Fig. 7.7 Estimated marginal means for number of accurate forecasters

score difference is statistically significant, the trend is in the opposite direction of the hypothesis. Again, this could be due to lack of information under the single ballot rules because the single round players received no information regarding the distribution of the votes prior to casting a ballot, but the double ballot players receive some information based on the results of the first round. In sum, ballot type influences party ideological distance, voter ideological distance, supporter ideological distance, and the number of accurate forecasters.

Conclusion

We have addressed the general issue of whether electoral rules make a difference, applied specifically to how the double ballot affects political behavior. The issue is important, first, because the method guides the elections of a leading world democracy – France. The issue is important, second, because many new democracies are turning to the French example in their own electoral engineering. What are the double ballot effects? The not inconsiderable observational work done on the French case contradicts itself, saying it does not operate differently from another global class of electoral system – plurality, majority, or PR. Here, on the basis of experimental research, we show that the double ballot system does produce different electoral outcomes, compared to a single ballot (simple plurality) system. In particular, it tends to move the winning candidate ideologically away from the second-place candidate, and away from voters (i.e., the median voter, as well as his or her supporters). In sum, the double ballot encourages ideological movement away from the center, and toward the extremes. Admittedly, these experimental results were obtained from United States subjects, who had no prior experience with this method of presidential selection. Nevertheless, the principles and procedures of the experimental are, intentionally, of sufficient generality that they could be expected to hold in other democratic settings. That, of course, is a task for future research.

Appendix: Experiment Materials

Background Questionnaire

Elections Experiment

“Please fill out this brief questionnaire, to help us better understand the results of our study. Thank you.”

- A. Here are some quick questions to get started.
1. What is your major?
 2. What year in school are you?
 3. How old are you?
 4. Have you voted in a city, state, or national election?
 5. Are you a citizen of the United States?
- B. For the following questions, just circle the one that is most nearly correct.
1. My interest in politics is
 - a. High.
 - b. Medium.
 - c. Low.
 2. The political preference I feel closest to is
 - a. Democratic.
 - b. Republican.
 - c. Independent.
 - d. Other.
 3. I have had the following number of political science courses:
 - a. 0–1.
 - b. 2–3.
 - c. 4 or more.
 4. I would say that politically I am
 - a. Conservative.
 - b. Middle-of-the-road.
 - c. Liberal.
 5. My GPA is about
 - a. 2.0–2.4
 - b. 2.5–2.9
 - c. 3.0–3.4
 - d. 3.5 or higher
 6. I would say that politically I am
 - a. On the Left.
 - b. In the Center.
 - c. On the Right.
 7. I am
 - a. Female.
 - b. Male

Policy Issue

Government Assistance for the Unemployed

“These days there is a lot of talk about unemployment or job insecurity. Some people think government should step in and help, others are less sure if that is the best thing. For those people who suddenly lose their job, which of the following presidential candidate positions do you most closely agree with?”

- A. At least for a time, government should provide them with their full salary.
- B. At least for a time, government should provide them with 2/3 their salary.
- C. At least for a time, government should provide them with 1/2 their salary.
- D. At least for a time, government should provide them with 1/3 their salary.
- E. At least for a time, government should not provide them with any salary.

Ballots

Ballot 1 (For Both Groups)

I cast my vote for the following candidate (select only one):

1. Candidate A {1} -----
2. Candidate B {3}-----
3. Candidate C {5}-----
4. Candidate D {7}-----
5. Candidate E {9}-----

Ballot 2 (Double Ballot)

I cast my vote for the following candidate (please write in one candidate name):

Exit Questionnaires

Post-Election Questionnaire: Single Ballot

“Please answer these few questions, to help us better understand the results of our study. Thank you.”

1. What was your self-assigned score on the 0–10 left–right scale?
2. In the first-round of balloting, did you vote for your top candidate choice?
3. What candidate do you think will be elected?

Post-Election Questionnaire: Double Ballot

“Please answer these few questions, to help us better understand the results of our study. Thank you.”

1. What was your self-assigned left–right score on the 0–10 scale of government intervention in the economy?
2. In the first-round of balloting, did you vote for your top candidate choice?
3. In the second round of balloting, did you vote for your top candidate choice?
4. What candidate do you think will be elected?

Final Post-Election Questionnaire: Single Ballot

“Please answer these few questions, to help us better understand the results of our study. Thank you.”

1. What number did you select on the 0–10 left–right scale?
2. In the first-round of balloting, did you vote for your top candidate choice?
3. What candidate do you think will be elected?
4. How interested were you in this experiment?
 - a. Very interested
 - b. Somewhat interested
 - c. Indifferent
 - d. Somewhat bored
 - e. Bored

Final Post-Election Questionnaire: Double Ballot

“Please answer these few questions, to help us better understand the results of our study. Thank you.”

1. What number did you select on the 0–10 left–right scale?
2. In the first-round of balloting, did you vote for your top candidate choice?
3. In the second-round of balloting, did you vote for your top candidate choice?

4. What candidate do you think will be elected?
5. How interested were you in this experiment?
 - a. Very interested
 - b. Somewhat interested
 - c. Indifferent
 - d. Somewhat bored
 - e. Bored

Glossary of Key Electoral System Terms

Alternative vote One name for the use of the single transferable vote (*q.v.*) in a single seat district. In the USA, this method is often referred to as the **instant runoff**.

Approval voting (AV) A method in which voters may cast up to as many votes as there are candidates, under the instruction to vote only for those candidates/alternatives of which they approve, i.e., which they find acceptable. The candidates with the greatest number of approval votes are chosen.

AV A common acronym for **approval voting**; it is also used as an acronym for **alternative vote**.

Borda rule A method of ranked voting which assigns numerical scores to each candidate based on where they stand in each voter's ranking (one point for each candidate they are ranked higher than) and then sums up those votes over all voters to obtain each candidate's **Borda score**. Then, the candidate with the highest Borda score is chosen.

Borda score See **Borda rule**.

Closed list PR See **List PR**.

Compensatory allocation In mixed member systems (*q.v.*) or in other systems that have multiple tiers of election, a method of allocating seats in higher tiers based on results in lower tiers that acts to increase the proportionality of seat outcomes to party vote shares.

Condorcet extension method See **Condorcet rule**

Condorcet rule The ranked voting method which chooses that candidate, if any, who can defeat all other candidates in paired (head-on-head) competition. Such a candidate is called a **Condorcet winner**, or a **majority winner**. Since there may be no such candidate, a variety of methods have been proposed as Condorcet extension methods, to choose.

Condorcet winner See **Condorcet rule**

Coombs rule A form of ranked voting (*q.v.*) similar to the alternative vote (*q.v.*), except that, instead of dropping the candidate with fewest first place votes, in the

absence of any candidate who receives a majority of the votes cast, we drop the candidate with the most last place votes and then reallocate that candidate's support.

Cumulative voting (CV) An electoral rule in which voters have multiple votes to cast and are allowed to cumulate their votes on one or only a few candidates. There are many variants of *cumulative voting*, with perhaps the most common involving the requirement that all components of the allocation vector which sums to the number of votes each voter is entitled to cast must be integers.

CV The common acronym for **Cumulative voting** (*q.v.*).

Deviation from proportionality A measure of the extent to which party vote shares and party seats shares are not identical. The two most common measures of deviation from proportionality are the Loosemore and Hanby (1971) index of distortion, which is a function of the summed absolute differences between seat share and vote share, and the Gallagher index (Gallagher 1991), which is a function of the squared differences between seat share and vote share.

d'Hondt rule (for list PR, *q.v.*) A proportionality rule in which we allocate seats to each party after an integer division of each party's vote share, allocating seats to the parties with the M highest quotients of party shares, where M is the number of seats to be filled. Worldwide, this is the most common rule for specifying a proportional allocation. It is also a special case of what is called a divisor rule, i.e., one where the seat allocations go to the highest quotients obtained after division of party vote shares by a set of numbers. Other allocation rules include the Sainte-Laguë rule in which the set of divisors are the odd numbers, rather than the integers (see Balinski and Young 1982 for more details).

District magnitude (M) The number of seats that are allocated to a given constituency [see also single member district (SMD) and multimember district (MMD)].

Droop quota of votes [for list PR systems, *q.v.*, or STV, *q.v.*] This is equal to $E/(M + 1)$, where E is the size of the actual electorate and M is the number of seats to be filled.

Double ballot mixed system A mixed member electoral system in which voters cast one ballot to determine the outcome of the single member districts (*q.v.*) in which they are located and a different ballot to determine the party share for the proportional tier (*q.v.*) of the mixed system.

Effective number of electoral parties (ENEP) This is a calculation of the Laakso-Taagepera (1979) index for party vote shares. To calculate this index, we take each party's vote share, square it, sum the squares, and then take the inverse of the sum so obtained. When all r parties have equal vote shares, the L-T index will be r . The L-T index is the inverse of the Hirschman–Herfindahl index widely used in sociology and economics; it can also be linked to standard variance calculations (see Feld and Grofman 2007). Also see effective number of parliamentary parties.

Effective number of parliamentary parties (ENPP) This is a calculation of the Laakso-Taagepera (1979) index for party seat shares. To calculate this index, we take each party's vote share, square it, sum the squares, and then take the inverse of the sum so obtained. When all r parties have equal seat shares, the L-T index will be r . The L-T index is the inverse of the Hirschman–Herfindahl index widely used in sociology and economics; it can also be linked to standard variance calculations (see Feld and Grofman 2007). Also see effective number of electoral parties.

Empty lists (also called short lists or sterilized lists) In the Italian mixed system (*q.v.*) adopted in 1993, a technical trick in creating party lists designed to avoid victories in the plurality tier (*q.v.*) costing a party seats in the proportional component of the mixed system (for details, see di Virgilio 2002).

ENEP The acronym for effective number of electoral parties (*q.v.*).

ENPP The acronym for effective number of parliamentary parties (*q.v.*).

Evaluation voting A variant of the method of majority judgment (*q.v.*) in which voters can evaluate candidates using one of three grades (see the Baujard and Igersheim chapter in this volume).

Hare formula (for list PR, *q.v.* or STV, *q.v.*) A proportionality rule in which we allocate seats to each party based on integer and greatest (largest remainder) fractional shares of total votes cast multiplied by the number of seats to be filled. See also Imperiali formula, d'Hondt rule, Droop quota, Hare quota.

Hare quota of votes (for list PR systems, *q.v.*, or STV, *q.v.*) This is equal to $E/(M)$, where E is the size of the actual electorate and M is the number of seats to be filled.

Imperiali formula See **Imperiali rule**.

Imperiali rule (for list PR, *q.v.* or STV, *q.v.*) A proportionality rule used in Italy to list PR elections from 1956 to 1991, in which we allocate seats to each party based on integer and greatest (largest remainder) fractional shares of total votes cast divided by the number of seats to be filled plus two. See also Hare formula, d'Hondt rule, Droop quota.

Instant runoff See **Alternative vote**.

Laakso–Taagepera index See effective number of electoral parties (ENEP) and number of parliamentary parties (ENPP).

Limited voting A system of voting in which voters in districts where there are M seats to be filled have only k votes to cast. One pole of limited voting occurs when $k = 1$; this is the single nontransferable vote (*q.v.*).

List PR system In the list form of proportional representation, voters cast a (normally single) ballot for a party list, and the number of candidates on each list who are elected is determined by the share of the votes received by each party. In closed list PR, only parties are objects of choice and the parties determine rank of their own candidates so that a party which wins r seats will elect the top r candidates on

its list of candidates; in open list PR, voters may also affect by their vote choices (even if not fully determine) which individual candidates from a given party will be elected by indicating their preferences among candidates. Flexible list PR is also sometimes distinguished from open list PR in that in flexible list PR, voters have the option of either casting a simple list vote *or* of voting for individual candidates whose preference votes may then place them ahead of the other candidates on the party list.

List tier See **Proportional tier**.

M A common acronym for **District magnitude**.

Magnitude See **District magnitude**.

Majoritarian voting rule A voting rule in which a majority of the voters, if they are able to coordinate their votes, could determine all the winners within any constituency.

Majority judgment A new voting method proposed by Balinski and Laraki. It makes use of pre-specified grades assigned by voters to each candidate, and then looks for the candidate with the highest median grade, using a lexicographic rule to break ties (see their essay this volume for details).

Majority runoff (two rounds) A particular form of runoff rule (*q.v.*) in which the top two candidates in the first round face off in head to head competition in the second round if no candidate received a majority of the votes in the initial round of voting.

Majority winner See **Condorcet rule**; sometimes, however, this term merely refers to the candidate in a runoff rule (*q.v.*) who eventually receives a majority of the votes cast.

Method majoritaire See **Majority judgment**.

Mixed member electoral system (or mixed system, for short; with common acronyms either MM or MMES) Technically, simply one in which the electoral rule is not constant across all constituencies, but the term is more commonly used to refer to electoral systems that include both constituencies in which voters vote for a single candidate and those in which candidates are elected by some form of proportional representation (see Shugart and Wattenberg 2001). In terms of converting votes to seats, there are two basic forms of mixed member electoral systems: MMM (*q.v.*) and MMP (*q.v.*); and two basic forms of ballot: single ballot mixed member systems (*q.v.*) and double ballot mixed member systems (*q.v.*).

Mixed member system See **Mixed member electoral system**.

Mixed system See **Mixed member electoral system**.

MM An acronym for mixed member system.

MMD The acronym for **multimember district** (*q.v.*). See also **SMD**.

MMES An acronym for mixed member system.

MMM One of the two basic kinds of seat allocation in mixed member systems (*q.v.*): one in which the plurality component and the proportional component of the electoral rules operate essentially independently of one another. See also **MMP**.

MMP One of the two basic kinds of seat allocation in mixed member systems (*q.v.*): one in which the plurality component and the proportional component of the electoral rules do *not* operate independently of one another, so that outcomes in the plurality component may affect party representation in the PR aspect of the system. See also **MMM**.

MMES A general acronym for a mixed member electoral system (*q.v.*), more commonly denoted as an **MM** system.

Multimember district (MMD) A constituency from which more than a single legislator is to be elected (also see **Single member district**).

Open list PR (sometimes referred to as “PR with preferential voting,” though that term is better used for the single transferable vote *q.v.*, and related systems)

See **List PR**.

Plurality election A single member district election (*q.v.*) in which the winner is the candidate with the most votes regardless of whether or not this vote share is a majority of the votes cast. (Plurality elections may also be held in *m* seat multimember districts, *q.v.*, in which case the winners are the *m* candidates with the highest votes. Elections using plurality in multimember districts are sometime called “plurality bloc elections.”)

Plurality tier In a mixed member electoral system (*q.v.*), this refers to the single member district (*q.v.*) component of the mixed system in which elections are held under a plurality rule (*q.v.*).

PR The acronym for proportional representation (*q.v.*).

Proportional representation (PR) There are several families of electoral rules that are intended to provide some level of proportionality in translating votes into seats. The most important of these are the list PR systems (*q.v.*), the single transferable vote system (*q.v.*), and the single nontransferable vote system. Cumulative voting (*q.v.*) also can provide proportionality. While cumulative voting and SNTV (*q.v.*) are sometimes called semi-proportional since they require voter coordination to assure proportionality, this is a quantitative rather than a qualitative difference between them and, say, list PR methods, and so we treat both under the general rubric of PR; we reserve the intermediate category of semi-proportional systems for limited voting (*q.v.*) with $1 < k < M$. Because of the problem of rounding to an integer seat allocation, proportionality is almost never exact.

Proportional tier In a mixed member electoral system (*q.v.*), this refers to the proportional representation (*q.v.*) component of the mixed system. This is sometimes also referred to as the list tier.

Ranked voting Any voting method that requires voters to submit a ranking of all (or some of the candidates) as compared to merely using x 's to indicate preferred (or acceptable) candidates.

Runoff rule A multielection voting method in which some fraction of the highest vote getters on the first round advance into one or more further runoff rounds if no candidate obtains sufficiently many votes to be declared a winner. There are many varieties of runoff in use worldwide, with the most common the two round majority runoff, also called the double ballot system, in which the top two candidates advance to the second round if no candidate has a majority of the vote on the first round (see Lemennicier 2008).

Seat bonus A rule that gives to parties receiving more than a certain share of the vote (usually only the party receiving a plurality of the votes) extra seats in the legislature. For example, the 2005 changes in Italian election law created a seat bonus rule that was intended to insure that there was a majority coalition.

Sequential elimination rule A runoff voting method ($q.v.$) in which the candidate with the fewest first place votes (or possibly, the one with the most last place votes) is eliminated and the balloting continues until some candidate gets a majority of the votes cast (see **Runoff rule**).

Single ballot mixed system A mixed member electoral system ($q.v.$) in which the same vote which is used to determine the outcome in each of the single member districts ($q.v.$) is also used to determine the party share for the proportional component of the mixed system. See also **Double ballot mixed member system**.

Single member district (SMD) A constituency from which only a single legislator is to be elected. See also **Multimember system**.

Single nontransferable vote (SNTV) SNTV is a method of proportional representation ($q.v.$) which is a special case of limited voting ($q.v.$) in districts with M seats to be filled ($M > 1$) where voters have but a single vote to cast. The Threshold of Exclusion for SNTV is identical to that of the most common (d'Hondt) form of list PR, namely $1/(M + 1)$, i.e., any set of voters that makes up at least $1/(M + 1)$ th of the electorate of the district and which is able to coordinate how its members cast their votes is guaranteed to be able to elect a candidate of its choice under SNTV.

Single transferable vote (STV) One of the standard methods of proportional representation ($q.v.$). Under STV, voters rank order the candidates: if there are M seats to be filled, any candidate who receives at least a *Droop quota* of votes ($q.v.$) is elected, and exactly $E/(M + 1)$ of the ballots (equals one Droop quota) in which that candidate is at the top of the preference rankings are removed from further consideration, where E is the size of the actual electorate and M is the number of seats to be filled, and the votes on the remaining ballots on which that candidate is at the top of the preference ranking are reallocated to the next highest ranked (still eligible) candidate on that ballot. If that reallocation now gives some additional candidate a Droop quota, that candidate is elected, and we continue in this fashion as long as

we can. If there are still unfilled seats, the candidate with the fewest first place votes is dropped from eligibility, and her votes are reallocated to the next highest ranked (still eligible) candidate on the ballots of those who had the dropped candidate at the top of their preference ranking. This process continues until all seats are filled. (If there are some voters who do not rank sufficiently many candidates, their ballots may never come into play, and so sometimes it may be necessary to elect the last candidate(s) with less than a Droop quota.)

SMD The acronym for **Single member district** (*q.v.*).

STV The acronym for single transferable vote (*q.v.*).

SNTV The acronym for single nontransferable vote (*q.v.*).

Threshold See **Threshold rule**, **Threshold of exclusion**.

Threshold of exclusion In any given electoral rule, the minimum share of votes a group of voters able to coordinate the votes of its members needs in order to guarantee election of at least one candidate of its choice. For example, for the d'Hondt rule (*q.v.*), the Threshold of exclusion is $1/(M + 1)$, where M is the number of seats to be filled. However, only for the d'Hondt form of divisor-based PR methods and for STV (*q.v.*) and for SNTV (*q.v.*) is the Threshold of exclusion always *exactly* $1/(M + 1)$. With other PR methods, the Threshold of exclusion is generally also a function of n , the number of parties receiving votes, except when $n = M + 1$, when the $1/(M + 1)$ is also found (see Lijphart and Gibberd 1977: Table 1, p. 225). Within any given country, an M seat district can be expected to have roughly M times the population of a single seat district. Thus, if we are interested in the actual number of voters who must change their mind to affect election outcomes, then Threshold of exclusion values need to be adjusted to take population differences into account across constituencies of different sizes (see Grofman 2001).

Threshold rule In various forms of proportional representation (*q.v.*) and in the proportional representation tier of a mixed member electoral system (*q.v.*), a rule that denies seats to a party that fails to achieve some pre-specified threshold of national or regional vote share, or fails to achieve some necessary regional distribution of party success.

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