Chapter 15
Framed Field Experiments on Approval Voting: Lessons from the 2002 and 2007 French Presidential Elections

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15.1 Introduction

Competitive elections are an essential feature of representative democracies; thus, the choice of voting method is partly constitutive of the form of the democracy. Clearly, this engenders fundamental debates on the properties that acceptable voting rules should and should not exhibit. These debates take place primarily in two spheres: the public and the scientific. Let us here consider an example from France. The President of the French Republic is elected by direct universal suffrage, on the basis of a two-round plurality vote. In other words, run-off voting ensures that the elected President always obtains a majority. On each round, each voter can vote for one and only one candidate. If no candidate receives a majority of votes in the first round of voting, there is a run-off between the two highest-scoring candidates. The winner of this latter round is the winner of the election. Hence, each round is determinant for the result and considered as an important source of information on citizens' political preferences. The results of the first round of the 2002 French presidential election were a shock for a large part of the population: contrary to the predictions of the opinion polls, the candidate for the extreme Right, Jean-Marie Le Pen, and the sitting president, Jacques Chirac, were selected for the second round. This surprise has contributed to serious public debate on the mechanisms of the two-round single-name vote. This discussion focuses in particular on the tension between tactical and sincere voting, with many citizens pleading for the adoption of a voting method which would allow better expression of their true preferences.

Alongside the debates in the public sphere, voting rules have been the subject of extensive theoretical study since the works of Borda (1781) and Condorcet (1785). Theoreticians have established numerous results that illuminate the properties of different voting rules. In particular, Brams and Fishburn (1983) have shown that Approval Voting (henceforth, AV) is endowed with many favorable properties (e.g. providing strong incentives for sincere voting, and having a high probability of

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electing the Condorcet candidate). 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, and the winner of the election is the candidate who obtains the highest number of approvals. At first sight, the principle of AV seems quite simple to understand and to apply. Further, AV appears to have good prospects for meeting the expectations of voters, since it theoretically allows them to give their opinion about all the candidates – as opposed to a two-round voting system that restricts them to picking a single candidate.

Only field experiments – i.e. experiments carried out in the voting stations, with real voters and citizens – could determine whether AV is accepted by the electorate, confirm (or invalidate) theoretical claims made about its properties in political contexts, and, above all, show that voters' aims can be combined with scientific results in a manner that elaborates a better democracy. Although laboratory experiments are of obvious interest regarding the properties of AV and voter rationality (see, in this volume, Laslier 2010b), since they provide the only suitable protocol to control preferences, it proves hard to convince the public and policymakers of the relevance of lab findings for real elections, in which the political context determines not only strategic information and beliefs, but also the expression of voters' rationality. More generally, conventional lab experiments are often criticized, first, for providing biased and unrepresentative results, since it is mostly students who participate, and, second, for factoring out the wider political context, even though *the context itself is relevant to the performance of subjects*.

However, large-scale field experiments can hardly be conducted within a political context. Harrison and List (2004) stress that a main feature of the 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 was dependent on the experiment rather than on the Constitution, that different voting rules were being used for different groups of voters (due to different rules applying to control groups), and that the voters did not know in advance which official rule had been chosen: for Constitutional reasons at the very least, these traits straightforwardly rule out large-scale natural field experiments within political contexts. However, there is a bridge between lab and natural field experiments: these are *framed field experiments*, which Harrison and List (2004) describe as being undertaken "in naturally occurring settings, in which the factors that are at the heart of the theory arise endogenously, and on which the remaining controls needed to implement the experiment are then imposed. In other words, rather than impose all the controls exogenously on a convenient sample of college students, Harrison and List (2004)[1] locate a population in the field in which one of the factors of interest arises naturally and can be easily identified, and then add the necessary controls." In the context of the French presidential election, identifying the relevant population is straightforward: all official voters are good candidates for the experiment. Further, by tying

[1] The working paper here referred to is now published as Harrison and List (2008).

the framed field experiment closely to the official election, the experimental circumstances (site, date, process, etc.) should here mimic exactly the official voting circumstances.

What we could now call a French school of large-scale framed field experiments in a political context was inaugurated in 2002. During the 2002 French presidential election, Balinski, Laraki, Laslier, and van der Straeten conducted a framed field experiment (henceforth, the 2002 experiment) with 5,000 voters, in order to test AV in a large-scale election. A similar experiment – though with the design slightly modified in line with the results from tests of Evaluation Voting (henceforth, EV) conducted by Baujard and Igersheim – was used during the 2007 French presidential election, with the participation of over 5,500 voters (henceforth, the 2007 experiment). In each case, a large team of researchers and student volunteers worked 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, to check whether AV is comprehensible to, and accepted by, a large proportion of the public; third, to compare the results obtained under AV with those of the official election, in order to investigate how AV behaves statistically with real electoral preferences, and to determine the extent to which different voting rules may yield different outcomes; fourth, to facilitate an extended analysis of voters' behavior with respect to AV, and on the French political supply structure, based on the data collected.

The remainder of the paper is organized as follows: Sect. 15.2 is a presentation of the experimental design; Sect. 15.3 sets out wider lessons from AV framed field experiments; Sect. 15.4 surveys the specific lessons on AV derived from the present experimental data; Sect. 15.5 concludes.

15.2 Experimental Design

As emphasized above, (framed) field experiments on AV are necessary in order that voters' expectations concerning the capacity for democratic expression embodied in a voting rule can be integrated with the hypotheses put forward by theoreticians about its properties. In France, the presidential election is the appropriate setting in which to run such a large-scale experiment. First, it aims at selecting one winner from a list of candidates which is the same all over France, using an official voting method – the two-round vote – which is similarly uniform. Second, it has the highest rate of participation (and thus promises the most representative experimental results) of all the official ballots.

The idea of conducting a large-scale experiment on AV in the context of a presidential election may have first been raised by Mann in his PhD on AV, defended in 1995 in the École Polytechnique. The first large-scale experiment on AV was conducted on April 21st, 2002, during the first round of the French presidential election, by a team of researchers from the Laboratoire d'Économétrie of the École Polytechnique: Balinski, Laraki, Laslier and van der Straeten (Balinski et al. 2002, 2003; Laslier and van der Straeten 2004, 2008). This seminal experiment generated

an original protocol, on the basis of which every large-scale political experiment subsequently conducted in France has proceeded.

Numerous experiments took place in parallel with the first round of the next French presidential election, on April 22nd, 2007: one by Balinski and Laraki on "majority judgment" (Balinski and Laraki 2007b, c), another by Farvaque, Jayet and Ragot on the single transferable vote (Farvaque et al. 2009), and a third by Baujard and Igersheim on AV and EV (Baujard and Igersheim 2007a, b, c; Baujard and Igersheim 2009).[2] All three experiments were based on the protocol introduced by the seminal 2002 experiment. The major differences between the four protocols lie, of course, in the voting rules tested and some corresponding specific improvements. Balinski and Laraki experimented regarding the "majority judgement" method in three polling stations in Orsay: on this voting rule, each voter evaluates every candidate in a common language of grades, and a candidate wins the election if she has the highest final grade based on the median of these evaluations (on this method and similar techniques, see Bassett and Persky 1999; Gehrlein and Lepelley 2003; Balinski and Laraki 2007a; Laslier 2009a). Farvaque, Jayet and Ragot tested the single transferable vote method in two voting posts in Faches-Thusmenil in Nord-Pas-de-Calais. Finally, Baujard and Igersheim conducted their experiment on AV and EV in six polling stations: three in Illkirch-Graffenstaden (Alsace), two in Louvigny (Basse-Normandie), and one in Cigné (Pays de Loire). Since what is at stake here is AV, we restrict our attention to the seminal 2002 experiment and to the 2007 Baujard-Igersheim experiment. In each case, the experimental voting stations were located near the official ones, and only those voters who were registered for the official vote could actually participate in the experiment.

Let us now present the protocol in detail. An essential preliminary step was to present the experimental materials and instructions to many different sectors of the public – administrative staff and students, individuals and groups (to favor brainstorming) – in order to test the material and ensure that it was clear and informative. The second step was a pilot experiment. Once the actual participants had been identified and contacted, the experiment proper took place; and the last step was the circulation of results and subsequent public debate.

15.2.1 The Experimental Voting Rules and Ballots

In line with the subject of this book, we restrict our attention here to experiments on approval voting. Although both the 2002 and 2007 experiments were concerned to test AV, certain other rules, such as EV, were also under consideration in the 2002 pilot experiment and in the 2007 experiment proper. This explains some important distinctions between the 2002 and 2007 ballots.

[2] See also Alós-Ferrer and Granić (2010) in this volume regarding the January 2008 experiment conducted by Carlos Alós-Ferrer in Messel (Germany).

Frame 1 Experimental ballot of the 2002 experiment

Expérience de vote : *Quel scrutin pour quelle démocratie ?*

Bulletin de vote

Bruno Mégret	
Corinne Lepage	
Daniel Gluckstein	
François Bayrou	
Jacques Chirac	
Jean-Marie Le Pen	
Christiane Taubira	
Jean Saint-Josse	
Noël Mamère	
Lionel Jospin	
Christine Boutin	
Robert Hue	
Jean-Pierre Chevènement	
Alain Madelin	
Arlette Laguiller	
Olivier Besancenot	

Règlement du vote par assentiment : L'électeur vote en mettant des croix dans la deuxième colonne du bulletin. Il peut mettre des croix pour autant de candidats qu'il le souhaite, mais pas plus d'une croix par candidat. Est élu le candidat qui obtient le plus de croix.

In the 2002 experiment, the experimental ballot (see Frame 1) presented the list of the sixteen candidates in the official election, and participants were requested to mark a cross next to the name of the candidates they wanted to approve. Notice that the order of the candidates on the 2002 and 2007 ballots is the official Constitutional order.

With EV, voters assess candidates by giving them a grade or score on a predefined scale – for instance, integers from 0 to 99 (as in http://rangevoting.org/), from 0 to 20 (as in European school grades), or from -2 to $+2$ (as in http://votedevaleur.info/). A candidate wins the election under EV if she has the highest sum of grades. Among the many ways in which EV systems can be set up, the rule tested in the Institut d'Etudes Politiques of Paris in January 2002 was a 10 points EV, which could be called EV10. Baujard and Igersheim chose to test the rule based on a three level scale, which Hillinger (2004a, b, c, 2005) calls EV3. It appeared, indeed, to be the most simple model, which avoids major problems of interpersonal comparison of grades, and prevents any problem of confusion between

being indifferent to and disliking a candidate (see Baujard and Igersheim 2007a for arguments in favor of this option). Note, though, that Felsenthal (1989) has proposed that EV3 is really an extension of AV, interpreted as a combination of approval and disapproval voting. For each option, voters would be able to choose between three options: approve, disapprove, and abstain. A candidate's score is the difference between the number of approvals and the number of disapprovals, and the winner is the candidate with the highest score. Felsenthal has studied the possibilities for manipulation in the case of a low number of voters. He has shown that, under the assumptions of perfect information and voter rationality, the collective result would be the same under either EV3 and AV. He has also shown that, for each voter, the probability to be decisive is higher with EV3 than with AV[3]. Hillinger (2004a, b, c, 2005) sets out the general proprieties of EV and defends his preference for EV3 on the basis of pragmatic arguments. The problem with more fine-grained scales derives from the difficulty for voters to attribute specific meaning to the different points on the scale, and for this sense to be interpersonally comparable among different voters.

Let us now go further. Any three level system of EV is, on a theoretical basis at least, equivalent: thus, the (2,1,0) scale should provide results equivalent to (1,0,−1).[4] The latter scale is attracting the most support both from theoretical studies and from laymen. It is indeed a very attractive way to evaluate candidates: the meaning of −1 is quite easy to intuit, relative to +1. This straightforward interpretation would guarantee homogeneous interpretations of grades among voters: approved (+1), disapproved (−1), and acceptable or indifferent (0). In spite of these uncontroversial advantages, there are two main hindrances for (−1,0,1) EV3. First, there is the problem of confusion that could occur between the average grade (acceptable) and actual indifference (that is to say, an incompletely graded ballot paper). We have, in field experiments, to accept this possibility and consider how to treat ballots in which no grade is given for one or several candidates. This amounts to indifference, and thus it makes sense to attribute 0 to these candidates. A rule in which we attributed −1 to a candidate who has received no grade would be hardly accepted, since indifference would normally be graded 0. We thus have to consider the effect of attributing a grade of 0 to these candidates. We have observed, for instance, that the candidate Schivardi was very often not evaluated in 2007; in practice, this meant that no cross would appear in any box next to his name. See Frame 2 as an illustration. In a (2,1,0) EV3, all abstentions as regards this candidate would be considered as a zero; it thus does not raise his score. If we had taken a (−1,0,1) EV3, each abstention would have provided him with a relatively higher score than a candidate who was evaluated −1. This would tend to lead to higher average scores for candidates who attract more indifference – because, for instance, voters do not know who they are or what political values they represent – than for candidates

[3] See Laslier and Sanver (2010) and Núñez (2010) in this volume for a definition of "decisiveness."

[4] Let us remark, though, that, intuitively, it is not obvious that similar individual preferences would induce equivalent results with these two versions of EV3 in actual political contexts as opposed to theoretical settings.

Frame 2 Experimental ballot for the 2007 experiment, both sides

Cette expérience, qui vise à étudier les comportements des électeurs face à un mode de scrutin différent, est simultanément réalisée dans trois communes de France.

PARTICIPEZ A UNE EXPERIENCE DE VOTE

A l'occasion des élections présidentielles françaises de 2007, notre équipe de recherche teste deux nouveaux modes de scrutin à un seul tour.

Nous vous proposons de participer à cette expérience en remplissant les **deux bulletins de vote** qui suivent.

Nous sommes à votre entière disposition pour répondre à vos questions.

Nous vous remercions par avance de respecter le secret et la sérénité du scrutin.

Merci de votre participation !

Vote par note

Bulletin de vote expérimental n° 1

Instructions :

Vous donnez une note à chacun des 12 candidats: soit 0, soit 1, soit 2 (2 étant la meilleure note et 0 la plus mauvaise).

Pour cela, mettez une croix dans la case correspondante. Si vous ne souhaitez pas noter un candidat, ne cochez aucune case de la ligne.

Attention : si plus d'une seule case par ligne est cochée, le bulletin est nul dans sa totalité.

Le candidat élu avec le mode de scrutin expérimental n° 1 est celui qui comptabilise le plus de points.

	2	1	0
Olivier Besancenot			
Marie-George Buffet			
Gérard Schivardi			
François Bayrou			
José Bové			
Dominique Voynet			
Philippe de Villiers			
Ségolène Royal			
Frédéric Nihous			
Jean-Marie Le Pen			
Arlette Laguiller			
Nicolas Sarkozy			

Vote par approbation

Bulletin de vote expérimental n° 2

Instructions :

Vous indiquez, parmi les 12 candidats, quels sont ceux que vous soutenez.

Pour cela, entourez le nom du ou des candidats que vous soutenez. Vous pouvez entourer un seul nom, plusieurs noms ou aucun nom.

Attention : entourez les noms un à un. Si plusieurs candidats sont entourés ensemble, le bulletin est nul dans sa totalité.

Le candidat élu avec le mode de scrutin expérimental n° 2 est celui qui reçoit le plus grand nombre de soutiens.

Olivier Besancenot
Marie-George Buffet
Gérard Schivardi
François Bayrou
José Bové
Dominique Voynet
Philippe de Villiers
Ségolène Royal
Frédéric Nihous
Jean-Marie Le Pen
Arlette Laguiller
Nicolas Sarkozy

who attract relatively more approvals and disapprovals. In an election, it is quite unacceptable to take the risk of favoring – or indeed electing – a candidate nobody knows. Second, the average grade is equal to the total of the scores divided by the number of ballots. With (−1,0,1) it is likely that the winning candidate would win

the election with an average negative score. It seems to us to be quite unsatisfactory that the legitimacy of the winning candidate should be based on a negative score. For these two reasons, we selected the (2,1,0) EV3 rule. We would expect voters to consider grade 2 as denoting "approved or preferred candidates," grade 1 as denoting "acceptable candidates," and 0 as either "to be rejected" or "indifferent candidates." This is the only method which avoids the risk of electing a candidate who attracts mostly indifference, and which is at the same time also simple, transparent, and permissive of a wide scope of expression.

The AV and EV experimental ballots were registered on the same sheet of paper, as shown in Frame 2, in order to enable comparisons between how participants vote under both voting rules. This particularity introduced a change in the protocol: while voters were requested to indicate with a cross the grade they attributed to each candidate under EV, they were asked to circle the names of the candidates they wanted to approve of under AV – and not to mark a cross next to them, as in 2002 – in order to avoid any ambiguity between AV and EV.

15.2.2 The Pilot Experiments

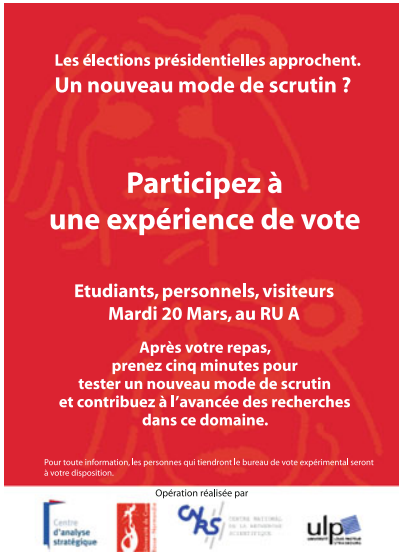
Pilot experiments are necessary in fieldwork in order to guarantee the quality of the experimental protocol. Balinski, Laslier and van der Straeten conducted a pilot experiment on January 23rd, 2002, in the Institut d'Etudes Politiques. As mentioned above, this used a slightly different protocol since, in addition to AV, an EV from 0 to 10 points was also tested. See Balinski et al. (2002) for a brief presentation.

Baujard and Igersheim carried out their pilot experiment on March 20th, 2007. This took place from 11:15 to 14:00 in Caen University Restaurant A, on Campus 1 in Caen, and was made possible by the assistance of around ten colleagues and PhD students. This restaurant serves up to 2000 persons a day in a very short period of time, the clientele comprising students and any other persons working in the university. The date was chosen to be close enough to the presidential election for information about candidates to be available to the participants, but also far enough away that the organizers would be able to change the protocol in case this was indicated as necessary by the results of the pilot. The pilot took place on a Tuesday as this was supposed to be the busiest day of the week for this university restaurant. The protocol was basically the same as the official one and will be presented below. No previous information had been given out; the potential participants learned of the experiment when entering the restaurant, through posters and flyers which were personally given to each of them as they entered the hall (see the poster on Frame 3). The experimental voting station was just next to the exit. Voters did not spend more than 3 min engaged in the whole process.

The pilot experiment was a success, with 447 persons, mostly students, participating, and 300 of these agreeing to devote some more time to filling in a questionnaire. The results of the questionnaire were especially interesting.

Representative negative points were the following. First, the lack of a blank was resented; this remark led to a modification of the protocol. Second, there were

Frame 3 Poster to inform people of the experiment



Pilote Experiment

Louvigny Experiment

complaints that there was an excessive delay before getting access to the results; this was due to the fact that the Centre d'Analyse Stratégique (CAS, Paris) – our main partner for the 2007 experiment – did not allow us to circulate the results before the end of the legislative election, which was held in late June 2007, i.e. 2 weeks after the second round of the presidential election and thus 3 months after the pilot experiment. Third, they said that they received information about the experiment too late; it seems that many other people would have liked to participate and that they would have appreciated the chance to alert friends. Fourth, a small number of people expressed strong disagreement with the voting methods tested, while also saying or otherwise indicating that they did not understand them. We assumed that those who knowingly disagreed with the voting method itself, or with the very idea of conducting such an experiment, would have rather decided not to participate.

Representative positive points were the following. First, the experimenters were congratulated for having taken the initiative to conduct an experiment on voting rules and on the presidential election. Second, appreciation was expressed for the organization and the organizational team: in particular, the location in the university restaurant, the reproduction of the official conditions (see Sect. 2.4), the simplicity of the protocol and the fact that it required very little time, the clear explanations in the documents, the fact that it was organized by researchers, and the welcoming and friendly attitude of organizers were commended. Third, participants liked the fact that we were addressing students, either because they felt that society rarely

Frame 4 Information meeting

Mardi soir, au foyer des anciens, une réunion d'information était organisée par le CNRS

Source: Ouest France, April 19th 2007, p. CAN19.
A picture illustrating the information meeting that was held in Louvigny on April 17th.

concerned itself with what students thought, or because they considered this a way for them to educate themselves in political thinking; one said that the experiment would induce students to think hard before voting. Fourth, the voting methods inspired many positive reactions: the students were glad to be engaged in "questioning the voting rule as an institution"; they appreciated the opportunity it afforded them to enhance their expressive ability through their vote: one said that the plurinominal systems "helped to go beyond his or her fear of voting by being able to approve several candidates" and another concluded that they engendered "a less silent vote," giving more relevant information for journalists to analyse political opinions. The experiment was considered as another way in which to organize a poll, but under "more satisfying conditions than the polls that are run by private institutes". Many concluded by saying they would be glad to see these voting rules being officially adopted, even though some were pessimistic that this could ever happen.

The pilot experiment led to some cosmetic modifications of the experimental design and of organizational aspects. In particular, blanks for each candidate were authorized under the evaluation rule, and some questions in the questionnaire were rephrased.

15.2.3 Information for Participants

The next step of the experimental protocol consisted in providing information about the experiment to the persons who would participate.

Three media were used for this. First, thanks to the active help of the town councils, 1 week before the election, a letter was sent to each registered voter of the six voting stations, explaining the principle of AV and requesting her participation in

the experiment. In some cases, named letters were sent; in others, the letter was included in the local associations paper which is sent to each house in the town.

Second, information meetings were scheduled in each town, as illustrated by the newspaper picture in Frame 4 (see also the poster announcing the experiment and the information meeting in Louvigny, in Frame 3).

Third, general media relayed the information. In Orsay in 2002, an article in the municipal bulletin, sent 1 month in advance, announced the experiment. For the 2007 experiment, newspapers, local radio and national TV spots were of great help to make sure each voter knew about the experiment before coming to the voting stations. Nevertheless, we should acknowledge that around ten persons for our six polling stations came and regretted that they had not been informed about it: most of them were students who had been out of town or had just moved abroad. They generally claimed that the most effective way to inform people would have been to have sent the information letter along with the official voting papers; we had to answer that this "solution" was strictly forbidden.

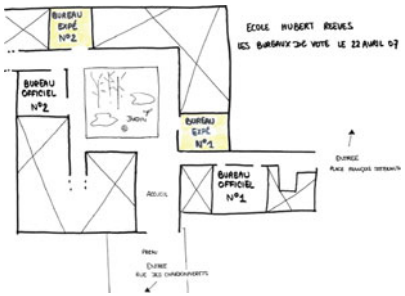
15.2.4 The Experiments

On April 21st, 2002, Balinski, Laraki, Laslier and van der Straeten ran their field experiment during the first round of the French presidential election in six polling stations located in two towns: the single voting station of Gy les Nonains, in the region Centre, with 482 registered voters, and five voting stations out of the twelve of Orsay, in the region Ile-de-France, representing 4,237 registered voters.

On April 22nd, 2007, Baujard and Igersheim ran their experiments under similar conditions in six polling stations in three towns: the two voting stations of Louvigny in the region Basse-Normandy, representing 1948 registered voters, the single voting station of Cigné in the region Pays-de-Loire, representing 378 registered voters, and three voting stations out of the sixteen of Illkirch-Graffenstaden in the Alsace region, representing 3,211 registered voters. From Basse-Normandy to Alsace, these towns are very far from each other and thus the voters of the six stations belonged to a wide scope of political patterns, in terms of the respective electorate, social and economic class, size and rural/urban characteristics. Therefore, voters' reactions to the experiment could be expected to be different and/or more diverse.

On the day of the election, April 21st, 2002, the town councils in each locality allowed the researchers of the Laboratoire d'Econométrie to set up experimental voting posts in the immediate vicinity of the official voting stations (either in the same room or in an adjacent room), where voters – once they had made their official vote – were requested to proceed. Frame 5 shows the organisation of the building – a primary school – where the experimental and official voting posts were located in Louvigny for the 2007 experiment. The other picture gives an idea of the tags, pathways and badges. Yellow was used for communications regarding the experimental vote; this color was chosen, with the explicit agreement of the town councils, because it was the only color that was not easily associated with a political party. Tags in white, conversely, signaled official voting posts.

Frame 5 Pictures of the 2007 experiment in Louvigny. Orientating voters in the voting building



Map of the voting posts in the school building

Pathways to orientate voters to experimental or official voting posts

Frame 6 Pictures of the 2007 experiment in Louvigny: The anonymous voting process

Voting booths. Once the experimental ballot is filled in, it is put in an envelope, just as in the official voting process.

See in the back the table where experimental ballots were distributed to arriving voters; on the board there are posters asking for silence.

After filling in her vote in the locked booth, this lady has registered with the experimental assessors. Each person can vote only once.

The test of AV reproduced the modus operandi of the official elections; that is, the research team respected a similar rhythm, with similar opening and closing hours, and reduced waiting time. The staff was also similar – with a president of the polling station and assessors – as was the voting equipment: envelopes, ballot papers, polling booth, ballot box, and a book to gather participants' signatures. The rules to guarantee conditions of anonymity were also similar, with the first voter of the day checking the empty box, the box then being locked and opened at closing time in front of voters; silence in the polling station was also maintained. The pictures of the vote in Louvigny in Frame 6 give an idea of the process.

15.2.5 Questionnaires

Many oral remarks by participants were noted by the 2002 researchers, and these have provided many insights into rules and experiments in general, as is reported

Frame 7 Pictures of the 2007 experiment in Louvigny: Answering questionnaires

in Laslier and van der Straeten (2004). This is why more systematic questioning of participants was undertaken in the 2007 experiment. After the experimental ballot, participants were invited to fill in a questionnaire about the experiment and the two voting methods. They could either answer it right away or send it afterwards by post or e-mail. Notice that the questionnaires were available on the experiment official internet site [URL: http:unicaen.fr/crem/vote]. Frame 7 shows the serious attitude of participants in answering questionnaires. Contrary to expectations – we would have thought that participants would forget to reply, or would choose not to devote more time to it – a significant number of people did send back their questionnaires, by both e-mail and post.

These questionnaires, presented in Frame 8, provide rich information about how participants reacted to the experiment and, more specifically, about the voting rules under test. The lessons drawn therefrom will be presented in the next section.

15.2.6 Participating in a Public Debate

The final, and very significant, stage of the framed field experiments was for information about the results to be fed back to the participants and the public, and for the organizers to take part in the public debate on voting methods.

The actual work of registering the results had been completed just after the day of the experiment, but the results could not be made public before the end of the official elections. In 2007, the Centre d'Analyse Stratégique (CAS) had even required the experiment team not to give out any information on the results per candidate (both for the pilot and the experiment proper) until late June, i.e. after the end of the legislative elections.

Frame 8 Questionnaire for the 2007 experiment

EXPERIMENTATION DE NOUVEAUX MODES DE SCRUTIN

Questionnaire sur l'expérience

Nous vous remercions par avance de bien vouloir nous aider à évaluer notre expérience en répondant aux questions suivantes. Répondre à ce questionnaire devrait vous prendre **moins de 5 minutes.**

		Oui	Un peu	Plutôt non	Non	Sans opinion
	Sur le vote officiel					
1	Vous avez aujourd'hui voté pour un candidat aux élections présidentielles. Parmi les informations qui ont déterminé votre choix, lesquelles ont été les plus déterminantes ? - Les programmes des candidats ? - Les informations issues des sondages ?	O O	O O	O O	O O	O O
2	Avez-vous changé d'avis sur votre choix de vote ou déterminer votre choix ces 15 derniers jours ?	O	O	O	O	O
3	Avez-vous voté au 1er tour en tenant compte de ce qui pourrait arriver au 2ème tour ?	O	O	O	O	O
4	Souhaitez-vous que le candidat pour lequel vous venez de voter soit présent au 2ème tour du scrutin ?	O	O	O	O	O
5	Estimez-vous que le raisonnement que vous suivez au moment de voter est différent depuis les dernières élections présidentielles en France (2002) ?	O	O	O	O	O
	Sur le vote expérimental					
6	Le principe du mode de scrutin par note vous semble-t-il clair ?	O	O	O	O	O
7	Le principe du vote par approbation vous semble-t-il clair ?	O	O	O	O	O
8	Pensez-vous que des chercheurs doivent étudier les modes de scrutin ?	O	O	O	O	O
9	Connaissez-vous d'autres modes de scrutin que le scrutin majoritaire à deux tours, le scrutin proportionnel et ceux de cette expérience ?	O	O	O	O	O
10	Si le vote par approbation ou le vote par note était le mode de scrutin officiel, cela influencerait-il le raisonnement que vous tenez au moment de voter ?	O	O	O	O	O
11	Pour quelles élections officielles estimez-vous que la méthode par note pourrait être utilisée ? (Cochez une ou plusieurs cases) O Pour les élections présidentielles O Pour les élections législatives O Autres. Précisez :..... O Vous ne pensez pas que la méthode par note puisse être utilisée pour un scrutin officiel					
12	Pour quelles élections officielles estimez-vous que la méthode par approbation pourrait être utilisée ? (Cochez une ou plusieurs cases) O Pour les élections présidentielles O Pour les élections législatives O Autres. Précisez :..... O Vous ne pensez pas que la méthode par approbation puisse être utilisée pour un scrutin officiel					

	Sur l'expérience en elle-même	Oui	Un peu	Plutôt non	Non	Sans opinion
13	Etes-vous satisfait d'avoir participé à cette expérience ?	O	O	O	O	O
14	Si vous aviez des questions sur l'expérience, avez-vous trouvé des interlocuteurs et les réponses que vous attendiez ?	O	O	O	O	O
15	Seriez-vous prêt à participer à nouveau à une expérience scientifique sur votre comportement de vote ?	O	O	O	O	O
16	Estimez-vous avoir été suffisamment informé sur cette expérience ?	O	O	O	O	O
17	Comment avez-vous été informé de l'existence de l'expérience ? (Cochez une ou plusieurs cases) O Vous n'avez pas été informé avant le jour du scrutin O Par bulletin municipal O Par courrier adressé à votre domicile O Par les affichages dans votre commune O Par la presse O Par le bouche à oreille O Autres. Précisez :.....					
18	Qu'avez-vous apprécié dans cette expérience ?					
19	Qu'avez-vous désapprouvé dans cette expérience ?					
20	Selon vous, quels sont les différents enjeux de cette expérience ?					
21	Autres commentaires :					

Merci de bien vouloir nous remettre ce questionnaire, une fois rempli par vos soins, soit :
– directement auprès des expérimentateurs présents dans les bureaux de vote le 22 avril 2007 ;
– par courrier à l'adresse suivante :
Expérimentation de nouvelles méthodes de vote – Antoinette Baujard
Université de Caen, CREM, Campus de Claude Bloch, 14 032 Caen Cedex
– Vous pouvez également remplir un questionnaire disponible sur le site internet de l'expérience (http://www.unicaen.fr/crem/vote) et le renvoyer par mail à: Antoinette.Baujard@unicaen.fr

Toute l'équipe de chercheurs des Universités de Caen et de Strasbourg qui travaille sur les modes de scrutin vous remercie de votre participation.

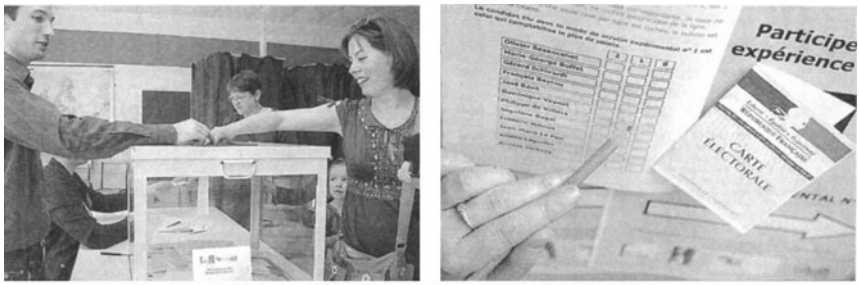
The presentation of the different steps of the experiment in newspapers helped to create a debate not only between the organizers and the public, but also among the public more broadly. For the 2007 experiment, for instance, Frame 9 gives a short list of the different papers, TV, radio or internet programmes that discussed it. To illustrate this, the article in *Le Monde*, a national newspaper, is reproduced in Frame 11, and the pictures used in different regional newspapers in Frame 10.

The participation in various conferences organized by the Centre d'Analyse Stratégique (see Baujard and Igersheim 2007c, and the debate with sociologists and lawyers in the annexes of Baujard and Igersheim 2007a), generated some interesting discussion with specialists. The publication of the report of the first results (see Baujard and Igersheim 2007b) instigated wider public debate. As well as this, the information meetings that had been organized in late June to set out the specific results for each town had led each voter participating in the experiment to realize concretely what the new voting rule would have meant in the particular case of their community. Last but not least, the publication of the official report in December 2007 (see Baujard and Igersheim 2007a) also fed this public debate with in-depth analyses of the acceptance of the new voting rules, the voting strategies of voters and their electoral preferences. It is now available on the CAS website [URL: http://www.strategie.gouv.fr] and on the experiment website [URL: http://www.unicaen.fr/crem/vote]. A caricature published in a local newspaper of Mayenne, inspired by the results of Cigné in 2007, illustrates with humor the kind of debate that was inspired by the experiment: see Frame 12.

Frame 9 A short list of the media coverage of the 2007 experiment

National newspapers: *Le Monde* (April, 26th 2007, p.3); *Ouest France*, national edition (April 23rd 2007, p.3; June 25th, 2007, p.3).
Regional newspapers: *Ouest France*, local edition (April 19th 2007, p.7 and p.CAN16; April 23rd 2007, p.CAN17 and p.LAV16; June 26th, p.CAN18); *Les Dernières Nouvelles d'Alsace* (April 19th 2007; June 26th 2007); *Le Journal de la Haute Marne* (April 3rd 2007, p.34); *Le Courrier de la Mayenne* (April 23rd 2007; June 29th 2007; July 5th 2007), *Loopy* (June 2007, p.6–7).
Magazines: *Territoires* (n°479, June 2007, p.16); *Sciences et avenir* (July 2007, p.28); *Sciences Humaines* (n°187, October 2007, p.14).
Television broadcasts: France 3 Basse-Normandie, *Programme 19/20* (April 22nd 2007 and June 25th 2007); France 3 Alsace, *Programme 12/13* and *Programme 19/20* (April 22nd 2007; June 26th 2007); France 3 Pays de Loire, *Programme 19/20* (April 22nd 2007).
Websites: *Dépêches AFP* (April, 20th 2007 and April, 22nd 2007) taken up by several websites, among which were: LCI, TF1, France 2, Yahoo actualité, Linternaute, Orange.
Radio programmes: France Info (April, 21st 2007); France Bleu Alsace (April 20th, 2007; June 26th 2007); NRJ and Nostalgie, Edition Basse-Normandie (June 26, 2007).

Frame 10 Presentation of the 2007 experiment in regional newspapers



Une bonne partie des votants de Louvigny a pu voter trois fois, hier. Ils ont pris part à un test lancé par le CNRS.

Pictures to illustrate the experiment taken up in *Ouest France* and in *Les dernières nouvelles d'Alsace*, April 23rd 2007.

The 2007 experiment had benefited from wide media coverage thanks to the active help of the Centre d'Analyse Stratégique, a governmental institution. Yet, curiously, no effort has been made to circulate the actual results, nor to mark the publication of the final report where these results were analyzed.

15.3 General Lessons from AV Experiments

The most important objectives of these experiments were to evaluate the feasibility of undertaking this type of large-scale experiment in political elections, and to investigate whether AV is comprehensible to and accepted by the public. The lessons drawn from the experiments regarding these two objectives are set out below.

Frame 11 Presentation of the 2007 experiment in a national newspaper

Le Monde

Page trois Election présidentielle 3

Une équipe de chercheurs a permis aux électeurs de six bureaux de vote d'expérimenter d'autres modes de scrutin : donner une note aux candidats, en choisir plusieurs...

Une expérience : noter au lieu de voter

Vote expérimental à Lons-le-Saunier (Jura), lors du premier tour de l'élection présidentielle, où les électeurs ont été invités à noter les candidats.

« Nous avons suivi la geste électorale de A à Z »

Le Monde, April 26th, 2007, p.3, with a short presentation on the first page.

15.3.1 Participation

The experimental design was such that only voters who turned out for the official vote could take part. Therefore, the participation rate in the experiment is defined as the ratio of the number of participants over the number of voters who turned out.

Table 15.1 presents the participation rates for the 2002 experiment in Gy and Orsay: the rates were unexpectedly high, above 75% in Orsay, and above 90% in Gy.

Frame 12 Presentation of the 2007 experiment in a national newspaper

Le Courrier de la Mayenne, July 5th, 2007, p.10

A caricature to illustrate the extensive presentation of the results of the 2007 experiment. Specific attention to the Cigné results was made. Recognize Nicolas Sarkozy – the incumbent French president – in front of the mirror saying "Mirror, tell me who is the best president", François Bayrou – a centrist candidate – in the mirror answers "it's not you". The tag "CNRS (National Center for Scientific Research)" on the mirror is supposed to designate the organizer of the experiment, even though other institutions, such as CAS, participated in financing and organizing it. It is generally the case that the public straightforwardly associates any research with CNRS, so journalists did not agree to provide a more faithful list of the institutions concerned.

Table 15.1 Participation rates and votes cast in the 2002 experiment

	Gy 1 polling station	Orsay 5 polling stations	All
Official vote			
Registered voters	482	4,237	4,719
Votes cast	395	2,951	3,346
Experimental vote			
Participants	365	2,232	2,597
Participation rate (%)	92.4	75.6	77.6
Spoiled	1	9	10
Votes cast	364	2,223	2,587
Votes cast (%)	99.7	99.6	99.6

Table 15.2 Participation data and votes cast in the 2007 experiment

	Cigné 1 polling station	Louvigny 2 polling stations	Illkirch 3 polling stations	All
Official vote				
Registered electors	378	1,948	3,211	5,537
Votes cast	318	1,760	2,526	4,604
Experimental Vote				
Participants	233	1,063	1,540	2,836
Participation rate (%)	73.3	60.4	61	61.6
Spoiled	1	12	10	23
Votes cast	232	1,051	1,530	2,813
Votes cast (%)	99.6	98.9	99.4	99.2

Table 15.2 presents the participation rates for the 2007 experiment in Cigné, Louvigny, and Illkirch-Graffenstaden:[5] they are still high but not as markedly so as in the previous experiment – around 60% on average over the 6 polling stations – and, as expected, the highest rate was for Cigné, which, like Gy, is a small village. Several points explain why the rate of participation was higher in 2002. First, the smaller the village, the higher are the participation rates. One can, indeed, easily imagine that in small communities people know each other much better. They meet and speak at the polling station, and thus everybody can observe who votes and who does not and, accordingly, who has taken part in the voting experiment and who has not. In 2006, Gerber, Green and Larimer conducted a large-scale field experiment in order to determine if and how social pressure encourages citizens to take part in a ballot. According to them, "higher turnout was observed among those who received mailings promising to publicize their turnout to their household or their neighbors. These findings demonstrate the profound importance of social pressure as an inducement to political participation" Gerber et al. (2008, p. 33). Clearly, the high participation rates in Gy in 2002 and in Cigné in 2007 are a consequence of the same kind of social pressure.

Second, one must stress that Orsay is an unusual city, close to Paris, whose population, economy and national reputation are based on famous universities and scientific research. In addition to the University of Paris 11, which is one of the biggest universities in France, and important research centers such as the CNRS, a very high number of famous French engineering schools (e.g. École Polytechnique, Supelec, Sup Optique) are located in Orsay and nearby. Thus, a statistically significant proportion of residents of Orsay are researchers or students. All these elements make the acceptance of a scientific experiment easier, no matter what the experiment is. Conversely, Illkirch and Louvigny, despite being located near two big cities with significant academic traditions (Strasbourg and Caen), are more representative of the national reception of science.

Third, the official participation rate was much higher in 2007 (83.8% in 2007 against 71.6% in 2002); and for those voters who were not used to voting and were not particularly interested in politics, participation in the official vote might have been effort enough. One can easily imagine that a voting experiment would not arouse their interest: indeed, the experimental assessors overheard comments from people who had just left the official polling stations such as: "I already did vote for the 'real' ballot; that is enough" or "even to take part in the official voting is pretty good!"

Fourth, the 2007 official election was also characterized by a very high rate of proxies (the experiment occurred during the school vacations for Illkirch), which complicated the participation of away voters in the experiment. Even though experimental voting by proxy was authorized in the 2007 experiment, few voters who had a proxy for somebody else decided to use it in the experimental vote. In Louvigny,

[5] Here, unlike Baujard and Igersheim (2007a, b, 2009), we regard the blank ballots as significant, in order that the 2002 data and the 2007 data may be compared.

Table 15.3 Answers to questionnaire qu. 13: "Are you satisfied with having taken part in this experiment?"

	Nb. Occurences	%
Yes	1,041	88.7
A little	87	7.4
Mostly not	6	0.5
No	6	0.5
No opinion	34	2.9
Total	1,174	100

Table 15.4 Answers to questionnaire qu. 8: "Do you think that researchers must study voting methods?"

	Nb. Occurences	%
Yes	855	69.1
A little	156	12.6
Mostly not	34	2.7
No	137	11.1
No opinion	55	4.4
Total	1,237	100

for instance, there were fewer than fifteen experimental proxy votes, while the city council of Louvigny granted around eighty proxies.

Finally, the 2007 experimental ballot design was different, longer, and hence more demanding, than the 2002 one, since it also tested EV; this could have reduced the rate of participation.

Putting the different rates of participation on one side, however, the most difficult question is, rather: why was the participation rate so high? Good, repeated and early information, and the support of communities, provide part of the explanation, but do not explain everything. Both the 2002 and 2007 research teams noted that voters were sincerely interested in the subject and the aim of the experiment. Most participants had brought with them the information letter they had received at home. Some of them had already filled in the experimental ballot enclosed with it. Many participants had a discussion with a member of the research team or with another participant about the voting methods under test. The answers to the 2007 questionnaire confirm these observations. Indeed, 96.10% of those who filled in the questionnaire responded positively to the question "Are you satisfied with having participated in this experiment?"(see Table 15.3).[6] 81.7% thought that researchers should continue to study alternative voting methods (see Table 15.4) and 92% responded positively to the question of whether they would be willing to take part in such an experiment again (see Table 15.5). Furthermore, almost 50% of the 626 participants who answered the open question "What did you appreciate in this experiment?" mentioned the very fact that this kind of experiment had been instigated at all. Conversely, less than 25% of the 150 participants who answered the open question "What did you dislike in this experiment?" wrote that they disapproved of it (see Tables 15.6 and 15.7).

[6] That is, 96.10% of respondents answered "yes" or "a little" to question 13 of the 2007 questionnaire.

Table 15.5 Answers to questionnaire qu. 15: "Would you be ready to take part again in a scientific experiment on your voting behavior?"

	Nb. Occurences	%
Yes	1,020	87.4
A little	54	4.6
Mostly not	21	1.8
No	56	4.8
No opinion	16	1.4
Total	1,167	100

Table 15.6 Answers to questionnaire qu. 18: "What did you appreciate in this experiment?"

Items (several items per answer)	Nb. Occurrences
Initiative of such an experiment, its consequences	305
Extended expressive possibilities of 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

Table 15.7 Answers to questionnaire qu. 19 question: "What did you dislike in this experiment?"

Items (1 item per answer)	Nb. Occurences
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

Thus, our first major general lesson is that such a large-scale experiment on voting is feasible and very well accepted by voters (on this issue, see also Laslier 2009b). Further, the answers to the 2007 questionnaire show that voters consider research on voting methods to be very useful and have expectations from its results.

15.3.2 Positive Public Response to AV

In traditional experimental economics, specific questionnaires are used to test participants' understanding before the experiment takes place; for example, in experiments on voting methods, prior questions are posed about how to fill in a ballot and how to compute the election outcome. In large-scale experiments in the field, it is very difficult to respect such protocols. One can argue a posteriori, through inspection of the experimental ballots, that the participants have understood what was asked of them, since overall the experimental ballots have been properly filled in. But it is impossible to demonstrate that they have perfectly understood the rules of AV: one can only make plausible conjectures based on the facts that, first, AV's rules (like EV's) are very simple, and, second, comprehension has been confirmed individually by some voters who are known to have explained it perfectly to organizers as well as to journalists.

With this caveat in mind, one can nevertheless plausibly claim that a satisfying level of understanding and acceptance of the principle of AV is indicated in both experiments (2002 and 2007). This second major lesson is derived from the analysis of three kinds of data: (1) the expression rate, (2) the questionnaires, and (3) the number of approvals.

First, out of 2,597 approval ballots cast in the 2002 experiment, only ten were spoiled; and out of 2,836 ballots cast in the 2007 experiment, only 23 were spoiled. Thus, as one can observe in Tables 15.1 and 15.2, the votes cast in percentage terms, which is equal to the number of non-spoiled ballots over the number of participants, is systematically higher than 99%. This suggests that almost all participants understood AV and engaged in the experimental vote according to its principle.

Second, the answers to the 2007 questionnaire corroborate this observation. Indeed, 83.5% of respondents answered positively to the question "Does the principle of Approval Voting seem clear to you?" – note that this is slightly less than for EV (89.2 %) – see Tables 15.8 and 15.9. As well as this, 75.1% of participants opined that AV could be used for official elections (presidential, legislative, and other), as against 87.9% for EV – see Tables 15.10 and 15.11. As regards the open questions ("What did you appreciate in this experiment?", "What did you dislike in this experiment?", see Tables 15.6 and 15.7), we have already stressed that we received 626 positive remarks against only 150 negative ones. Further, 295 voters sing the praises of AV and EV (247 note that AV and EV enable greater voter expression and 48 emphasize their simplicity) against only 75 voters who dislike them. Consequently, one sees voters taking a strong stance in favor of these new voting methods – with the small reservation that in 2007 EV seemed to arouse a little bit more excitement than AV. This can be explained in two different ways: on the one hand, it could have been caused by the slight change in the protocol. In 2007, voters were asked to circle the names of the candidates they wanted to approve of, and not to mark a cross next to them as in 2002: checking a name with a cross is perhaps a

Table 15.8 Answers to questionnaire qu. 7: "Does the principle of Approval Voting seem clear to you?"

	Nb. Occurences	%
Yes	826	66.9
A little	205	16.6
Mostly not	80	6.5
No	98	7.9
No opinion	25	2.0
Total	1,234	100

Table 15.9 Answers to questionnaire qu. 6: "Does the principle of Evaluation Voting seem clear to you?"

	Nb. Occurences	%
Yes	987	78.6
A little	133	10.6
Mostly not	41	3.3
No	76	6.1
No opinion	19	1.5
Total	1,256	100

Table 15.10 Answers to questionnaire qu. 12: "For which official election do you think that Approval Voting could be used?"

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

Table 15.11 Answers to questionnaire qu. 11: "For which official election do you think that Evaluation Voting could be used?"

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

Table 15.12 Number of approved candidates in the 2002 experiment

Approvals	0	1	2	3	4	5	6	7	8	9	10	>10
Ballots	36	287	569	783	492	258	94	40	16	6	1	5
% of ballots	1.39	11.09	21.99	30.27	19.02	9.97	3.63	1.55	0.62	0.23	0.04	0.19

Average number: 3.15 candidates out of 16, over 2,587 non-spoiled ballots

Table 15.13 Number of approved candidates in the 2007 experiment

Approvals	0	1	2	3	4	5	6	7	8	9	10	>10
Ballots	120	736	905	673	264	75	23	13	1	1	1	1
% of ballots	4.27	26.16	32.17	23.92	9.38	2.67	0.82	0.46	0.04	0.04	0.04	0.04

Average number: 2.23 candidates out of 12, over 2,813 non-spoiled ballots

more intuitive procedure in an electoral context. On the other hand, the principle of EV itself – i.e. giving a grade to each candidate – is very well-known (from school, sporting events, etc.), and thus perhaps more easy to understand and to adopt.

Third, a last clue as to how voters understood and accepted the principle of AV is given by the number of approvals conceded by each participant (the number of candidates approved of). The 2002 and 2007 distributions are presented in Tables 15.12 and 15.13 and in Figs. 15.1 and 15.2 respectively. In 2002, on average in the two towns, each voter approved of 3.15 candidates out of 16, the distribution around this value being rather smooth (in particular, one-name approval ballots are few). In 2007, each voter approved of 2.23 candidates out of 12, which is still high, but lower than in 2002. This difference is a consequence of the fact that there is a larger number of zero-name and one-name approval ballots in 2007. The first point affords of various explanations, but principally it should be recalled that this experiment was

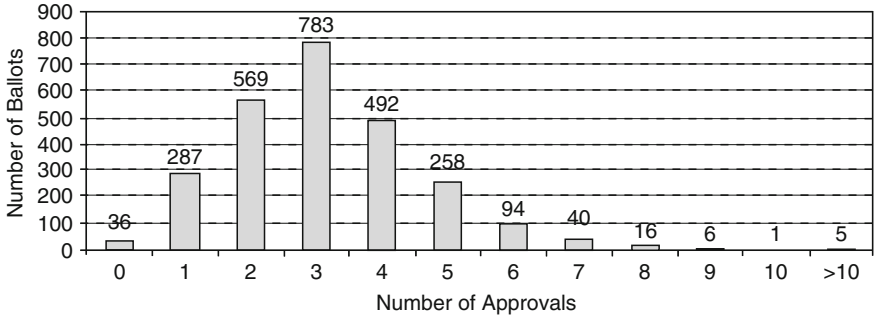


Fig. 15.1 Number of approved candidates in the 2002 experiment

conducted in parallel with a test of EV. For the evaluation rule, far fewer blanks were counted (45 against 120 for AV), and a significant proportion of these were blank for the approval voting test as well: 10 ballots are blank for both AV and EV – the exact number of spoiled ballots as in 2002! Besides this, a significant percentage of approval blanks corresponds to ballots attributing few grade 1s and no grade 2s, which reveals little enthusiasm towards the candidates: in this regard, we should learn something about the trigger under which a voter does not concede an approval. The second point, regarding the significantly higher number of one-name approval ballots in 2007, is clarified when it is noted that many of these ballots were supporting Nicolas Sarkozy, the incumbent president, and furthermore the only candidate of the traditional Right-wing in 2007. Facts about the French political supply structure in 2007, rather than a substantial desire to retain the official plurality vote, thus seem to explain this characteristic.[7] Hence, both the specifics of the 2007 protocol and the particularities of French political supply in 2007 influence the difference between the two average numbers of approvals. But the same conclusion remains: whatever the circumstances, voters do actually make use of the possibility of broader expression generated by AV; this thus strongly suggests that they understand and accept its principle.

15.4 Specific Lessons Regarding AV

The two lessons from Sect. 15.3 essentially concerned the global features of both experiments. We now review the research that has led to interesting findings based on deeper analyses of the data collected. First, to learn more about AV in an experimental context, and in view of the fact that many theoreticians claim that different voting rules may yield different outcomes (Cox 1997; Cox and Katz 2002), we

[7] On this point, see the next section and Baujard et al. (2009b).

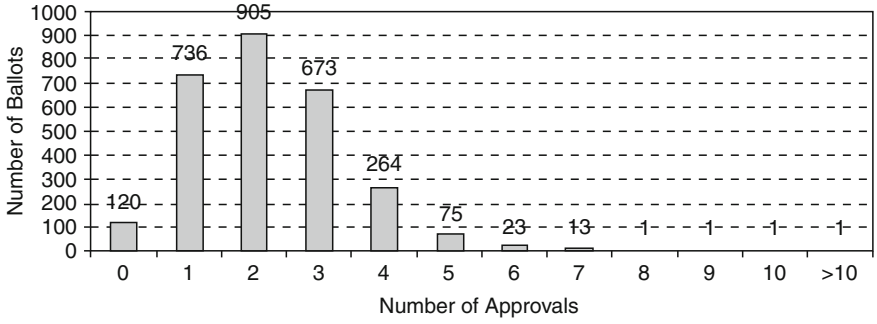


Fig. 15.2 Number of approved candidates in the 2007 experiment

examine whether AV is able to modify the overall ranking of candidates compared with the official election system. Second, the elaboration of an original behavioral model enables us to link approval voting to single-name balloting. Finally, an extended analysis of the French political supply structure, based on AV experimental data, leads to an attempt to define what a consensual candidate is.

15.4.1 Comparing the Outcomes of AV with the Official First-Round Vote

The results of the 2002 and 2007 experiments are given in Tables 15.14 and 15.15. Candidates are ordered by scores in the French official election. These tables provide the scores, i.e. the proportion of voters who approved of or voted for each candidate, and the rankings for every town, in 2002 and in 2007, in which the experiments were conducted. But one cannot compare directly the approval and the official columns in a town since the hypothesis of a participation bias in the experiment cannot be excluded (see Laslier and van der Straeten 2004; Baujard and Igersheim 2007a). Indeed, Laslier and van der Straeten show that in 2002 only a small proportion of voters for Jean-Marie Le Pen, the candidate of the extreme Right-wing, agreed to participate in the experiment. Applying the same method to the 2007 data, the analysis of the participation bias reveals that voters of Nicolas Sarkozy, the only candidate of the traditional Right-wing, were over-represented and these of François Bayrou, the centrist candidate, were slightly under-represented in the data from the AV experiment. Conversely, the results of AV and the official election can be compared at the national level (the columns headed "France"): here both participation and sampling bias have been corrected.[8]

[8] Notably via the behavioral model described in Sect. 4.2 of this article.

Let us comment on these results. A first conclusion is obvious: rankings under AV and official voting are very different, not only in detail but in their major features. In the 2002 experiment, Laslier and van der Straeten (2004) observed that "the ranking of candidates is modified in favor of Lionel Jospin, François Bayrou, Jean-Pierre Chevènement, Noël Mamère and Alain Madelin .... The candidates that AV seems to put at a disadvantage without unambiguity are J.-M. Le Pen, A. Laguiller, O. Besancenot, Jean Saint-Josse et Robert Hue." Some candidates, such as the centrist candidate François Bayrou, seem to benefit from AV, unlike others who are disadvantaged by it. This tendency is clearly corroborated by the 2007 experiment; most notably, in 2007, the winner under AV for France (François Bayrou) is different than the winner of the official ballot (Nicolas Sarkozy).

Second, some political parties receive numerous approvals, and so find greater representation under AV than they do in the official vote – in which they are, indeed, almost nonexistent. Both in 2002 and 2007, Green candidates (Noël Mamère, Corinne Lepage, Dominique Voynet) greatly benefit from AV. Conversely, some others lose from this new method of voting: notably the extreme Right candidates, and Jean-Marie Le Pen in particular. The specific feature of 2007 is that "little" candidates of the Extreme left (Olivier Besancenot especially, but José Bové and Arlette Laguiller too) gain from AV, while the opposite conclusion is valid in 2002 (Robert Hue, Arlette Laguiller).

Third, no candidate attracted an absolute majority of approvals in 2002, nor in 2007 at the national level (in his best showing, that of 2007, François Bayrou came

Table 15.14 AV's results, Extrapolations to France – 2002

	Gy				Orsay				France			
	Approval		Official		Approval		Official		Approval		Official	
Chirac	38.2	1	19.6	1	36.2	2	18.8	2	36.7	1	19.9	1
Le Pen	32.7	2	19.6	1	11.7	12	8.7	4	25.1	4	16.9	2
Jospin	23.9	3	11.1	4	43.2	1	20.7	1	32.9	2	16.2	3
Bayrou	23.4	4	6.7	6	35.2	3	10.3	3	27.1	3	6.8	4
Laguiller	17.6	9	13.0	3	15.1	10	3.7	8	16.8	9	5.7	5
Chevènement	18.4	7	4.7	8	32.3	4	8.6	5	22.4	6	5.3	6
Mamère	18.4	7	4.7	8	30.6	5	8.3	6	24.3	5	5.2	7
Besancenot	17.0	10	2.8	11	17.7	9	3.1	10	17.6	8	4.2	8
Saint-Josse	20.3	6	9.6	5	5.8	15	0.7	15	13.5	11	4.2	9
Madelin	21.2	5	5.2	7	21.3	6	4.9	7	20.4	7	3.9	10
Hue	10.2	12	3.1	10	11.7	11	2.6	15	11.3	14	3.4	11
Mégret	17.0	10	2.8	11	6.1	14	1.1	14	13.8	10	2.3	12
Taubira	9.1	14	0.5	16	20.6	7	3.6	9	12.6	13	2.3	13
Lepage	9.9	13	2.8	11	19.3	8	2.8	11	13.4	12	1.9	14
Boutin	5.8	16	0.8	15	8.1	13	1.4	13	6.7	15	1.2	15
Gluckstein	7.1	15	1.8	14	3.8	16	0.7	16	5.5	16	0.4	16
Total	290.1		100		318.6		100		297.1		100	

N.B.: For France, the official results of the second round were: Jacques Chirac (82.2%) and Jean-Marie Le Pen (17.8%).

Table 15.15 AV's results, Extrapolations to France - 2007

	Cigné				Louvigny				Illkirch				France			
	Approval		Official		Approval		Official		Approval		Official		Approval		Official	
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
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
Bayrou	40.5	2	20.8	3	49.8	2	23	3	51	2	23.2	2	42.8	1	18.8	3
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
Besancenot	26.1	4	4.2	6	28.1	4	5	4	20.3	4	3.4	5	27.9	4	4.1	5
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
Buffet	9.3	8	2	7	10.1	7	1.3	8	5.2	10	0.4	10	9.8	10	1.9	7
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
Laguiller	7.9	9	2	7	9.6	8	1.2	9	9.3	7	0.8	9	11.4	8	1.3	9
Bové	19.1	5	2	7	13.3	6	1.1	10	9.2	8	1	8	15.2	6	1.3	10
Nihous	6.1	11	2	7	4.5	11	1.1	10	2.3	11	0.2	12	4.4	11	1.2	11
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	

N.B.: For France, the official results of the second round were: Nicolas Sarkozy (53.1%) and Ségolène Royal (46.9%).

near 43% for French simulated results out of all ballots, but note that such a score is possible because, in 2007, Bayrou was approved of by 51% of voters in Illkirch, and by 49.8% in Louvigny).

Another major lesson can thus be drawn from the three comments above: the analysis of AV's results does lead to different conclusions compared to those of the official ballot, especially because AV carries different information on voters' political preferences. In particular, with AV, we learn that voters may be interested in candidates who are ignored by the official ballot. Further, since AV allows the voters to give their opinion on each candidate, one can expect the winner to be different than the one designated by the two-round vote, as in 2007. Finally, it must be emphasized that EV's results in 2007 confirm in every respect all the preceding observations.

15.4.2 Examining the Conversion of Approval into Single-Name Balloting

So far, we have examined the raw results and compared the ranking of the candidates under AV with that of single name balloting, on the basis of the result of the official first-round vote. But AV's results cannot be reduced to scores: AV ballots provide much richer information than this, since the number of voters who approve of various groups of candidates can be computed. An agreement matrix, such as the one in Table 15.16, gives the number of voters who simultaneously approve of two candidates. For an election with 16 candidates, as in 2002, the agreement matrix for AV has 256 values: each candidate cross-referenced with all the others. The matrix is thus symmetric and the diagonal is equal to the score of each candidate. The

agreement matrix for Gy les Nonains (see Laslier and van der Straeten 2004: 15) can be read as follows: among the 139 voters for Jacques Chirac, the outgoing president from the traditional Right-wing, 51 approve of Jean-Marie Le Pen, 15 approve of Lionel Jospin, the candidate of the traditional Left-wing, and so on (see also Table 15.17 for the 2007 experiment; this table can be read in the same manner as the previous one).

But an important piece of information is missing: namely, the priority that voters afford to a particular candidate in the official election process. In other words, does the intersection between the voters for Jacques Chirac and for Jean-Marie Le Pen contain those who voted for Chirac in the official first round, who also approve of Le Pen? Or, on the contrary, are they those who voted for Le Pen in the official first round, who also approve of Chirac?

In order to induce from the AV data some clues as to how voters convert their approval vote into first-round voting (or, more precisely, into single-name balloting, since the model does not distinguish between both voting methods), one can resort to formalization and set up a behavioral model (for further explanation regarding this model, see Laslier 2004; Laslier and van der Straeten 2004, 2008; Baujard and Igersheim 2007a). In this model, a parameter μ_c, called the "lever," is assigned to each candidate c: μ_c estimates the propensity of candidate c to be not only one of the approved candidates under AV, but also the chosen candidate in the official vote. More precisely, if a voter approves the set B of candidates, she votes for c with a null probability if $c \notin B$ and with a probability equal to $\frac{1}{\sum_{d \in B} \mu_d} \mu_c$ if $c \in B$. Hence, the higher μ_c, the greater the propensity of candidate c to convert approvals into votes in a single-name ballot.

Table 15.18 presents the levers computed with Gy's data (normalized to 1 for Jacques Chirac) in the 2002 experiment. One can observe that both Jacques Chirac and Jean-Marie Le Pen have the highest levers, showing that these two candidates are more capable than others of turning approvals into official votes. Of course, the values of the levers also partially reflect the phenomenon of tactical voting – or its absence – which can "artificially" increase the official score of a major candidate. Here, one can note that the lever of Lionel Jospin, the traditional Left-wing candidate and a priori the principal challenger to Jacques Chirac, is particularly weak compared to Chirac's and Le Pen's. This is not surprising, since Jospin's famous defeat during the 2002 French presidential election is generally explained by a lack of strategic voting in his favor. But, above all, the values of the levers depend on the type of support a candidate arouses among the voters. Hence, from Table 15.16, one notes that the 119 voters who approve Jean-Marie Le Pen give 2 approvals to other candidates on average. Conversely, the 62 voters who approve Olivier Besancenot give 4.4 approvals to other candidates on average. According to the behavioral model, then, the participants who approve Jean-Marie Le Pen are more able to convert their approval into an official vote for this candidate than those who approve Olivier Besancenot. In other words, the votes for the former are much more concentrated than those for the latter.

As for 2007, Table 15.19 shows us that Nicolas Sarkozy, the candidate of the traditional Right-wing, has a much higher lever than any other candidate. This

Table 15.16 Agreement Matrix for Gy les Nonains – 2002

	Chirac	Le Pen	Jospin	Bayrou	Laguiller	Chevènement	Mamère	Besancenot	Saint-Josse	Madelin	Hue	Mégret	Taubira	Lepage	Boutin	Gluckstein
Chirac	139	51	15	47	10	28	11	10	36	48	3	31	5	9	6	3
Le Pen	51	119	10	22	18	17	9	13	21	22	5	44	3	5	4	4
Jospin	15	10	87	14	21	17	40	24	11	5	26	0	23	9	5	4
Bayrou	47	22	14	85	10	25	13	9	10	33	3	13	8	14	7	2
Laguiller	10	18	21	10	64	13	19	24	10	3	18	6	11	11	7	12
Chevènement	28	17	17	25	13	67	10	11	10	19	2	7	8	11	4	3
Mamère	11	9	40	13	19	10	67	32	7	9	15	3	15	10	4	12
Besancenot	10	13	24	9	24	11	32	62	10	8	16	9	16	13	3	15
Saint-Josse	36	21	11	10	10	10	7	10	74	18	5	13	5	6	6	4
Madelin	48	22	5	33	3	19	9	8	18	77	2	15	4	10	6	3
Hue	3	5	26	3	18	2	15	16	5	2	27	0	5	4	3	7
Mégret	31	44	0	13	6	7	3	9	13	15	0	62	1	2	4	4
Taubira	5	3	23	8	11	8	15	16	5	4	5	1	33	7	4	3
Lepage	9	5	9	14	11	11	10	13	6	10	4	2	7	36	5	4
Boutin	6	4	5	7	7	4	4	3	6	6	3	4	4	5	21	1
Gluckstein	3	4	4	2	12	3	12	15	4	3	7	4	3	4	1	26

Table 15.17 Agreement Matrix for the 6 polling stations – 2007

	Sarkozy	Royal	Bayrou	Le Pen	Besancenot	De Villiers	Buffet	Voynet	Laguiller	Bové	Nihous	Schivardi
Sarkozy	1216	231	588	221	116	169	23	99	56	52	53	14
Royal	231	1176	577	40	386	0	150	303	147	194	27	11
Bayrou	588	577	1340	101	271	94	65	223	87	120	43	14
Le Pen	221	40	101	312	45	95	6	19	24	17	16	5
Besancenot	116	386	271	45	637	25	112	161	148	171	28	19
De Villiers	169	0	94	95	25	242	36	14	17	13	16	9
Buffet	23	150	65	6	112	36	198	92	68	60	9	8
Voynet	99	303	223	19	161	14	92	456	75	117	14	7
Laguiller	56	147	87	24	148	17	68	75	250	69	16	7
Bové	52	194	120	17	171	13	60	117	69	309	14	15
Nihous	53	27	43	16	28	16	9	14	16	14	91	9
Schivardi	14	11	14	5	19	9	8	7	7	15	9	38

suggests strongly that the participants who approved him in the experiment also voted for him in the official election. Indeed, the 1,216 voters who approved him gave approval to 1.33 other candidates on average: this is the lowest average for the 2007 experiment (see Table 15.17). One can note further that Jean-Marie Le Pen and, to a lesser extent, François Bayrou and Ségolène Royal, the candidate of the traditional Left-wing, also have high levers, even if not comparable to Nicolas Sarkozy's. Among the candidates of the Left-wing (traditional and alternative) – Ségolène Royal, José Bové, Marie-Georges Buffet, Olivier Besancenot, Dominique Voynet, Gérard Schivardi, Arlette Laguiller–Ségolène Royal has the highest lever, showing that there is substantial strategic voting in her favor. Indeed, the voters who approve one or many candidates of the Left wing, Ségolène Royal excepted, give support to 2.33–3.11 other candidates on average.

Now, these levers make it possible to extrapolate the results of AV if the experiments had been conducted over the whole country.[9] This indicates that the elaboration of a behavioral model, which explains the conversion of approval voting into single-name balloting and vice versa, is crucial if we are to be fully aware of the mechanisms of AV. Another way to address this issue is to examine how voters transform their approvals under AV into grades under EV. In other words, we can develop a behavioral model that explains the conversion of AV into EV. The data Baujard and Igersheim collected during the 2007 French presidential election permits the development of such a model, which should improve the understanding of AV.

For first results and remarks on this issue, one can start by computing the correlation coefficients between AV and EV for every candidate. Let us recall that the linear correlation coefficient, or the Pearson's coefficient, is obtained by dividing the covariance of two variables by the product of their standard deviations. It ranges between -1 (decreasing linear relation) and $+1$ (increasing linear relation). Hence, the closer the correlation coefficient of a candidate is to 1, the more voters give her an approval and a grade 2. Conversely, the closer it is to -1, the more voters give her no approval and a grade 0. A correlation coefficient of 0 corresponds to no linear relation between variables. Recall that a strong correlation is considered to exist between two variables whenever the correlation coefficient exceeds 70%.

In our case, there seem to be positive linear correlations between the AV and EV scores for all candidates. Table 15.20 shows that the candidates who obtain a

Table 15.18 Levers in 2002

Chirac	1	Saint-Josse	0.9
Le Pen	1.2	Madelin	0.4
Jospin	0.7	Hue	0.5
Bayrou	0.5	Mégret	0.3
Laguiller	0.4	Taubira	0.1
Chevènement	0.4	Lepage	0.5
Mamère	0.4	Boutin	0.2
Besancenot	0.2	Gluckstein	0.2

[9] The results of the extrapolation are given in Sect. 4.1.

Table 15.19 Levers in 2007

Sarkozy	1	Buffet	10^{-7}
Royal	0.00388	Voynet	$9{,}57\times10^{-7}$
Bayrou	0.00465	Laguiller	10^{-7}
Le Pen	0.56	Bové	10^{-7}
Besancenot	5.77×10^{-7}	Nihous	0.000013
De Villiers	0.000454	Schivardi	0.0000366

Table 15.20 Correlation coefficient per candidate between AV and EV – 2007

Sarkozy	80.7	Buffet	52.0
Royal	77.0	Voynet	60.8
Bayrou	77.2	Laguiller	51.2
Le Pen	73.5	Bové	58.9
Besancenot	67.6	Nihous	53.3
De Villiers	62.4	Schivardi	39.9

Table 15.21 Frequencies of conversion from AV to EV – 2007

	No Approval into...			Approval into...		
	Grade 0	Grade 1	Grade 2	Grade 0	Grade 1	Grade 2
	(%)	(%)	(%)	(%)	(%)	(%)
Sarkozy	73	21	5	2	18	80
Royal	67	29	04	2	26	72
Bayrou	53	42	6	3	29	68
Le Pen	90	9	2	5	41	54
Besancenot	71	26	3	3	43	54
De Villiers	85	13	2	8	42	50
Buffet	77	21	2	6	53	42
Voynet	67	30	2	4	47	49
Laguiller	74	23	4	5	49	47
Bové	77	21	2	5	50	45
Nihous	90	9	1	9	46	45
Schivardi	92	8	0	16	46	38

significantly high correlation coefficient between AV and EV are Nicolas Sarkozy, Ségolène Royal, François Bayrou and Jean-Marie Le Pen. Other candidates, Olivier Besancenot excepted, obtain weaker correlation coefficients. This corroborates our previous remark: Nicolas Sarkozy and Jean-Marie Le Pen benefit from high concentration in their voters. With regards to Ségolène Royal, the fact that she seems to benefit from strategic voting should explain the difference between her rather high coefficient correlation in comparison with those of the other candidates of the Left-wing. François Bayrou, the centrist candidate, is able to receive approvals and maximum grades from the voters of both political sides, Left and Right.

Further, one can consider Table 15.21, which exhibits the frequencies of conversion from an approval or no approval into grades 0, 1 or 2. For instance, 80% of voters who give an approval to Nicolas Sarkozy give him a grade 2 and 73% of voters who do not give him an approval give him a grade 0. Further, the columns "No Approval into Grade 1" and "Approval into Grade 1" make it possible to analyse precisely how voters vote in AV: do they give approval both to candidates they like *and*

those they merely tolerate, or only to the candidates they really prefer? Two kinds of behavior can be characterized: let us define "bonus" behaviour as consisting in giving an approval to the most preferred candidates only, whereas "malus" behaviour consists in giving approval to all the candidates a voter likes or is indifferent to: thus, on the malus strategy, only the least-preferred candidates are punished. For the 2007 data, one can count 2095 malus ballots and 5231 bonus ballots. At first sight, then, bonus behavior seems to be the most common.

15.4.3 Analyzing the French Political Context

A third strand of analysis can be dedicated to examining the French political supply structure. Indeed, we have stressed that AV's results are interesting since not only do they consist of scores, but also of the numbers of voters who approve of various groupings of candidates. Hence, if two candidates are supported by the same set of voters, one could argue that they correspond to the same political supply. AV data thus enables us to go beyond simple observations of the political sympathies claimed by the candidates themselves and to define more precisely the position of each candidate as perceived by voters. For further insights in this regard, see Laslier (2010a).

Laslier (2004, 2006) has proposed a method through which to analyse the political context, and so to build "a kind of *official photograph* of voters' preferences" (Laslier, 2006: 160). To do so, Laslier brings together three main ingredients: first, the spatial theory of voting according to which the utility function of a voter v is a decreasing function of the usual distance between the position of a candidate c, y_c, and her ideal point,[10] x_v: $\|y_c - x_v\|$, where y_c and x_v belong to the Euclidian space $\mathbb{R}^k$ and $\|.\|$ is the usual distance. But a further element is added: a candidate is evaluated by a voter not only through her political tendency (or position, deduced from correlations between the candidates' approvals), but also through her "valence" (which is a characteristic of each candidate and depends on the total number of approvals she receives). In other words, even if two candidates are located at the same point, they won't necessarily receive the same number of approvals: the one with the higher valence will get more. The second ingredient is the random utility model according to which the decision of a voter to give an approval to one or another candidate is a random variable whose probability increases (1) with the valence of the candidate, and (2) with increasing proximity of the candidate to her ideal point. The third ingredient is a principal component analysis. Finally, based on these three elements, Laslier offers a picture of the political space which is "purely endogenous … without reference to an a priori specified set of issues" (Laslier 2006: 163). Further, the definition of the distance between two candidates thus

[10] Note that the distribution of the voters' ideal points is assumed to be normal and widely dispersed: it thus opens a promising line of research which would aim to replace this hypothesis with a more realistic one.

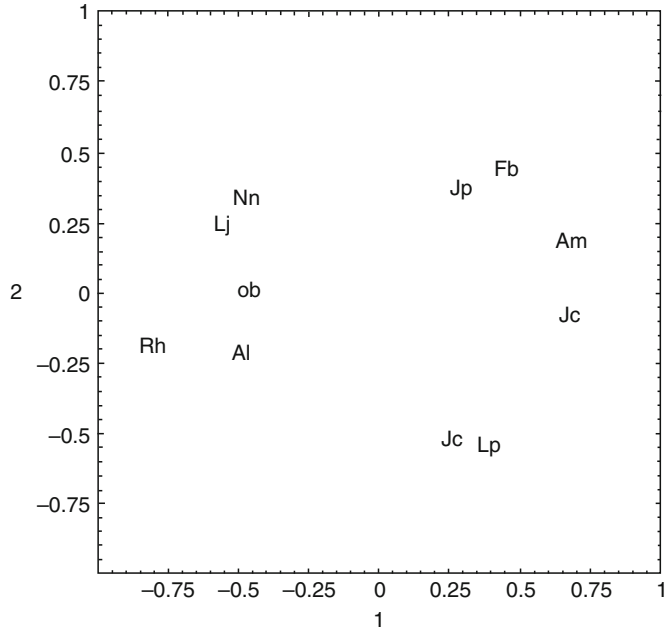


Fig. 15.3 Gy, main plane – 2002

obtained is specific to this model. Note that some other definitions of distance could be considered, such as the difference in the number of approvals. Laslier stresses that "in practice, different distances often provide the same qualitative findings and lead to essentially the same interpretations" (Laslier 2006: 169).

Let us briefly present the political space of Gy in 2002 with this original method (Laslier 2004: 179–180; Laslier 2006: 174–175). Figure 15.3 shows that the first axis can be interpreted as the Left–Right axis. Indeed, Arlette Laguiller (Al – alternative Left-wing), Olivier Besancenot (Ob – alternative Left-wing), Lionel Jospin (Jp – traditional Left-wing) and Noël Mamère (Nm – Green Party) are located on the left side of the picture, while Jean-Marie Le Pen (Lp – nationalist Right-wing), Jean Saint-Josse (Js – a candidate of the Right-wing who created his own political party "Hunting, Fishing, Nature and Traditions"), Jacques Chirac (Jc – outgoing president, traditional Right-wing), François Bayrou (Fb – centrist candidate), Alain Madelin (Am – liberal Right-wing) and Jean-Pierre Chevènement (Jp – centrist candidate) are on the right. But one could argue further that the political space does not seem to be unidimensional, since Jean-Marie Le Pen, the so-called extreme Right candidate, is not on the extreme right, and François Bayrou, the so-called Centrist candidate, is not at the center of the picture. Figure 15.4 shows indeed that each candidate of the Right lies on a different plane, and thus represents a distinct political programme, as determined by the second and the third axes.

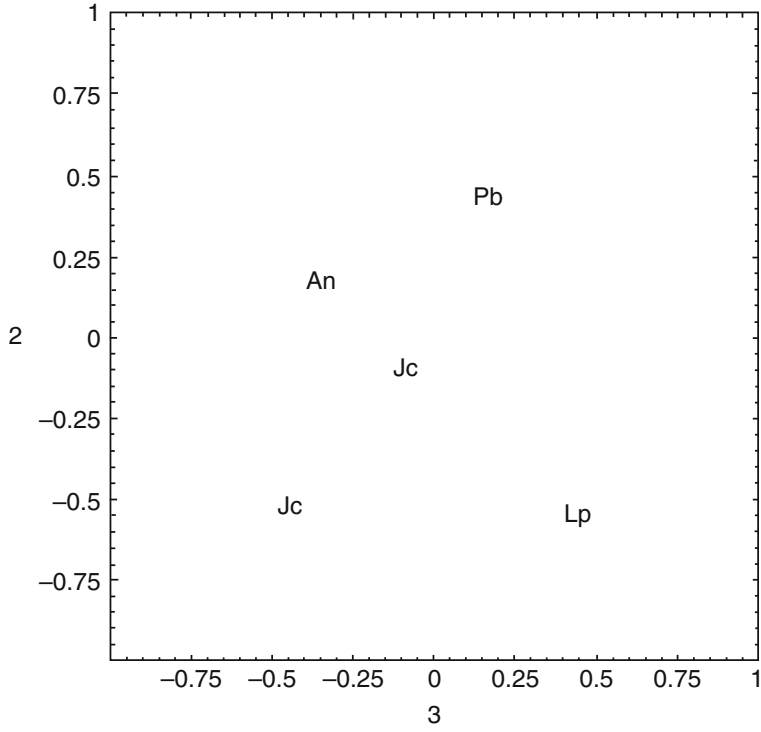


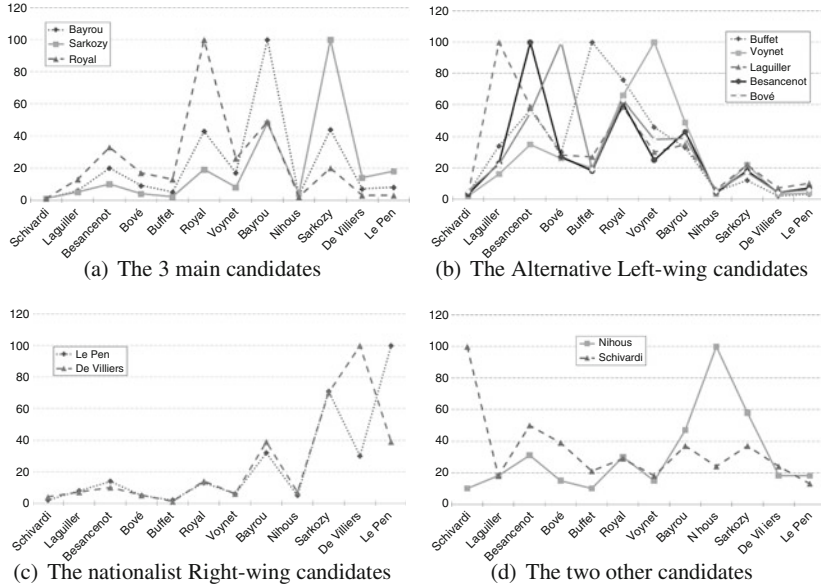
Fig. 15.4 The Right in Gy – 2002

A second way to analyse the French political supply structure using the AV data is to consider more closely the agreement matrix as in Baujard and Igersheim (2007a) and Baujard et al. (2009a, b). Indeed, by computing differently the AV data from the 2007 experiment (see Table 15.22), we derive a "second" matrix of agreement which gives the proportion of voters who support a given candidate (by column) and simultaneously another one (by row). Here the diagonal is always equal to 100% but, contrary to Table 15.17, this matrix is not symmetric: the proportion of voters for Jean-Marie Le Pen (312 approvals) who also supported Nicolas Sarkozy is 71%, while the proportion of voters for Nicolas Sarkozy (1,216 approvals) who also supported Jean-Marie Le Pen is only 18%; the difference makes sense since we do not consider the same set of voters in computing the percentage. This property of asymmetry suggests different lessons depending on whether rows or columns are at stake. In the columns, we read the propensity of voters of a candidate to support other candidates – in other words, the dilution of the support of this candidate. In the rows, we read the propensity of voters for other candidates to support the former, that is, a candidate's ability to attract voters for other candidates.

In order to compare candidates, and thus to point out some characteristics of the French political supply in 2007, the information contained in Table 15.22 is

Table 15.22 Agreement Matrix in % – 2007

	Schivardi	Laguiller	Besancenot	Bové	Buffet	Royal	Voynet	Bayrou	Nihous	Sarkozy	De Villiers	Le Pen
Schivardi	100	3	3	5	4	1	2	1	10	1	2	2
Laguiller	18	100	23	22	34	13	16	6	18	5	7	8
Besancenot	50	59	100	55	57	33	35	20	31	10	10	14
Bové	39	28	27	100	30	17	26	9	15	4	5	5
Buffet	21	27	18	19	100	13	20	5	10	2	1	2
Royal	29	59	61	63	76	100	66	43	30	19	14	13
Voynet	18	30	25	38	46	26	100	17	15	8	6	6
Bayrou	37	35	43	39	33	49	49	100	47	48	39	32
Nihous	24	6	4	5	5	2	3	3	100	4	7	5
Sarkozy	37	22	18	17	12	20	22	44	58	100	70	71
De Villiers	24	7	4	4	2	3	3	7	18	14	100	30
Le Pen	13	10	7	6	3	3	4	8	18	18	39	100



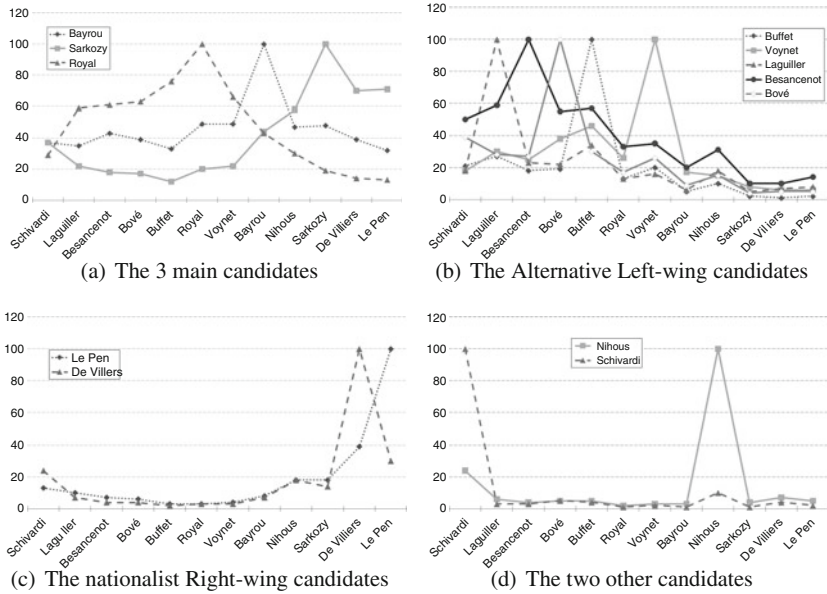
(a) The 3 main candidates

(b) The Alternative Left-wing candidates

(c) The nationalist Right-wing candidates

(d) The two other candidates

Fig. 15.5 Representation of columns of 2007 agreement matrix



(a) The 3 main candidates

(b) The Alternative Left-wing candidates

(c) The nationalist Right-wing candidates

(d) The two other candidates

Fig. 15.6 Representation of rows of 2007 agreement matrix

represented in graphs 15.5 and 15.6. Note that both for Table 15.22 and graphs 15.5 and 15.6, the candidates are ordered to make reading and understanding easier, that is, to obtain nice curves, which are as far as possible single-peaked. Baujard et al. (2009b: 18) emphasize that: "this has eventually generated an order which is close to the standardly used ideological axis from Left-wing to Right-wing". Finally, five different political supplies stem from the observation of the curves – which correspond, visually, to alike or different trends: "1- Nicolas Sarkozy matches Right-wing voters; 2- Ségolène Royal matches voters of the traditional Left-wing; 3- François Bayrou matches voters refusing bipolarization; 4- Philippe de Villiers and Jean-Marie Le Pen match voters of the nationalist right-wing; 5- Dominique Voynet, Olivier Besancenot, José Bové, Marie-Georges Buffet and Arlette Laguiller match voters of the governmental and alternative Left-wing. Moreover, the two last candidates, Frédéric Nihous and Gérard Schivardi, are special cases who attract very few supporters; for this reason, we claim they do not really represent a homogeneous political supply" (Baujard et al. 2009b: 20).

Further, still based on the 2007 AV data, Baujard et al. (2009a), in a work in progress, elaborate a way to highlight the consensual candidates in the 2007 French presidential election. For this purpose, they propose an original definition of consensus based on attractiveness, dilution and symmetry of approvals.

15.5 Concluding Remarks

This paper has presented the two main framed field experiments on AV: the first one conducted by Balinski, Laraki, Laslier and van der Straeten during the 2002 French presidential election, and the second one by Baujard and Igersheim during the 2007 French presidential election.

Several lessons can be drawn from the experiments: (1) Such experiments are feasible, and very well accepted by voters; (2) The principle of AV is easily understood and accepted by the public; (3) Within the observed political context, compared to the official first-round vote, AV modifies the overall ranking of candidates: in 2002, under AV, Jacques Chirac and Lionel Jospin, rather than Jean-Marie Le Pen, would have reached the second round, and in 2007, the winner of the French presidential election would have been François Bayrou and not Nicolas Sarkozy; (4) Further, the behavioral model which links approval voting to single-name balloting suggests a new notion of "lever," which allows us to compute the probability of an approved candidate also to be chosen by a voter in the official vote. From the comparison of the levers of all candidates one can point out the high support of one candidate and/or the presence of significant levels of tactical voting in favor of another, and so on. Furthermore, since AV enables voters to give their opinion on every candidate, AV data gives in essence a very good representation of how voters perceive the political supply.

Research on the data from the AV experiments is far from being exhausted. We have indicated above three new research leads: first, to pursue the study of "how

voters vote" under AV by examining the conversion from AV to EV; second, to consider a more realistic distribution of the voters' ideal points into Laslier's graphical model (Laslier 2004, 2006); third, to develop an original definition of a consensual candidate based on the experimental data on AV. These, and the many other fruitful leads which we can expect will emerge, should allow us to make progress along the path of fairness and democracy.

References

Alós-Ferrer, C., & Granić, Đ. G. (2010). Approval voting in Germany: description of a field experiment. In J.-F. Laslier & R. Sanver (Eds.), *Handbook on approval voting* (pp. 397–411). Heidelberg: Springer.

Balinski, M., & Laraki, R. (2007a). A theory of measuring, electing and ranking. *Proceeding of the National Academy of Sciences USA*, *104*(21), 8720–8725.

Balinski, M., & Laraki, R. (2007b). Election by majority judgement: experimental evidence. Cahiers du Laboratoire d'Econométrie de l'Ecole Polytechnique, no. 28, 2007.

Balinski, M., & Laraki, R. (2007c). Le jugement majoritaire : l'expérience d'Orsay. *Commentaire*, *30*(118), 413–420.

Balinski, M., Laraki, R., Laslier, J.-F., & van der Straeten, K. (2003). Le vote par assentiment: une expérience. Cahiers du Laboratoire d'Econométrie de l'Ecole Polytechnique, no. 2003-13.

Balinski, M., Laslier, J.-F., & van der Straeten, K. (2002). Compte-rendu de l'expérience de vote du 23 janvier 2002 à l'IEP. Mimeo, mars 2002.

Bassett, G. W. Jr., & Persky, J. (1999). Robust voting. *Public Choice*, *99*(3–4), 299–310.

Baujard, A., & Igersheim, H. (2007a). Expérimentation du vote par note et du vote par approbation lors des élections présidentielles françaises du 22 avril 2007. Rapport au Centre d'Analyse Stratégique, décembre 2007. 289 p.

Baujard, A., & Igersheim, H. (2007b). Expérimentation du vote par note et du vote par approbation lors des élections présidentielles françaises du 22 avril 2007. Premiers résultats. Rapport d'étape au Centre d'Analyse Stratégique, juin 2007.

Baujard, A., & Igersheim, H. (2007c) L'expérience du vote par note. Expérimenter des modes de scrutins différents. In *Organiser l'expression citoyenne. Pratiques électorales, déroulement des scrutins, technologies du vote. Un dimanche au bureau de vote. Actes du colloque du 5 avril 2007*, no. 10. Rapports et documents du Centre d'Analyse Stratégique, La Documentation Française, avril 2007, pp. 48–53. 60–62.

Baujard, A., & Igersheim, H. (2009). Expérimentation du vote par note et du vote par approbation le 22 avril 2007. Premiers résultats. *Revue Economique*, *60*(1), 189–202.

Baujard, A., Igersheim, H., & Senné, T. (2009a). Measuring consensus. An analysis based on experimental data. Mimeo CREM, Université de Caen.

Baujard, A., Igersheim, H., & Senné, T. (2009b). The political supply in the 2007 French presidential elections: An analysis based on experimental data. Mimeo CREM, Université de Caen; *Annales d'Economie et Statistiques* (Submited for publication).

Borda, J. (1781). *Mémoires sur les Élections au Scrutin*. Paris: Histoire de l'Académie Royale des Sciences.

Brams, S., & Fishburn, P. (1983). *Approval voting*. Boston: Birkhaüser.

Condorcet, J. (1785). *Essais sur l'Application de l'Analyse à la Probabilité des Décisions Rendues à la Pluralité des Voix*. Paris: Imprimerie Royale.

Cox, G. (1997). *Making Votes Count: Strategic coordination in the World's electoral system*. Cambridge: Cambridge University Press.

Cox, G., & Katz, J. (2002). *Elbridge gerry's salamander: The electoral consequences of the reapportionment revolution*. Cambridge: Cambridge University Press.

Farvaque, E., Jayet, H., & Ragot, L. (2009). Quel mode de scrutin pour quel vainqueur ? Une expérience sur le vote préférentiel transférable. *Revue d'Économie Politique*, *120*(2), 221–246

Felsenthal, D. S. (1989). On combining approval with disapproval voting. *Behavioral Science*, *34*, 53–60.

Gehrlein, W. V., & Lepelley, D. (2003). On some limitations of the median voting rule. *Public Choice*, *117*(1), 177–190.

Gerber, A. S., Green, D. P., & Larimer, C. W. (2008). Social pressure and voter turnout: evidence from a large-scale field experiment. *American Political Science Review*, *102*(1) , 33–48.

Harrison, G. W., & List, J. A. (2004). Field experiments. *Journal of Economic Literature*, *42*(4), 1009–1055.

Harrison, G. W., & List, J. A. (2008). Naturally occurring markets and exogenous laboratory experiments: a case study of the winner's curse. *Economic Journal*, *118*, 822–843.

Hillinger, C. (2004a). On the possibility of democracy and rational collective choice. Discussion Paper, no. 2004-21, University of Munich.

Hillinger, C. (2004b). Utilitarian collective choice and voting. Discussion Paper, no. 2004-25, University of Munich.

Hillinger, C. (2004c). Voting and the cardinal aggregation of judgments. Discussion Paper, no. 2004-09, University of Munich.

Hillinger, C. (2005). The case for utilitarian voting. *Homo Oeconomicus*, *23*, 295–321.

Laslier, J.-F. (2004). *Le vote et la règle majoritaire, analyse mathématique de la politique*. CNRS-édition.

Laslier, J.-F. (2006). Spatial approval voting. *Political analysis*, *14*, 160–185.

Laslier, J.-F. (2009a). A note on comparing median evaluations in single peaked-domains. Cahier no. 2009-23, Laboratoire d'économétrie, École Polytechnique, June 2009.

Laslier, J.-F. (2009b). Lessons from in situ experiments during french elections. In B. Grofman, A. Laurent & B. Dolez (Eds.), *In situ and laboratory experiments on electoral law reform: french presidential elections*, Heidelberg: Springer (in press).

Laslier, J.-F. (2010a). Describing the society through approval data. In J.-F. Laslier & R. Sanver, (Eds.), *Handbook on approval voting* (pp. 455–468). Heidelberg: Springer.

Laslier, J.-F. (2010b). Laboratory experiments on approval voting. In J.-F. Laslier & R. Sanver (Eds.), *Handbook on approval voting* (pp. 339–356). Heidelberg: Springer.

Laslier, J.-F., & Sanver, R. (2010). The basic approval voting game. In J.-F. Laslier & R. Sanver (Eds.) *Handbook on approval voting* (pp. 431–451). Heidelberg: Springer.

Laslier, J.-F., & van der Straeten, K. (2004). Election présidentielle : une expérience pour un autre mode de scrutin. *Revue Française de Science Politique*, *54*, 99–130.

Laslier, J.-F., and van der Straeten, K. (2008). Approval voting in the french 2002 presidential election: a live experiment. *Experimental Economics*, *11*, 97–195.

Núñez, M. (2010). Approval voting in a large electorate. In J.-F. Laslier & R. Sanver (Eds.) *Handbook on approval voting* (pp. 165–197). Heidelberg: Springer.