Jean-François Laslier and M. Remzi Sanver (eds.): Handbook on Approval Voting

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As the readers of this journal may not ignore, Approval Voting (AV) is a voting system where voters can "approve" as many candidates as they want and the winner is the candidate approved by the largest number of voters. Since the publication of the seminal book written by Steven Brams and Peter Fishburn in 1983, a very large number of studies have been devoted to various aspects of this voting procedure. The handbook offered by Jean-François Laslier and Remzi Sanver intends to summarize the current state of knowledge on AV, by gathering a collections of contributions that survey a variety of theoretical and empirical works, some of these contributions including original results. It is worth mentioning that Laslier and Sanver have been among the most prolific and insightful contributors on AV during these last 10 years and as such, were particularly qualified for editing this handbook; quite naturally, they have not only edited it, they have also partly written it since they have authored or co-authored not less than 7 of the 20 contributions that constitute the handbook (including the first Chapter in which Laslier and Sanver introduce the subject and summarize the content of the *opus*).

These contributions cover a wide range of topics and each of them is of a high scientific quality.

The first Part of the volume is of an historical nature. Charles Gérard argues in Chap. 2 that AV was used in Ancient Greece to elect the Sparta's Council of Elders. In these elections, voting was conducted by shouting and the candidate with loudest acclaim was elected. The fact that the voters were free to acclaim several candidates leads Girard to consider this procedure as an early form of AV.

The next "historical" contribution due to Steven Brams and Peter Fishburn was originally published in the journal *Social Choice and Welfare* in 2006. In this text, the founding fathers of AV studies trace their early involvement with AV and enumerate the various scientific societies having adopted AV as well as some (rather) rare examples of political elections where AV was used during the past 25 years. After having recalled the main arguments in favor of AV adoption, they analyze the empirical data of some professional societies that used AV; they show that adopting AV does make a difference and that AV does not appear to elect "lowest common denominators" - a fear that has often been expressed about the use of AV. They conclude by offering some interesting lessons on the difficulty for academics to "sell" new ideas on electoral procedures.

The second Part of the handbook is devoted to axiomatic approaches and gives a better understanding of the structure of AV. In Chap. 4, Biung-Ghi Ju starts from the classical impossibility theorems and then surveys the various possibility results that can be obtained when

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"simple preferences" are considered. By "simple preferences", Ju means a variety of situations such that (but not only) the dichotomous or trichotomous preferences and thus includes in his overview the axiomatic foundations for majority and approval voting systems. The main quality of this survey is to connect various old and recent axiomatic developments in a single and comprehensive perspective. Chap. 5, written by Yongsheng Xu, focuses on dichotomous preferences and surveys the main axiomatic characterizations existing in the literature for AV.

Part III addresses the use of voters' approvals in multi-winner elections, where the objective is to identify a "best" subset of candidates, i.e. to choose a *committee*. As shown in Chap.6 by Marc Kilgour, there are many ways to determine a winning committee in such elections. Kilgour collects, classifies and compares in this chapter the various procedures that uses approval balloting to elect committees. Gilbert Laffond and Jean Lainé study in Chap. 7 the same type of situations where a committee, rather than a single candidate, has to be chosen from approval ballots. They address the following question: how faithfully does the outcome of a voting rule designed from approval ballots represent the actual preference of the voters? The authors investigate various notions of representativeness for a voting rule under the assumption of separable preferences and show that numerous paradoxes (failures at satisfying representativeness properties) can occur; they also study the conditions that allow for avoiding these paradoxes.

The fourth Part of the volume is devoted to strategic aspects of AV and gathers three chapters. In the first one (Chap. 8), Jean-François Laslier and Remzi Sanver survey the main results obtained on AV within the framework of classical noncooperative game theory. As mentioned by Laslier and Sanver, one could hope that statements as "A Condorcet loser cannot be elected at equilibrium under AV" or "Voters vote sincerely at equilibrium under AV" could be demonstrated when the notion of equilibrium is properly defined. Unfortunately, counter-examples exist that kill the hope to make such statements true for any of the classical refinements of Nash equilibrium. The only positive result is obtained when strong equilibrium is considered as the game-theoretic solution concept: in this case, AV appears to be Condorcet consistent. But the notion of strong equilibrium has a serious drawback since, in many cases, there is no such equilibrium.

Matías Núñez surveys in Chap. 9 the studies on strategic AV dealing with elections with a large number of voters. In this context, the classical game theoretical framework can be disputed because it is no longer realistic to assume that voters have no uncertainty over the scores of the candidates. The introduction of commonly shared prior beliefs over the outcome of the election is the main objective of models with large electorates. The works of Myerson, Weber, Laslier and Núñez himself help to understand why voters who vote strategically in popular elections under AV would often vote sincerely and elect the Condorcet winner, if one exists; and why it is not always true. These models also draw some positive conclusions over the properties of AV when compared with Plurality Voting and the Borda Count.

In Chap. 10, Dorothea Baumeister, Gábor Erdélyi, Edith Hemaspaandra, Lane Hemaspaandra and Jörge Rothe also study strategic issues for voters, but from a computational point of view. They apply the tools of complexity theory to determine how hard it is to modify the outcome of AV elections through manipulation, control or bribery. The results for AV are rather negative: among the 22 types of "control attacks" identified by the authors, AV is computationally resistant to only four. However, it turns out that a variant of AV, in which the ballots contain a preference ranking of the candidates in addition to approvals votes, displays broad resistance to control: this variant is resistant to 19 of the 22 control attacks.

The contributions offered in Part V, entitled *Probabilistic Exercises*, are based upon probabilistic assumptions about voters' preferences and ballot choices. In Chap. 11, Mostapha Diss, Vincent Merlin and Fabrice Valognes compute analytically the *Condorcet efficiency* (i.e. the

probability that the Condorcet winner is elected, given that one exists) of various voting rules in three candidate elections. The original framework they adopt allows them to compare AV to alternative voting systems. Using an extended "Impartial Culture" condition, they show that AV is more efficient than the Plurality rule or the Antiplurality rule but is beaten by the Borda Count in most of the contexts they study. In Chap. 12, Aki Lehtinen uses a computer simulation framework for investigating the welfare consequences of strategic behavior under AV and Plurality voting; these consequences are evaluated in term on *Utilitarian efficiency*, defined as the percentage of simulated elections in which the candidate that maximizes the sum of voters' utilities is selected. It is known from previous works by Lethinen that strategic voting is beneficial to AV as well as to Plurality voting: the utilitarian efficiencies of these procedures are higher under strategic behavior than under sincere voting. The current study analyzes whether or not unequal manipulative dispositions in the voting population is susceptible to yield undesirable results. Voters are assumed to be heterogeneous in the sense that some voter types do not manipulate. The robustness of Approval and Plurality voting with respect to this behavioral heterogeneity is thus investigated. It turns out that AV is much more sensitive to behavioral heterogeneity than Plurality. As Chap. 11 and Chap. 12, Chap. 13 is not a survey but an original contribution. This chapter, written by Jean-François Laslier, is devoted to computer simulations of voting and compare the results of four voting systems, including AV. The simulations are based upon various probabilistic assumptions, going from the classical Impartial culture to Spatial Euclidean cultures, allowing to analyze a variety of voting contexts. The voting results are computed by assuming that voters vote either sincerely or strategically. One of the most original features of this study is that strategic behavior is introduced in a heuristic way as "responsive voting" without reference to equilibrium considerations: voters are supposed to respond to an announced candidate score vector. The study confirms that voting rules exist that improve substantially on Plurality rule and that, apart the voting rule itself, the behavior of voters is of primary importance to predict the outcome of an election. Moreover, it appears that when strategic voting is considered, the use of Borda rule may generate perverse effects, whereas AV does not seem to suffer from such pathologies.

The sixth part of the volume deals with empirical observations. In Chap. 14, Jean-François Laslier surveys the laboratory experiments that have been conducted about AV. All these experiments show that AV, compared to other voting rules, tends to favor consensual and socially optimal outcomes: this result is obtained in the various settings considered in the reported experiments: "divided society", "split majority" and "single-peaked domain". These experiments also make clear that individual approval decisions are well described by strategic theories described in the previous chapters, a key observation being that voting strategically under approval voting is usually simple and does not contradict voter's sincerity. The next two empirical chapters describe original experiments that were performed on the occasion of real elections in France and in Germany. Chapter 15, written by Antoinette Baujard and Herrade Igersheim, deals with the French presidential elections in 2002 and 2007, while Chap. 16, by Carlos Alós-Ferrer and Dura-Georg Granić, deals with a German state election in 2008. These "field experiments" took place on election day itself and voters were asked to vote using AV (or some other rule) as if this was the official system in operation. The first lesson that can be drawn from these experiments is that the idea of experimenting on voting rules, as well as the notion of AV, are welcomed by voters. Moreover, extrapolation of the results to the whole country indicates that, in France, the use of AV would have changed the relative position of several candidates and might even have changed the identity of the elected candidate in favor of a more moderate one (F. Bayrou). In Germany, there would have been four (instead of two) main parties of comparable size, and small parties would have obtained parliamentary representation.

Part VII is devoted to *Electoral Competition* and studies the impact of AV on the set of candidates or political parties and their policy positions. In Chap. 17, Jean-François Laslier and François Maniquet use the classical Downsian political model to tackle this issue. They prove that under AV, the outcome of the electoral competition among candidates converges towards the Condorcet winner policy in the following sense: if a Condorcet winner policy exists, then there exists an equilibrium that supports it; and if the set of policies is one-dimensional and voters' preferences are single-peaked, then this equilibrium is the only one. The prediction of the model is thus that AV drives office-motivated candidates to policy moderation and makes more than two parties viable. This conclusion is to be contrasted with what happens with Plurality rule: in that case, only two parties can be viable. In Chap. 18, Arnaud Dellis studies an alternative model of electorate competition, in which candidacy is endogenous. It is shown that, in this context, the claim that AV would lead to the adoption of more moderate policies compared to Plurality Voting holds only if two conditions are satisfied (the first one applies to the candidacy behavior and the second one to the voting behavior). If either of these conditions is not satisfied, then AV may result in more extreme policies than Plurality Voting.

The two last chapters are gathered in Part VIII, entitled *Meaning for Individual and Society*. In Chap. 19, Jean-François Laslier recalls that an election is not only a way to choose among candidates but also an occasion for voters to express publicly their opinion and to know the opinion of the others. Using AV, a society can obtain a richer description of itself than can be obtained with a Plurality rule or a Plurality with a runoff. Laslier presents in this chapter means to summarize approval profiles in useful ways. He recommends that AV be used together with these methods (in particular during the process of decision-making for a committee). In Chap. 20, Remzi Sanver proposes to express AV in an informational framework that extends the Arrovian model. He assumes the existence of two cardinal qualifications, "good" and "bad", with a common meaning among individuals, thus incorporating elements of cardinality and interpersonal comparability into individual preferences. This extended model allows him to revisit AV as well as to define and study other interesting voting systems which combine preference and approval-type inputs.

In 1980, Brams had predicted that AV "would be the election reform of the twentieth century" (Brams 1980, p. 105). This was not to be but, in his preface of the handbook, Brams persists and moves up the deadline for the widespread adoption of AV to the twenty-first century. The handbook contains a lot of results arguing convincingly in favor of AV adoption and I strongly believe that Brams' prediction will soon come true. It is now hardly disputable that AV could advantageously replace Plurality voting or Plurality with a runoff in every single-winner political election where the number of candidates may be high (as in French presidential elections). We should not forget, however, that other alternatives exist; we can, in particular, consider the possibility to allow voters to rate candidates in terms of more than two grades, as proposed with *Range voting* or *Majority judgment voting* (Balinski and Laraki, 2010). Why should we choose AV rather than these procedures, which extend the AV principle? I have my own answers to this question but I regret the absence of debate on this point in the volume: it is indeed my only (very minor) criticism to this remarkable handbook, which undoubtedly constitutes a must-read in voting theory.

I will conclude by reporting a recent and interesting episode about AV. On 30 July - 2 August 2010 was held an international workshop on "Assessing Alternative Voting Procedures" at Château du Baffy, Normandy, France. This workshop gathered about 20 scholars, including some of the best academic experts in voting theory, as well as two voting practitioners. At the end of the workshop, it was decided to hold a vote as to the best single-winner procedure for electing a mayor for a city or town. A set of 18 voting procedures, including all the usual

procedures, was proposed as candidates and it was suggested by one of the participants to use AV for this election. AV was the winner of the election and was the only candidate approved by more than half of the voters with an approving percentage of 68.18% (see Laslier, 2012, for details). This episode suggests that "self-selectivity" should be added to the already long list of AV virtues!

Read this book, and vote for AV!

References

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