Voter Autrement 2017 for French Presidential Election — The Online Experiment

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Abstract

In March and April 2017, we have run a voting experiment during the French presidential election. During this experiment, participants were asked to test several alternative voting methods to elect the French president, like scoring methods, instant-runoff voting, Borda with partial rankings. The experiment was both carried out *in situ* in polling stations during the first round of the presidential election (using paper ballots), and online during the month preceding the first round, and until the second round of the election (using a web application). A total of 6358 participants took part to the *in situ* experiment and 37739 participants took part to the online experiment. This paper provides an extensive description of the online experiment. The aim is not to provide any result about this experiment, but to describe the protocol and the format of the dataset resulting from this experiment.

Keywords: Voting Theory, Experiments, Elections, Online Voting

1. Introduction

In April 2017, the fourth edition of the series of experiments about alternative voting methods at the French presidential election was carried out. During this experiment, called "Voter Autrement", voters from 5 French cities were asked, right after having voted in their respective polling stations for the first round of the official election, to test alternative voting methods for the election of the French president. In total, 6358 voters participated in this *in situ* experiment.

In parallel, an electronic experiment was organised on the web. This experiment also aimed at testing alternative voting methods for the presidential election, but using a web application. The online experiment started on March, the 29th, and lasted until the second round of the official election, namely May, the 7th. A total of 37739 voters took part to the online part of the experiment. The participation to this experiment was voluntary and free. Anyone could take part just by going to the dedicated web site (https://vote.imag.fr/). At the opening of the web site, it was first advertised using mostly academic mailing lists and social networks. In the course of experiment, the information was then relayed by several press media (see the press release on the website of the experiment, https://vote.imag.fr/about#media) and via several groups of interests, including activists from several political parties. During the whole experiment, we also

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received several hundreds of e-mails from participants to the experiment, including comments, suggestions and questions, mostly benevolent.

After the end of the experiment, the data collected was gathered and processed to make it freely available to the community in the form of a dataset that can be downloaded on a public repository. The objective of this paper is to provide an extensive description of the online experiment, including a detailed description of the online application, and a description of the resulting dataset. We give as many details as possible in order for the potential users of this dataset to be aware of how this data has been produced and how to use it with a limited risk of misinterpretation.

The paper is organized as follows. First, we give in Section 2 some formal definitions about the voting methods and opinion languages we test in our experiment. Then, we present the application itself in Section 3. Some technical details about the application (code, architecture...) are given in Section 3.1. Then we give some details in Sections 3.2, 3.3, 3.4 and 3.5 about the sequence of screens and actions through which each participant has to go during the experiment. Finally, we present in Section 4 the dataset resulting from this online experiment.

2. Technical Preliminaries

In this section, we introduce several formal definitions about the voting and opinion elicitation methods we use in the experiment. These definitions are given for the sake of precision, but they are not really required to understand the rest of the paper and might be skipped if necessary.

2.1. Voting Methods

In this section, we will describe the several voting methods that are proposed to the participants. Because we consider voting rules with various kind of input we will state the following, very general, definition:

Definition 1 (Voting method). *Let $\mathcal{C}$ be the set of candidates. A voting method is a pair $(\mathcal{L}_\mathcal{C}, f_\mathcal{C})$, where $\mathcal{L}_\mathcal{C}$ is a set of well-formed formulas depending on $\mathcal{C}$ and $f_\mathcal{C} : 2^{\mathcal{L}_\mathcal{C}} \to \mathcal{C}$ is a function mapping each set $\mathcal{X}$ of well-formed formulas from $\mathcal{L}_\mathcal{C}$ to a unique winner $f_\mathcal{C}(\mathcal{X})$.*

In other words, a voting method is made of a preference representation language that depends on the set of candidates, and an aggregation function whose role is to compute a single winner from any set of well-formed ballots (such a set will be called voting profile).

Note the voting rules we use in this experiment are based on aggregation functions that are irresolute, in the sense that they can map a given profile to several winning candidates. To be well defined, these aggregation functions must be associated to a *tie-breaking* rule $t_\mathcal{C}$ that maps each set of co-winning candidates $\mathcal{W}$ to a unique candidate $w \in \mathcal{W}$.

In our experiment, we consider two kinds of voting methods, depending on the input preference representation language: range voting and ranking methods.

2.1.1. Range Voting

The first kind of voting method we use is range voting. Here, each voter gives a score from a predefined numerical scale to each candidate. Given a voting profile, the score of a candidate is simply the sum of all the scores given by the voters to this candidate. The candidates with the highest score win.

In our version of range voting, for simplicity of preference elicitation, abstention is allowed, in the sense that a voter is not obliged to give a score to all the candidates. The interpretation we give to abstention is that if a voter does not evaluate a given candidate c, then c receives the lowest score from this voter.

More formally:

Definition 2 (Range Voting). *Let $\mathcal{C}$ be the set of candidates, $\mathcal{S} = \{s_1, \ldots, s_k\}$ be a finite set of $\mathbb{R}^k$ (with $s_1 < \cdots < s_k$), and $t_\mathcal{C}$ be a tie-breaking rule. The range voting method associated to $\mathcal{S}$ is defined as follows:*

- $\mathcal{L}_{\mathcal{C},\mathcal{S}}$ *is the set of mappings from $\mathcal{C}$ to $\mathcal{S} \cup \{\star\}$;*

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- *for each voting profile $\mathcal{V} \in (\mathcal{L}_{\mathcal{C},\mathcal{S}})^m$, the score of candidate $c \in \mathcal{C}$ is*

$$\text{score}_{\mathcal{V}}(c) = \sum_{v \in \mathcal{V} \text{ s.t. } v(c) \neq \star} v(c) + s_1 \times |\{c \in \mathcal{C} \text{ s.t. } v(c) = \star\}|;$$

- *for each voting profile $\mathcal{V}$, the winner is the candidate*

$$t_{\mathcal{C}} \circ \text{argmax}_{c \in \mathcal{C}}(\text{score}_{\mathcal{V}}(c))$$

A particular case of range voting is when the scale of possible values is $\{0, 1\}$. In that case, the voting method is called *approval voting*. In our experiment, we test range voting with several scales, including approval voting (see Section 3.3).

2.1.2. Ranking Methods

The second kind of methods we use are closer to the traditional setting of Arrovian social choice theory, where it is assumed that the ballots come in the form of linear orders (rankings) over the candidates. In practice, asking for complete rankings would not be realistic: there are eleven candidates for the French election, and ranking all of them would be tedious and irrelevant. This is why we just ask for partial orders, or more exactky for possibly truncated rankings. In the following, for a set of candidates $\mathcal{C}$, we will denote by $\mathfrak{L}_{\mathcal{C}}^k$ the set of linear orders over any subset of k candidates from $\mathcal{C}$. Moreover, $\mathfrak{L}_{\mathcal{C}}^{k-k'}$ will be a shortcut for $\mathfrak{L}_{\mathcal{C}}^k \cup \cdots \cup \mathfrak{L}_{\mathcal{C}}^{k'}$. For any $> \in \mathfrak{L}_{\mathcal{C}}^k$, $r_>(c)$ will be equal to the rank of c in $>$ if c is among the candidates concerned by $>$, and $k+1$ otherwise. For any $> \in \mathfrak{L}_{\mathcal{C}}^{k-k'}$ and any candidate c, we will denote by $>_{-c}$ the order $>$ where c has been removed (if c is not concerned by $>$, then $>_{-c}=>$). Finally, for any set $\mathcal{V}$ of orders from $\mathfrak{L}_{\mathcal{C}}^{k-k'}$ and any candidate c, we will write $\mathcal{V}_{-c}$ the set $\{>_{-c} \mid > \in \mathcal{V}\}$.

The ranking methods we use in our experiment are of two kinds: Borda-like and instant-runoff voting (IRV).

Definition 3 (Borda-k Voting Method). *Let $\mathcal{C}$ be the set of candidates, and $k < |\mathcal{C}|$ be an integer, and $t_{\mathcal{C}}$ be a tie-breaking rule. The Borda-k voting method (associated to $t_{\mathcal{C}}$) is defined as follows:*

- $\mathcal{L}_{\mathcal{C}} = \mathfrak{L}_{\mathcal{C}}^k$;

- *for each voting profile $\mathcal{V} \in (\mathfrak{L}_{\mathcal{C}}^k)^m$, the score of candidate $c \in \mathcal{C}$ is*

$$\text{score}_{\mathcal{V}}(c) = \sum_{> \in \mathcal{V}} (k + 1 - r_>(c));$$

- *for each voting profile $\mathcal{V}$, the winner is the candidate*

$$t_{\mathcal{C}} \circ \text{argmax}_{c \in \mathcal{C}}(\text{score}_{\mathcal{V}}(c))$$

In other words, in the Borda-k method, a candidate wins k points each time she is ranked first by a voter, $k-1$ each time she is ranked second, and so on. She does not win any additional point when she does not appear in a voter's list.

The second kind of voting method we use is Instant-Runoff Voting (IRV). To define formally this method, we need to first define the notion of plurality loser.

Definition 4 (Plurality Loser). *Given a set of candidates $\mathcal{C}$ and a tie-breaking rule $t_{\mathcal{C}}$, the the plurality loser of a set $\mathcal{V}$ of partial rankings from $\mathfrak{L}_{\mathcal{C}}^{k-k'}$ is the candidate:*

$$\text{pl}(\mathcal{V}) = t_{\mathcal{C}} \circ \text{argmin}_{c \in \mathcal{C}} |\{> \in \mathcal{V} \mid r_>(c) = 1\}|.$$

In other words, the plurality loser is the candidate (tie-breaking-wise) that is ranked first by the lowest number of voters. Note that here the tie breaking rule designates the loser among a set of co-losers (not the winner).

We are now in position of defining the IRV winner:

Definition 5 (IRV Winner). *Given a set of candidates $\mathcal{C}$ and a tie-breaking rule $t_{\mathcal{C}}$, the the IRV winner of a set $\mathcal{V}$ of partial rankings from $\mathfrak{L}_{\mathcal{C}}^{k-k'}$ is the candidate $\mathrm{irvw}(\mathcal{V})$ recursively defined as follows:*

- *if $|\mathcal{C}| = 1$, $\mathrm{irvw}(\mathcal{V})$ is the only candidate of $\mathcal{C}$;*

- *otherwise $\mathrm{irvw}(\mathcal{V})$ is the IRV winner of the set $\mathcal{V}_{-\,\mathrm{pl}(\mathcal{V})}$.*

Definition 6 ($k - k'$-Instant-Runoff Voting). *Let $\mathcal{C}$ be the set of candidates, $k < |\mathcal{C}|$ and $k' < |\mathcal{C}|$ be two integers, and $t_{\mathcal{C}}$ be a tie-breaking rule. The $k - k'$-IRV voting method (associated to $t_{\mathcal{C}}$) is defined as follows:*

- $\mathcal{L}_{\mathcal{C}} = \mathfrak{L}_{\mathcal{C}}^{k-k'}$;

- *for each voting profile $\mathcal{V}$, the winner is the IRV winner of $\mathcal{V}$.*

2.2. Opinion on Candidates

In the previous section, we have introduced the notion of a voting method. A voting method is basically made of two components: a preference representation language and a function that computes the winner without ambiguity, from a profile of votes. On top of voting methods, we have also asked the participants to provide their opinion on candidates, independently of any way of computing the winner of the election. What we call *opinion language* here is basically a voting method where no rule is given to compute the winner of the election from the votes of the participants. More precisely:

Definition 7 (Opinion Language). *Let $\mathcal{C}$ be the set of candidates. An opinion language is a set $\mathcal{L}_{\mathcal{C}}$ of well-formed formulas depending on $\mathcal{C}$.*

This is fundamentally different from voting methods, as the voters do not know when they vote how their votes will be taken into account to compute the winner.

We tested two different opinion languages: continuous opinion and pairwise comparisons.

Definition 8 (Continuous Opinion). *Let $\mathcal{C}$ be the set of candidates. The continuous opinion language on $\mathcal{C}$ is the set of mappings from $\mathcal{C}$ to $[0, 1] \cup \{\star\}$.*

As for range voting, in the continuous opinion language, each voter is asked, for each candidate, either to give a score or to abstain. The main difference with range voting (which explains that continuous opinion is not a voting method) is that we do not explicitly state how a potential winner is computed; in particular this opens the door to several interpretations of abstention about a candidate.

Definition 9 (k-Pairwise Comparison). *Let $\mathcal{C}$ be the set of candidates and k be an integer. The k-pairwise comparison language is the set of subsets $\{(c_1, c_1'), \ldots, (c_k, c_k')\}$, where $k' \leq k$ and for each i, $(c_i, c_i') \in \mathcal{C}^2$ with $c_i \neq c_i'$.*

For each i, (c_i, c_i') is denoted by $c_i > c_i'$ and is interpreted as "the candidate c_i beats the candidate c_i' in a pairwise comparison". In other words, each voter is asked here to give at most k pairwise comparisons between candidates.

3. The Experimental Protocol

3.1. The Online Application

The experiment has been carried out online, under the form of a web application accessible to anyone with a simple URL: `https://vote.imag.fr/`. Although the experiment is now closed, the application is still running, and can still be accessed for testing using this URL.

The web site of the experiment contains:

- a home page, with a direct link to the experiment itself;

- the web pages of the experiment itself, as described in Section 3.2;

- an information page ("about..."), explaining the objective of the experiment, the confidentiality policy, the list of academic institutions involved, a contact address, an extensive description of the protocol and the voting methods used, frequently asked questions, some external links and a press review;

- some information about the candidates (mostly the list of candidates with their name, party, picture, and link to the official website).

3.1.1. Technical Aspects

The source code of the application is available at this URL: `https://vote.imag.fr/static/vote/code/vote_exp.tar.gz`.

The application has been developed in Python 3, with the web framework Django (`https://www.djangoproject.com/`). The following additional libraries have been used on top of Django:

- Bootstrap3 (`http://getbootstrap.com/`) for responsive CSS design;

- Django-bootstrap3 (`https://django-bootstrap3.readthedocs.io`) for the integration of Bootstrap CSS to Django templates;

- Django-simplecaptcha (`http://django-simple-captcha.readthedocs.io/`) for the integration of a simple captcha generator to Django templates and views;

- Python-qrcode (`https://pypi.python.org/pypi/qrcode`) for the generation of QR codes in Python;

- JQuery (http://jquery.com/) for enhanced Javascript interactions;

- JQuery-nstslider (`https://github.com/lokku/jquery-nstslider`) for the sliders used on the continuous opinion page;

- Google Fonts (https://fonts.googleapis.com/) for three fonts used on the website: Roboto, Passion One and Crimson Text;

- Font Awesome (`http://fontawesome.io/icons/`) for some icons used on the web site;

- Awesome-bootstrap-checkbox (`https://github.com/flatlogic/awesome-bootstrap-checkbox`) for enhanced bootstrap check boxes and radio buttons.

All these libraries have a free licence. The design of the web pages and the main logo is our own work.

The application was hosted on a server located in a data center of University Grenoble-Alpes, running Debian (`https://www.debian.org/`). The application was served through an Apache web server (`http://httpd.apache.org/`) using wsgi module to interpret Python Django code. We have used a Postgres database (`https://www.postgresql.org/`) for data persistence. For safety reasons, the database was automatically replicated twice a day on a distant server using Cron and Rsync, which are standard unix tools, during the entire experiment.

3.1.2. Security Matters

For any application dedicated to electronic voting, security is of prime importance. It is important to notice that in our case, our application is not protected against most types of attacks (except Cross-Site Request Forgery), and does not use any authentication or security technique, beyond the simple ones described below.

To guarantee the confidentiality of the information exchanged between the participants and the web server, the application is only accessible via secured HTTP, with a certificate that has been generated by Certbot (https://certbot.eff.org/) using Let's Encrypt (https://letsencrypt.org/) certificate authority.

The application uses a Captcha (see Section 3.2) to prevent bots from automatically participating in the experiment and massively feeding the database with fake data. When the participant answers to the Captcha, a random identifier (uuid) is generated for this user. This uuid is used throughout the experiment to uniquely identify the user and let her modify her answers to the questions as long as this identifier is still marked as "open" (see Section 3.2).

However, it is important to notice that beyond the Captcha challenge, the application has no protection against multiple participation. This choice has been made on purpose. Protecting the application against multiple participation would have meant either storing some critical identifying information like the IP address or the name of the participant or relying on an external authentication authority (like a social network for instance). Neither solution appeared to be desirable to us, from the point of view of privacy. Hence, when exploiting the data, it must be kept in mind that some voters may have participated several times, as we only rely on participants' honesty.

3.2. The Sequence of Actions

When a participant enters the website and chooses to take part to the experiment, she is asked to go through several successive steps. Each step corresponds to a different screen. Any step can be skipped and the participant can go back to a previous step to modify previous answers. The answers are persistently saved after after each step. A progressbar is displayed on each screen so as to give some information about the progression of the voter in the process. The overall process should not take more than 10 minutes to a participant.

Every voter goes through the following steps in this precise order:

1. Welcome screen
2. Voting methods:
    (a) one range ballot (the possible scales for the range ballot are $\{0, 1, 2\}$, $\{0, 1, 2, 3\}$, $\{-1, 0, 1, 2\}$, $\{-1, 0, 1\}$ or $\{0, 1\}$ — approval);
    (b) one ranking ballot among the three following ones: Borda-4, 4-11-IRV, or 1-11-IRV
    (c) one range ballot different from the one proposed in Step 2a.
3. Opinion on candidates:
    (a) opinion on a continuous scale
    (b) pairwise comparisons
4. Questionnaire
5. Confirmation screen

The exact sequence of screens is randomly uniformly chosen from the set of sequences that match the latter model.

The welcome screen (Step 1) just presents the experiment in a few lines, and uses a simple Captcha (see Figure 1) to prevent (or at least discourage) bots to participate.

The confirmation screen at the end of the experiment (Step 5) just asks the participant to click a button to finish the participation (and offers her to go back and modify the answers). Once this button is clicked, the voter is marked as "closed" in the database, and as a result, she cannot modify her answers anymore. If a participant never clicks this button, her answers are stored anyway, but this participant is still marked as "open". As a result, these answers will not be exported in the dataset (see Section 4).

Figure 1: The Captcha displayed on the welcome screen.

3.3. Voting methods

After the welcome screen, the core of the experiment begins. For the voting part, the main difficulty was to find for each kind of voting method a simple and intuitive way of representing the ballot. The ballot should be an interactive (almost) self-explanatory screen that allows the participant to vote, that is, depending on the voting method, either to give a score to each candidate, or to rank a subset of candidates.

The ballots should not favour any candidate. In practice, in the official election, the order in which the candidates appear for any public communication is chosen at random and fixed once for all by the *Conseil Constitutionnel* at the beginning of the electoral period. In our case, we simply shuffle the candidates at each screen. Once the order of the candidates has been randomly chosen for a given screen, this order is stored in database, and whenever the participant goes back to this screen, the order will be the same.

In each voting screen, on top of the ballot, a small text explains how to use the ballot, and how the winner is computed. This text should be less than a few lines long to be useful. Note that we do not give any explicit tie-breaking rule, because it would make the explanation slightly longer and more complex, and because the odds of needing this tie-breaking rule in practice are extremely low.

The ballot screens for range voting methods are shown in Figure 2. The interface is rather simple: the candidates are shown from top to bottom. Each candidate has an associated radio button for the voter (a checkbox for approval voting) to enter her score. If the voter does not give any score to a candidate, this is interpreted as an abstention for the candidate, which is itself equivalent as giving the worst score for this candidate (see Section 3.3).

The ballot screens for ranking voting methods are a bit more elaborate. They use drag-and-drop interaction to rank the candidate. The ballot is made of two frames: one for non-ranked candidates, another one for ranked candidates. When the ballot appears for the first time, all the candidates are on the left (non ranked) frame (see Figure 3, left). When a voter drags-and-drops a candidate from the left frame to the right one, this candidate is added to the current truncated order (see Figure 2, right). The voter can also change the order of the ranked candidates by drag-and-dropping them inside the right frame itself.

Additionally, an info box on top of the ballot tells the voter whether the number of ranked candidates is enough or whether she still has to rank more candidates. For the ranking ballot dedicated to Borda-4, an information about the number of points won by each ranked candidate is given next to the candidate's name. For instance, next to the candidate ranked first, a small text indicates "4 points".

3.4. Opinion

After having tested three voting methods (two range voting screens and one ranking voting screen), the participant is asked to give her opinion about the candidates, using two different modalities. As explained in Section 2.2, an opinion language only differs from a voting method on the fact that there is no associated explicit rule that elects a winning candidate from a set of preferences.

On the first screen of the opinion part, the participant is asked to give a score to each candidate on a continuous scale. To do that, we use sliders to represent the continuous scale (see Figure 4, left). The voter can click on the sliders, and move the cursor from left (hostile) to right (in favour of). Each slider has exactly 100 different positions, which is empirically enough to simulate a continuous scale. To make the meaning of the scale clear, three emoticons representing the hostile area, the indifference area, and the favourable area are displayed at the bottom of each slider. The voter can also click on them to change the position of the
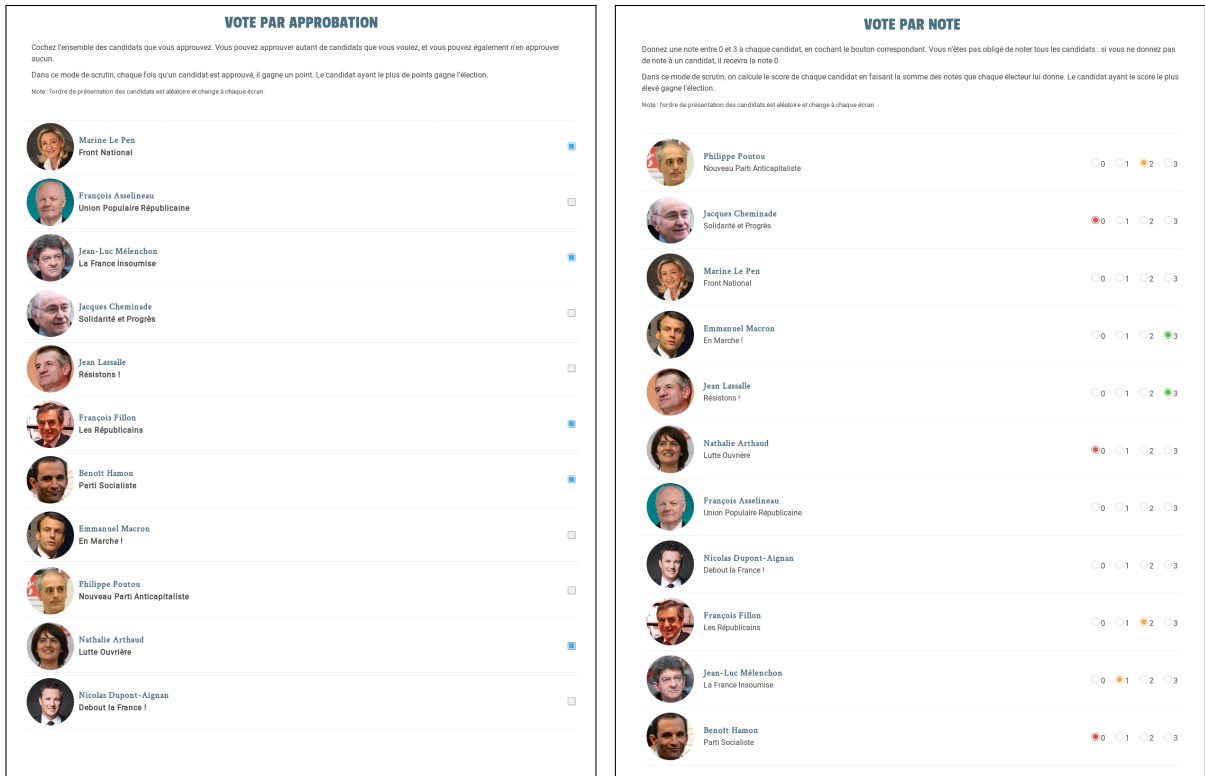
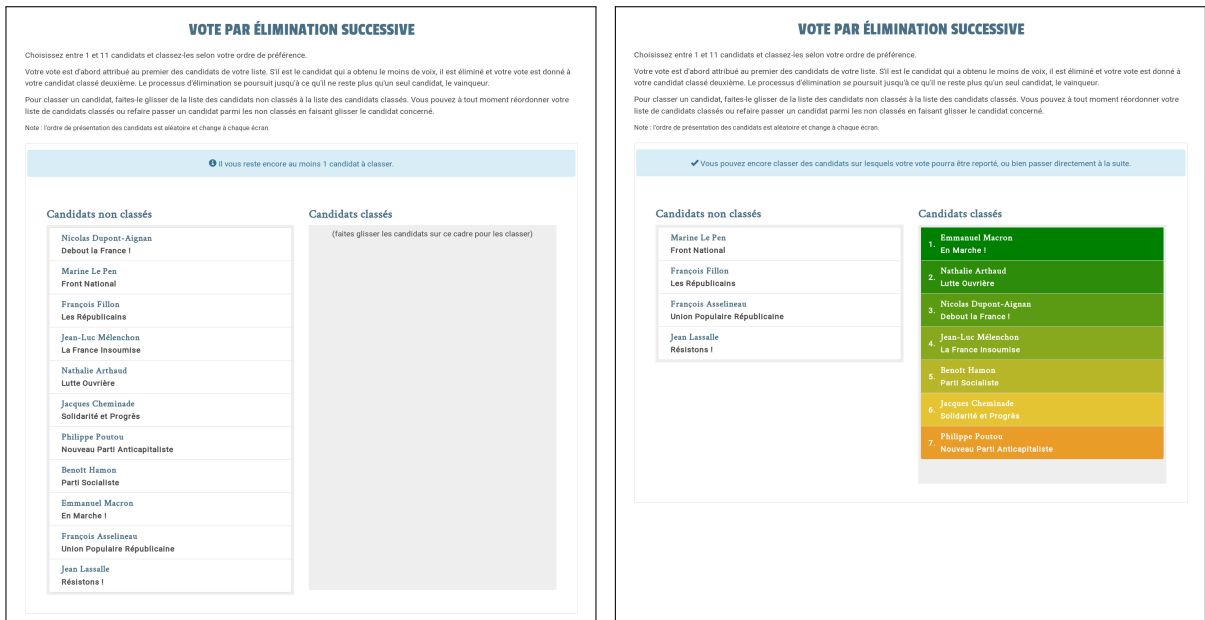Figure 2: The ballot for range voting methods. Left: approval voting. Right: 0-1-2-3-range voting.

Figure 3: The ballot for ranking voting methods (here: (1-11)-instant-runoff voting). When the screen first shows up (left picture), all the candidates are non-ranked. The voter must drag-and-drop candidates on the right frame to rank them (right picture).

cursor to leftest, middle and rightest positions respectively. Additionally, the cursor colour changes linearly with its position, from red (left) to yellow (middle), to green (right).

As in range voting, the participant can choose to give no evaluation for a given candidate, which is represented by the fact that the corresponding slider has no cursor at all. When the screen first shows up, all the sliders are in this situation. As soon as the voter clicks on a slider, a cursor is put on this slider, and hence a score is set for this candidate. At the same time, a red cross appears at the right of the slider. If the voter changes her mind and finally wants to abstain about this candidate, she can click on the cross to remove the cursor from the slider (and hence to remove the score for this candidate).
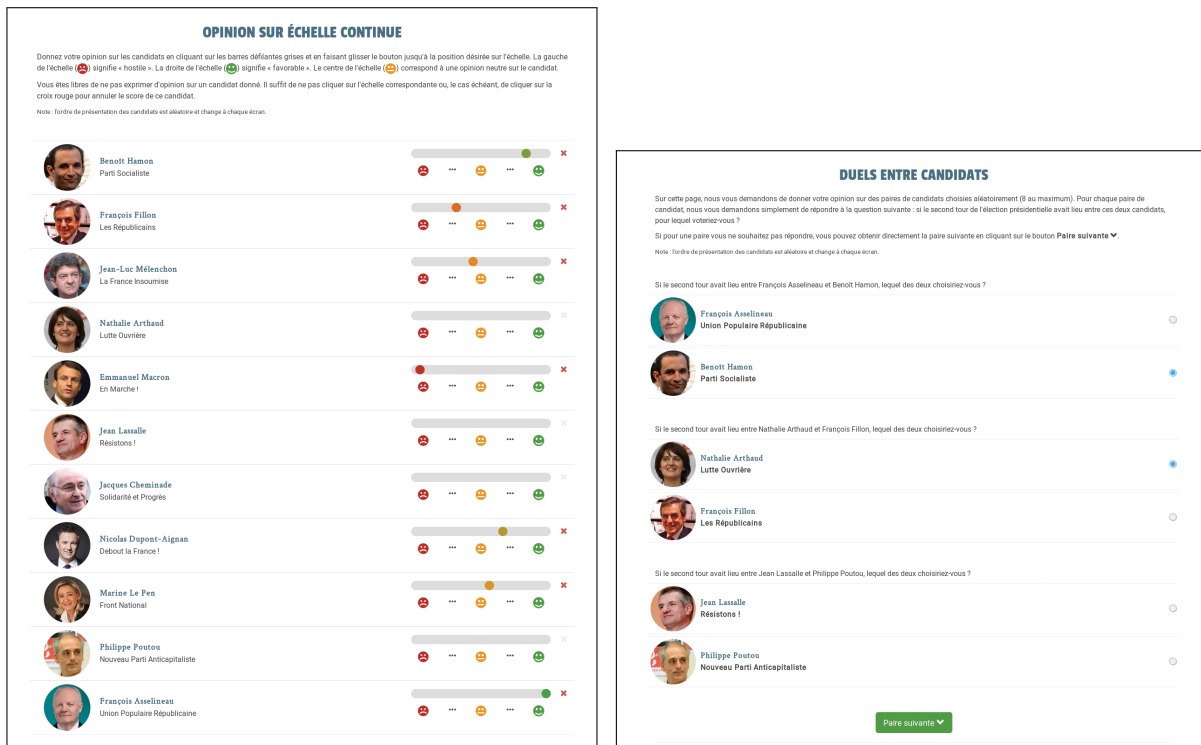

Figure 4: The two opinion screens. On the left, the continuous opinion screen. On the right, pairwise comparison.

The second opinion screen is dedicated to pairwise comparisons. When the participant arrives on this screen, a pair of candidates is shown, with a radio button for each candidate (see Figure 4, right). The participant is asked which candidate she would vote for if these candidates were both selected for the second round of the official election. The user can click on a button at the bottom of the page to reveal a next pair of candidates. The voter can stop doing pairwise evaluations whenever she wants, and in all cases is never asked to evaluate more than 8 pairs (after that, the button revealing the next pair disappears).

The 8 pairs proposed to the voter are chosen uniformly at random at first appearance of the screen among all the 8-uples of pairs of candidates that satisfy the following constraint: each candidate should appear at least once and at most twice in the 8 pairs. This ensures that the same voter will not have to rank too much times the same candidate, and that all the candidates are well represented.

3.5. Questionnaire

The last step of the experimentation is dedicated to a questionnaire. The objective is to know more about the participant, concerning her political opinions and her profile. Most questions are presented in the form of check-boxes or radio buttons for simplicity. The participant is free to answer to the questions she wants and can skip any question.

The questionnaire is made of four parts:

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- first round of the official election;

- opinion about the voting methods tested;

- political opinions;

- socio-professional profile.

3.5.1. Official First Round

The questionnaire begins with some questions about the first round of the official election. Since the experiment was carried out the month before the first round, and until the end of the second round, this part of the questionnaire changed after the first round to include more questions.

The only question that was asked in this part of the questionnaire before the first round was the following one: What do you plan to do at the first round of the official election? (vote for candidate X / blank / abstain / I do not have the right to vote / I do not know yet).

After the first round of the official election, we included more questions in order to evaluate the potential regret of the voters. The questions are the following:

- What did you do at the first round of the official election? (vote for candidate X / blank / abstain / I do not have the right to vote / I do not want to answer)

- Did you vote sincerely? (yes / no)

- Did you vote strategically? (yes / no)

- Did you have another motivation? (free text)

- Now that you know the results of the first round, do you think you did the right choice? (-2 = not at all / -1 = rather not / 1 = rather yes / 2 = absolutely)

- If you could vote again, what would you do? (vote for candidate X / blank / abstain / I do not have the right to vote / I do not want to answer)

- If you are not satisfied, is it because you should have voted sincerely? (yes / no)

- If you are not satisfied, is it because you should have voted strategically? (yes / no)

- If you are not satisfied, is it for another reason? (free text)

- What do you plan to do for the second round of the official election? (vote for candidate X / blank / abstain / I do not have the right to vote / I do not know)

After the first round, this new questionnaire was shown to the new participants in replacement of the previous one. Moreover, we also put a direct link from the home page of the experiment for people who did only want to answer to this new questionnaire, without doing the rest of the experiment.

3.5.2. Opinion About the Voting Methods

In the second part of the questionnaire, we ask the participant what she thinks about the three voting methods she tested, and what she thinks about plurality with runoff that is used for the official election. For each voting method, the user is asked to give an evaluation on the five-level scale "unsatisfied", "mostly unsatisfied", "indifferent", "mostly satisfied", "satisfied".

3.5.3. Political Profile

The third part is dedicated to political opinions. The part begins with the 4 following yes / no questions: For you, is voting a right? A duty? A chance? Useful? Then, we ask the voter to evaluate her own position on a political left-right scale graduated from 0 (left) to 10 (right).

3.5.4. Socio-professional Profile

Finally, we ask for some basic socio-professional facts:

- gender (woman / man / I prefer not to answer);

- age (18-29 / 30-39 / 40-49 / 50-59 / 60-69 / 70+ / I prefer not to answer);

- studies (basic / intermediate / higher / I prefer not to answer)

- socio-professional category (self-employed independent profession / employee in the private sector / employee in the public sector / unemployed / student / other)

3.6. QR Code Access

As explained in Section 3.1.2, one of the main issues with the experiment is that it is not possible to authenticate users and protect the application from multiple participation without giving up on privacy. As a result, it also seems difficult to precisely control the population participating to the experiment to ensure *e.g.* basic statistical representation properties.

As a partial workaround to this problem, we have developed an authentication system based on the distribution of QR codes to a given population $\mathcal{P}$. The idea is the following. First, the program randomly generates a set of users in the database. For each user, it generates a personal direct access URL, and a QR code that directly points to this URL. With this URL, a participant can directly access the experiment and be authenticated as a participant from population $\mathcal{P}$. In the end, it is thus possible to isolate the set of participants from population $\mathcal{P}$. If we can ensure that no physical participant received more than one URL and associated QR code, then we can ensure that no voter participated twice to the experiment. Moreover, if our population satisfies representation properties (or if we have a ground truth about this population, like the results at the official election), the results concerning this population are more representative.

The crucial privacy-preserving issue in this process is that we must ensure that it is not possible to match physical people with their participant identifier (or QR code), and hence, the association between people and identifiers must not be stored anywhere.

We tested this approach during the *in situ* experiment that took place in 3 polling stations in Grenoble during the first round of the official election. Before this experiment, we generated 2500 users and printed a paper with the personal URL and QR code for each of these generated users (see Figure 5). We distributed one paper to each of the participants to the *in situ* experiment.

In the end, only 86 persons participated to the experiment with this QR code, which is not enough to have representative results on the polling stations considered. However, we still believe that this approach is of interest because it can be an interesting trade-off between anonymity requirements and control of the population targeted by the experiment.

4. The Dataset

In this section, we will describe the dataset that has been produced from the answers received from the 37739 participants. We specify where this data can be found, under which format it is provided and under which licence it can be used.

4.1. Licence and Repository

The data can be downloaded from the open science platform Zenodo (https://zenodo.org/). The repository of the project is available at the following URL:

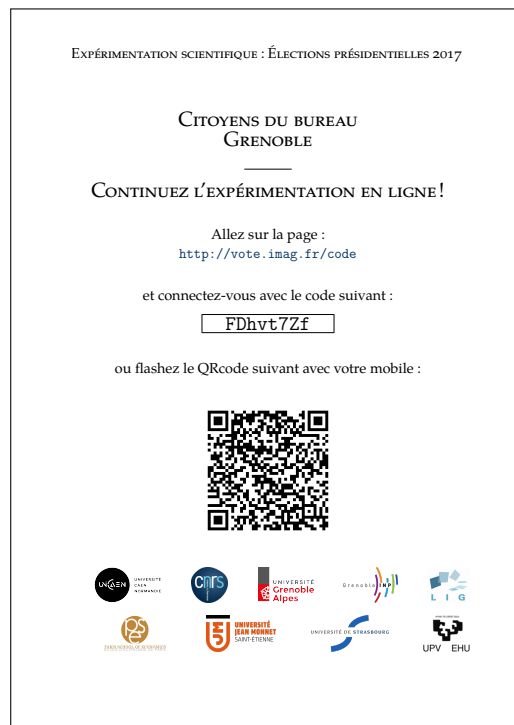https://doi.org/10.5281/zenodo.1199545

Figure 5: One QR Code participation paper distributed at the end of the in situ experiment.

The dataset Voter Autrement is made available under the Open Database License: `http://opendatacommons.org/licenses/odbl/1.0/`. Any rights in individual contents of the database are licensed under the Database Contents License: `http://opendatacommons.org/licenses/dbcl/1.0/`

Any written publication based on this dataset must explicitly cite the dataset and this present article as a reference. The appropriate way to cite them is the following:

[1] Bouveret, S., Blanch, R., Baujard, A., Durand, F., Igersheim, H., Lang, J., Laruelle, A., Laslier, J.-F., Lebon, I., Merlin, V., July 2018. Voter autrement 2017 - online experiment. Dataset and companion article on Zenodo.
URL `https://doi.org/10.5281/zenodo.1199545`

The BIBTEX format of this reference (which can also be exported from the aforementioned Zenodo repository) is the following:

```
@Misc{voterautrement2018,
  author =       {Bouveret, Sylvain and Blanch, Renaud and Baujard,
                  Antoinette and Durand, Fran\c{c}ois and Igersheim,
                  Herrade and Lang, J\'er\^ome and Laruelle, Annick
                  and Laslier, Jean-Fran\c{c}ois and Lebon, Isabelle
                  and Merlin, Vincent},
  title =        {Voter Autrement 2017 - Online Experiment},
  howpublished = {Dataset and companion article on Zenodo},
  month =        {July},
  year =         2018,
  doi =          {10.5281/zenodo.1199545},
  url =          {https://doi.org/10.5281/zenodo.1199545}
}
```

4.2. Content Description

The dataset is made of 14 files in the Comma Separated Format with Headers. In each file, there is a set of lines starting with "#" that should be interpreted as comments and should not be taken into account

when exploiting the dataset. The first uncommented line corresponds to the header of the columns. The subsequent ones contain the data itself.

In each file, one row represents one participant, identified by a number. These numbers do not correspond at all to the identifying numbers used in the web application. However, these numbers are *consistent* across the files, in the sense that if a voter number appears in two different CSV files, it indeed corresponds to the same participant. Each file corresponds to a different voting rule (or questionnaire). Additionally, a file entitled `merged.csv` joins the information from all the files into one single CSV file.

Extraction process. To create the different CSV files, SQL scripts have been used to extract the raw information stored in the Postgres database and create temporary CSV files. Then, these temporary files have been processed with Python scripts to create the final CSV files. In parallel and independently to this process, we have written a set of python scripts that directly read the Postgres database and tests the consistency of the CSV files compared to the database. Thanks to this set of unit tests, we have been able to detect and correct several mistakes. The extraction and testing scripts are available upon request to the contact author of this paper.

The detailed content of the dataset is described in Appendix A.

5. Conclusion

We have presented in this paper the experimental protocol we followed for the online part of the experiment Voter Autrement 2017. We have also provided an extensive description of the web application (which can still be tested online). Finally, we have given some details on the data sets we have built from the answers of the participants. The details provided in this paper should give enough information to anyone willing to exploit the data collected during this experiment.

Appendix A. Detailed content of the dataset

Appendix A.1. approval.csv (988 Kib)

This CSV file concerns the approval voting method. Meaning of the scores: 0 = not approved / 1 = approved.

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.2. ev0123.csv (632 KiB)

This CSV file concerns $\{0, 1, 2, 3\}$-range voting. If the score for a given candidate is empty, it means that the voter did not evaluate the candidate (means the least score).

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.3. ev012.csv (312 KiB)

This CSV file concerns $\{0, 1, 2\}$-range voting. If the score for a given candidate is empty, it means that the voter did not evaluate the candidate (means the least score).

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.4. ev-1012.csv (708 KiB)

This CSV file concerns $\{-1, 0, 1, 2\}$-range voting. If the score for a given candidate is empty, it means that the voter did not evaluate the candidate (means the least score).

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.5. ev-101.csv (704 KiB)

This CSV file concerns $\{-1, 0, 1\}$-range voting. If the score for a given candidate is empty, it means that the voter did not evaluate the candidate (means the least score).

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.6. borda4.csv (488 KiB)

This CSV file concerns the Borda-4 voting method. Meaning of the scores: 11 = first / 10 = second / 9 = third / 8 = fourth / nothing = not ranked.

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.7. stv111.csv (512 MiB)

This CSV file concerns the STV-1 − 11 voting method (voters were asked to rank between 1 and 11 candidates). Meaning of the scores: 11 = first / 10 = second / 9 = third / 8 = fourth / ... / 1 = last candidate / nothing = not ranked. Here the STV rule is used to elect the winner.

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.8. stv411.csv (512 KiB)

This CSV file concerns the STV-$4 - 11$ voting method (voters were asked to rank between 4 and 11 candidates). Meaning of the scores: 11 = first / 10 = second / 9 = third / 8 = fourth / ... / 1 = last candidate / nothing = not ranked. Here the STV rule is used to elect the winner.

Description of the columns:

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.9. evcontinuous.csv (1.8 MiB)

This CSV file concerns the continuous opinion form. Here, participants were asked to give a score to each candidate, on the pseudo-continuous scale $\{0, 1, ..., 100\}$. This is not a voting rule *per se*: the participants are free to not evaluate a candidate, in which case, it just means no information (we do not translate it into a score).

- Column 1: Voter number

- Column 2: score of Nathalie Arthaud

- Column 3: score of François Asselineau

- Column 4: score of Jacques Cheminade

- Column 5: score of Nicolas Dupont-Aignan

- Column 6: score of François Fillon

- Column 7: score of Benoît Hamon

- Column 8: score of Jean Lassalle

- Column 9: score of Marine Le Pen

- Column 10: score of Emmanuel Macron

- Column 11: score of Jean-Luc Mélenchon

- Column 12: score of Philippe Poutou

- Column 13: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.10. condorcet.csv (8,4 MiB)

This CSV file concerns the random pairs opinion form. Here, random pairs of candidates were presented to the participants. For each pair, they were asked who they think the best candidate of the two is. Participants could evaluate up to eight pairs (but could stop before the end).

- Column 1: Voter number

- Column 2: Winner of the first duel

- Column 3: Loser of the first duel

- Column 4: Winner of the second duel

- Column 5: Loser of the second duel

- Column 6: Winner of the third duel

- Column 7: Loser of the third duel

- Column 8: Winner of the fourth duel

- Column 9: Loser of the fourth duel

- Column 10: Winner of the fifth duel

- Column 11: Loser of the fifth duel

- Column 12: Winner of the sixth duel

- Column 13: Loser of the sixth duel

- Column 14: Winner of the seventh duel

- Column 15: Loser of the seventh duel

- Column 16: Winner of the eighth duel

- Column 17: Loser of the eighth duel

- Column 18: vote at the first round of the official election (extracted from the questionnaire)

Appendix A.11. questionnaire.csv (2,8 MiB)

This CSV file compiles the answers given by the participant to the questionnaire they had to fill at the end of the experiment (version proposed to the participants *before* the first round of the official election). For most questions, the participants were free not to answer at all (empty value) or explicitly they do not want to answer (value "nspp").

- Column 1: Voter number

- Colums 2-12: Appreciation of voting methods (-2, -1, 0, 1, 2) (NP) means that the voter did not test this method. No value means that the voter did not answer.

  - Column 2: Approval
  - Column 3: Evaluation 0/1/2
  - Column 4: Evaluation 0/1/2/3
  - Column 5: Evaluation -1/0/1/2
  - Column 6: Evaluation -1/0/1
  - Column 7: Borda 4
  - Column 8: STV 4-11
  - Column 9: STV 1-11
  - Column 10: Evaluation Continuous
  - Column 11: Condorcet
  - Column 12: two round majority

- Column 13: what do you plan to do at the first round of the official election? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 14: vote is a right (t = yes / f = no)

- Column 15: vote is a duty (t = yes / f = no)

- Column 16: vote is a chance (t = yes / f = no)

- Column 17: vote is useful (t = yes / f = no)

- Column 18: evaluate your position on a left / right axis (0 = left ... 10 = right)

- Column 19: age group (18-29, 30-39, 40-49, 50-59, 60-69, 70)

- Column 20: gender (h = male / f = female)

- Column 21: level of education (primaire = basic / secondaire = intermediate / superieur = higher)

- Column 22: socio-professional category (liberal = "profession libérale", approximately self-employed independent profession / prive = employee in the private sector / public = employee in the public sector / chomage = unemployed / etudiant = student / autre = other)

Appendix A.12. questionnaire-regret.csv (1.6 MiB)

This CSV file compiles the answers given by the participant to the questionnaire they had to fill at the end of the experiment (version proposed to the participants *after* the first round of the official election). For most questions, the participants were free not to answer at all (empty value) or explicitly they do not want to answer (value "nspp").

- Column 1: Voter number

- Columns 2-12: Appreciation of voting methods (-2, -1, 0, 1, 2) (NP) means that the voter did not test this method. No value means that the voter did not answer.

  - Column 2: Approval
  - Column 3: Evaluation 0/1/2
  - Column 4: Evaluation 0/1/2/3
  - Column 5: Evaluation -1/0/1/2
  - Column 6: Evaluation -1/0/1
  - Column 7: Borda 4
  - Column 8: STV 4-11
  - Column 9: STV 1-11
  - Column 10: Evaluation Continuous
  - Column 11: Condorcet
  - Column 12: two round majority

- Column 13: what did you do at the first round of the official election? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 14: did you vote sincerely? (t = yes / f = no)

- Column 15: did you vote strategically? (t = yes / f = no)

- Column 16: did you have another motivation? (free text)

- Column 17: now that you know the results of the first round, do you think you did the right choice? (-2 = not at all / -1 = rather not / 1 = rather yes / 2 = absolutely)

- Column 18: if you could revote, what would you do? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 19: if you are not satisfied, is it because you should have voted sincerely? (t = yes / f = no)

- Column 20: if you are not satisfied, is it because you should have voted strategically? (t = yes / f = no)

- Column 21: if you are not satisfied, is it for another reason? (free text)

- Column 22: What do you plan to do for the second round of the official election? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 23: vote is a right (t = yes / f = no)

- Column 24: vote is a duty (t = yes / f = no)

- Column 25: vote is a chance (t = yes / f = no)

- Column 26: vote is useful (t = yes / f = no)

- Column 27: evaluate your position on a left / right axis (0 = left ... 10 = right)

- Column 28: age group (18-29, 30-39, 40-49, 50-59, 60-69, 70)

- Column 29: gender (h = male / f = female)

- Column 30: level of education (primaire = basic / secondaire = intermediate / superieur = higher)

- Column 31: socio-professional category (liberal = "profession libérale", approximately self-employed independent profession / prive = employee in the private sector / public = employee in the public sector / chomage = unemployed / etudiant = student / autre = other)

Appendix A.13. merged.csv (41 MiB)

This CSV file joins all the previous CSV files into one big single file. Technically, it performs a full outer join, using the voter identifier as join condition, and leaving the column blank for NULL values.

Description of the columns:

- Column 1: Voter number

- Columns 2-13: approval scores

  - Column 2: score of Nathalie Arthaud
  - Column 3: score of François Asselineau
  - Column 4: score of Jacques Cheminade
  - Column 5: score of Nicolas Dupont-Aignan
  - Column 6: score of François Fillon
  - Column 7: score of Benoît Hamon
  - Column 8: score of Jean Lassalle
  - Column 9: score of Marine Le Pen
  - Column 10: score of Emmanuel Macron
  - Column 11: score of Jean-Luc Mélenchon
  - Column 12: score of Philippe Poutou
  - Column 13: correction weight to apply to participants to approval

- Columns 14-25: Evaluation 0/1/2 scores

  - Column 14: score of Nathalie Arthaud
  - Column 15: score of François Asselineau
  - Column 16: score of Jacques Cheminade
  - Column 17: score of Nicolas Dupont-Aignan
  - Column 18: score of François Fillon
  - Column 19: score of Benoît Hamon
  - Column 20: score of Jean Lassalle
  - Column 21: score of Marine Le Pen
  - Column 22: score of Emmanuel Macron
  - Column 23: score of Jean-Luc Mélenchon
  - Column 24: score of Philippe Poutou
  - Column 25: correction weight to apply to participants to evaluation 0/1/2

- Columns 26-37: Evaluation 0/1/2/3 scores
    - Column 26: score of Nathalie Arthaud
    - Column 27: score of François Asselineau
    - Column 28: score of Jacques Cheminade
    - Column 29: score of Nicolas Dupont-Aignan
    - Column 30: score of François Fillon
    - Column 31: score of Benoît Hamon
    - Column 32: score of Jean Lassalle
    - Column 33: score of Marine Le Pen
    - Column 34: score of Emmanuel Macron
    - Column 35: score of Jean-Luc Mélenchon
    - Column 36: score of Philippe Poutou
    - Column 37: correction weight to apply to participants to evaluation 0/1/2/3

- Columns 38-49: Evaluation -1/0/1/2 scores
    - Column 38: score of Nathalie Arthaud
    - Column 39: score of François Asselineau
    - Column 40: score of Jacques Cheminade
    - Column 41: score of Nicolas Dupont-Aignan
    - Column 42: score of François Fillon
    - Column 43: score of Benoît Hamon
    - Column 44: score of Jean Lassalle
    - Column 45: score of Marine Le Pen
    - Column 46: score of Emmanuel Macron
    - Column 47: score of Jean-Luc Mélenchon
    - Column 48: score of Philippe Poutou
    - Column 49: correction weight to apply to participants to evaluation -1/0/1/2

- Columns 50-61: Evaluation -1/0/1 scores
    - Column 50: score of Nathalie Arthaud
    - Column 51: score of François Asselineau
    - Column 52: score of Jacques Cheminade
    - Column 53: score of Nicolas Dupont-Aignan
    - Column 54: score of François Fillon
    - Column 55: score of Benoît Hamon
    - Column 56: score of Jean Lassalle
    - Column 57: score of Marine Le Pen
    - Column 58: score of Emmanuel Macron
    - Column 59: score of Jean-Luc Mélenchon
    - Column 60: score of Philippe Poutou

– Column 61: correction weight to apply to participants to evaluation -1/0/1

- Columns 62-73: Borda 4 scores

  – Column 62: score of Nathalie Arthaud
  – Column 63: score of François Asselineau
  – Column 64: score of Jacques Cheminade
  – Column 65: score of Nicolas Dupont-Aignan
  – Column 66: score of François Fillon
  – Column 67: score of Benoît Hamon
  – Column 68: score of Jean Lassalle
  – Column 69: score of Marine Le Pen
  – Column 70: score of Emmanuel Macron
  – Column 71: score of Jean-Luc Mélenchon
  – Column 72: score of Philippe Poutou
  – Column 73: correction weight to apply to participants to Borda 4

- Columns 74-85: STV 4-11 scores

  – Column 74: score of Nathalie Arthaud
  – Column 75: score of François Asselineau
  – Column 76: score of Jacques Cheminade
  – Column 77: score of Nicolas Dupont-Aignan
  – Column 78: score of François Fillon
  – Column 79: score of Benoît Hamon
  – Column 80: score of Jean Lassalle
  – Column 81: score of Marine Le Pen
  – Column 82: score of Emmanuel Macron
  – Column 83: score of Jean-Luc Mélenchon
  – Column 84: score of Philippe Poutou
  – Column 85: correction weight to apply to participants to STV 4-11

- Columns 86-97: STV 1-11 scores

  – Column 86: score of Nathalie Arthaud
  – Column 87: score of François Asselineau
  – Column 88: score of Jacques Cheminade
  – Column 89: score of Nicolas Dupont-Aignan
  – Column 90: score of François Fillon
  – Column 91: score of Benoît Hamon
  – Column 92: score of Jean Lassalle
  – Column 93: score of Marine Le Pen
  – Column 94: score of Emmanuel Macron
  – Column 95: score of Jean-Luc Mélenchon

- – Column 96: score of Philippe Poutou
- – Column 97: correction weight to apply to participants to STV 1-11

- Columns 98-109: Evaluation Continuous scores

  - – Column 98: score of Nathalie Arthaud
  - – Column 99: score of François Asselineau
  - – Column 100: score of Jacques Cheminade
  - – Column 101: score of Nicolas Dupont-Aignan
  - – Column 102: score of François Fillon
  - – Column 103: score of Benoît Hamon
  - – Column 104: score of Jean Lassalle
  - – Column 105: score of Marine Le Pen
  - – Column 106: score of Emmanuel Macron
  - – Column 107: score of Jean-Luc Mélenchon
  - – Column 108: score of Philippe Poutou
  - – Column 109: correction weight to apply to participants to Continuous

- Columns 110-121: Random pairs

  - – Column 110: Winner of the first duel
  - – Column 111: Loser of the first duel
  - – Column 112: Winner of the second duel
  - – Column 113: Loser of the second duel
  - – Column 114: Winner of the third duel
  - – Column 115: Loser of the third duel
  - – Column 116: Winner of the fourth duel
  - – Column 117: Loser of the fourth duel
  - – Column 118: Winner of the fifth duel
  - – Column 119: Loser of the fifth duel
  - – Column 120: Winner of the sixth duel
  - – Column 121: Loser of the sixth duel
  - – Column 122: Winner of the seventh duel
  - – Column 123: Loser of the seventh duel
  - – Column 124: Winner of the eight duel
  - – Column 125: Loser of the eight duel
  - – Column 126: correction weight to apply to participants to Random Pairs

- Colums 127-137: Appreciation of voting methods (-2, -1, 0, 1, 2) (NP) means that the voter did not test this method. No value means that the voter did not answer.

  - – Column 127: Approval
  - – Column 128: Evaluation 0/1/2
  - – Column 129: Evaluation 0/1/2/3

- Column 130: Evaluation -1/0/1/2
- Column 131: Evaluation -1/0/1
- Column 132: Borda 4
- Column 133: STV 4-11
- Column 134: STV 1-11
- Column 135: Evaluation Continuous
- Column 136: Condorcet
- Column 137: two round majority

- Column 138: what do you plan to do / did you do at the first round of the official election? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 139: did the voter answer to the first questionnaire or to the post first round (regret) questionnaire ? (f = first questionnaire / t = post first round questionnaire)

- Columns 140-148: post first round questionnaire:

  - Column 140: did you vote sincerely? (t = yes / f = no)
  - Column 141: did you vote strategically? (t = yes / f = no)
  - Column 142: did you have another motivation? (free text)
  - Column 143: now that you know the results of the first round, do you think you did the right choice?
  - (-2 = not at all / -1 = rather not / 1 = rather yes / 2 = absolutely)
  - Column 144: if you could revote, what would you do? (vote for candidate X / blanc = blank /
  - abstention = abstain / ni = I do not have the right to vote / nspp)
  - Column 145: if you are noty satisfied, is it because you should have voted sincerely? (t = yes / f = no)
  - Column 146: if you are noty satisfied, is it because you should have voted strategically? (t = yes / f = no)
  - Column 147: if you are noty satisfied, is it for another reason? (free text)
  - Column 148: What do you plan to do for the second round of the official election? (vote for candidate X / blanc = blank / abstention = abstain / ni = I do not have the right to vote / nspp)

- Column 149: vote is a right (t = yes / f = no)

- Column 150: vote is a duty (t = yes / f = no)

- Column 151: vote is a chance (t = yes / f = no)

- Column 152: vote is useful (t = yes / f = no)

- Column 153: evaluate your position on a left / right axis (0 = left ... 10 = right)

- Column 154: age group (18-29, 30-39, 40-49, 50-59, 60-69, 70)

- Column 155: gender (h = male / f = female)

- Column 156: level of education (primaire = basic / secondaire = intermediate / superieur = higher)

- Column 157: socio-professional category (liberal = "profession libérale", approximately self-employed independent profession / prive = employee in the private sector / public = employee in the public sector / chomage = unemployed / etudiant = student / autre = other)

Appendix A.14. vote-counts.csv (4.0 KiB)

This CSV file compiles the number of voters per candidate at the official election, for each voting method (called "Ballot box"). This can be useful for bias correction.

Description of the columns:

- Column 1: Ballot box (one of Official Election, Approval, Evaluation 0/1/2, Evaluation 0/1/2/3, Evaluation -1/0/1/2, Evaluation -1/0/1, Borda 4, STV 4-11, STV 1-11, Evaluation Continuous, Condorcet)

- Column 2: number of voters of Nathalie Arthaud

- Column 3: number of voters of François Asselineau

- Column 4: number of voters of Jacques Cheminade

- Column 5: number of voters of Nicolas Dupont-Aignan

- Column 6: number of voters of François Fillon

- Column 7: number of voters of Benoît Hamon

- Column 8: number of voters of Jean Lassalle

- Column 9: number of voters of Marine Le Pen

- Column 10: number of voters of Emmanuel Macron

- Column 11: number of voters of Jean-Luc Mélenchon

- Column 12: number of voters of Philippe Poutou

- Column 13: number of uncertain voters (pre-election questionnaire)

- Column 14: number of blank votes

- Column 15: number of abstainers

- Column 16: number of participants that are not registered on the official voter registry and hence cannot vote at the official election

- Column 17: number of participants who did not want to answer to the question

- Column 18: number of participants who did not answer to the question

- Column 20: total number of participants to this ballot box