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École Polytechnique and CNRS, Paris

(Joint work with Rida Laraki)

Workshop: New Developments in Judgment Aggregation and Voting Theory
Freudenstadt-Lauterbad, September 9, 2011
1 The Thesis

2 Voting Practice

3 Majority Judgment
The current state of affairs
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- The traditional model is inadequate: the inputs voters are assumed to have in mind are neither natural nor realistic.

- The theory which results is inconsistent and contradictory.
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- **Condorcet’s paradox**: with at least three candidates $A$, $B$, and $C$, it is possible that $A \succ_S B \succ_S C \succ_S A$. 

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- **Condorcet’s paradox**: with at least three candidates $A$, $B$, and $C$, it is possible that $A \succ_S B \succ_S C \succ_S A$.

- **Arrow’s paradox**: with at least three candidates, it is possible that $A$ wins, but that when $C$ withdraws and the preferences remain the same, $B$ defeats $A$. 

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- **Incompatibility theorem**: There is no rule for amalgamating any set of individual rank-orders into society’s rank-order for which the first place candidate is necessarily the winner.
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\[1 \text{ inch} + 1 \text{ foot} + 1 \text{ meter} = 3.\]
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*Range voting*—scores are given to candidates in a scale of [0, 100] and they are ranked by their total or average scores—is meaningless because scores have no definitions and the scale is not an interval scale.
Judge don’t rank!
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**Theorem**

An impartial method of ranking avoids the Arrow and Condorcet paradoxes if and only if rankings depend only on competitors’ grades (not who gave them).
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They are analyzed as *social-grading functions*—that assign final grades—and as *social-ranking functions*—that determine an order-of-finish.
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6. Heeds the majority’s will.
The Thesis

Voting Practice

Majority Judgment

Judge: Don't Vote!
Why majority voting fails
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- G. W. Bush elected in 2000: had Nader not been a candidate in Florida, the state would have been carried by Gore, and Gore would have won with 291 electoral votes to Bush’s 246.
Why majority voting fails
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The French debacle of 2002. First round (16 candidates, 72% participation):

<table>
<thead>
<tr>
<th>Candidate</th>
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- Chirac’s 82.2% in second round means little and in nothing does it measure the electorate’s wish for him to be elected (80.1% did not vote for him in first round).
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- Vote honestly for her favorite (if she has one), even if he has no chance to win?
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Democracy is denied by the very system that defines it!
Majority voting

Poll of 6-7 April 2011 carried out for Terra Nova by OpinionWay:
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<tr>
<th>Candidate</th>
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<tbody>
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<td>Aubry</td>
<td>21.7%</td>
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<tr>
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Judge: Don’t Vote!
Majority voting: deductions?

- The debacle of 2002 repeated.
The Thesis  Voting Practice  Majority Judgment

Majority voting: deductions?

- The debacle of 2002 repeated.
- Since polling error of 2 to 3% error: any of three could be eliminated (including the electorate’s real choice).
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Majority voting: deductions?

- The debacle of 2002 repeated.
- Since polling error of 2 to 3% error: any of three could be eliminated (including the electorate’s real choice).
- Three major, nine very minor candidates emerge.
- Obvious strategies of Aubry and Sarkozy: multiply candidacies in opposing camp, then call for “useful” votes.
Question 2: “If the second round of the 2012 presidential elections were to be held next Sunday, for which of the following candidates would you most likely vote for?”
Majority voting

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</thead>
<tbody>
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<td>Aubry</td>
<td>Le Pen</td>
</tr>
<tr>
<td>63.2%</td>
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Majority voting

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<td>56.0%</td>
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Judge: Don’t Vote!
Question 2: “If the second round of the 2012 presidential elections were to be held next Sunday, for which of the following candidates would you most likely vote for?”

- Aubry Le Pen: 63.2% 36.8%
- Aubry Sarkozy: 56.0% 44.0%
- Sarkozy Le Pen: 63.3% 36.7%

Judge: Don't Vote!
Question 2: “If the **second round** of the 2012 presidential elections were to be held next Sunday, for which of the following candidates would you most likely vote for?”

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- Le Pen defeated overwhelmingly by either Aubry or Sarkozy, yet she survives the first round!
- Aubry comfortably defeats both Le Pen and Sarkozy, yet she could be eliminated in the first round!
Question 2: “If the second round of the 2012 presidential elections were to be held next Sunday, for which of the following candidates would you most likely vote for?”

- Aubry defeated Le Pen by 63.2% to 36.8%.
- Aubry defeated Sarkozy by 56.0% to 44.0%.
- Sarkozy defeated Le Pen by 63.3% to 36.7%.

- Le Pen defeated overwhelmingly by either Aubry or Sarkozy, yet she survives the first round!
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Why does this happen?
Question 2: “If the second round of the 2012 presidential elections were to be held next Sunday, for which of the following candidates would you most likely vote for?”

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<th>Candidate 2</th>
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<tbody>
<tr>
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<td>Le Pen</td>
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- Aubry comfortably defeats both Le Pen and Sarkozy, yet she could be eliminated in the first round!

**Why does this happen?** In casting one vote for one candidate, a voter reveals *absolutely nothing* about her opinions concerning the others ... nor, indeed, about the one candidate for whom she voted.
1 The Thesis

2 Voting Practice

3 Majority Judgment

Michel Balinski  Judge: Don't Vote!
Majority Judgment (MJ)

• Conceived to eliminate the defects of the traditional methods.
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- Ranks all candidates – the majority-ranking – according to their majority-grades.

Michel Balinski  
Judge: Don’t Vote!
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With 12 candidates majority voting allows 13 different expressions of opinion; with 12 candidates and 7 grades MJ allows more than 13 billion different expressions of opinion.
### Ballot: Election of the President of France 2007

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

<table>
<thead>
<tr>
<th>Candidate</th>
<th>Out-standing</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Acceptable</th>
<th>Poor</th>
<th>to Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathalie Arthaud</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivier Besancenot</td>
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</tr>
<tr>
<td>Jean-Luc Mélenchon</td>
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<tr>
<td>Eva Joly</td>
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<tr>
<td>Martine Aubry</td>
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<tr>
<td>Jean-Pierre Chevènement</td>
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<td>Francois Bayrou</td>
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<td>Jean-Louis Borloo</td>
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<td>Dominique de Villepin</td>
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<tr>
<td>Nicolas Sarkozy</td>
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<tr>
<td>Nicolas Dupont-Aignan</td>
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<tr>
<td>Marine Le Pen</td>
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</tbody>
</table>

Check one single grade in the line of each candidate. No grade checked in the line of a candidate means to Reject the candidate.
Majority Judgment (MJ): Results

Poll’s question 3: vote with majority judgment.
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<tr>
<td>0.8%</td>
<td>Arthaud</td>
<td>0.1%</td>
<td>0.9%</td>
<td>3.4%</td>
<td>7.7%</td>
<td>13.7%</td>
<td>26.1%</td>
</tr>
<tr>
<td>2.9%</td>
<td>Besancenot</td>
<td>0.8%</td>
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<td>6.9%</td>
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<td>16.1%</td>
<td>20.4%</td>
</tr>
<tr>
<td>4.2%</td>
<td>Mélenchon</td>
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</tr>
<tr>
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<td>Joly</td>
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- Some 75% gave no Outstanding
Poll’s question 3: vote with majority judgment.

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- Some 75% gave no *Outstanding*.
- Almost 50% gave no *Outstanding*, no *Excellent*.
- About 20% gave no *Good* or above.
- Some 40% gave their highest grade to *at least* two candidates.
# Majority Judgment (MJ): Majority-grade

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A candidate’s **majority-grade** is the grade that obtains a majority of the electorate against any other grade.
Majority Judgment (MJ): Majority-grade

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A candidate’s **majority-grade** is the grade that obtains a majority of the electorate against any other grade.

Borloo’s is **Acceptable**:

- a majority of $2.2 + 6.2 + 15.3 + 22.3 + 19.6 = 65.6\%$ believes he merits at least **Acceptable**
- a majority of $19.6 + 15.9 + 18.5 = 54.0\%$ believes he merits at most **Acceptable**
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Aubry’s is **Good**:
- a majority of $50.7\%$ believes she merits at least **Good**
- a majority of $62.0\%$ believes she merits at most **Good**
Majority Judgment (MJ): Majority-ranking
## Majority Judgment (MJ): Majority-ranking

<table>
<thead>
<tr>
<th>Majority judgment ranking</th>
<th>Above majority-grade</th>
<th>The majority-grade</th>
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Michel Balinski  
Judge: Don’t Vote!
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The *majority-gauge*: \((p, \alpha \pm, q)\). Majority judgment resists strategic manipulation.
Majority Judgment (MJ): Resists manipulation
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Martine Aubry first: (38.0%, Good−, 49.3%).

Jean-Louis Borloo second: (46.0%, Acceptable+, 34.4%).
Majority Judgment (MJ): Resists manipulation

Martine Aubry first: \( (38.0\%, \text{Good} -, 49.3\%) \).

Jean-Louis Borloo second: \( (46.0\%, \text{Acceptable} +, 34.4\%) \).

Suppose a voter (or group of voters) believe(s) Martine Aubry deserves a higher majority-gauge: can he (they) change the grade(s) assigned and lift it?
Majority Judgment (MJ): Resists manipulation

Martine Aubry first : \((38.0\%, \text{Good \text{\textminus}}, 49.3\%)\).

Jean-Louis Borloo second : \((46.0\%, \text{Acceptable \text{\textplus}}, 34.4\%)\).

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Michel Balinski \hspace{0.5cm} Judge: Don’t Vote!
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- Borda and Condorcet methods hugely favor center, penalizing major parties of left and right.
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Mathematical arguments and experimentation establish the validity of the claims.
What do the critics say?

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Not surprisingly, challenging a paradigm that has stood for centuries has provoked attacks:

1. Majority judgment is not Condorcet-consistent.
2. It admits the “no-show paradox.”
3. It is nothing new: only the old welfarism approach to social choice.
4. Plus the usual trivial academic nitpicking and backbiting.
MJ is not Condorcet consistent
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\(2k + 1\) judges evaluate two competitors, \(X\) and \(Y\), in a scale of grades \([0, 20]\):

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\begin{array}{ccc}
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A highly artificial example: **1 judge alone** determines X’s majority-grade to be any in [4, 12], Y’s any in [8, 16].
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True—MJ is not Condorcet consistent—but neither are approval voting, Borda, range voting, first-past-the-post, and two-past-the-post.
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The no-show paradox: A method determines X to be the winner. A voter arrives who ranks X higher than Y (old model) or grades X higher than Y (new model). Result: Y wins.
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But should the new judge stay at home? In both cases she sees no great difference between $X$ and $Y$ and is perhaps more interested in seeing their grades come closer to those she gives (which happens).
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The Thesis Voting Practice Majority Judgment

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- The only methods that avoid the no-show paradox are point-summing methods (such as range voting)... and they are at once meaningless and the most manipulable of methods.
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In fact, the only substantive area in common between the welfarist and majority judgment models is meaningfulness: and the measurement theorists had found those results before the welfarists.
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The Thesis Voting Practice  Majority Judgment

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- The utility of voters of the left for Chirac against Jospin was very low, for Chirac against Le Pen was very high.
The Thesis Voting Practice

Majority Judgment

MJ is “nothing but the welfarism approach to social choice”

Formally, of course, when inputs of the welfarism model are interpreted as grades of a common language, the social welfare functionals of that model are social ranking functions of MJ.

This completely ignores the key concept of a common language of grades: what the components of a model mean changes everything.

Judges of competitions—of skaters, wines, pianists,. . .—use grades that have absolutely nothing to do with their utilities:

- Grades assigned to candidates are absolute measures of merit.
- Judge’s utilities are relative measures of outcome satisfaction.

Example. 2002 French presidential race.

- The utility of voters of the left for Chirac against Jospin was very low, for Chirac against Le Pen was very high.
- Their evaluation of Chirac would have been Acceptable or Poor against Le Pen, Jospin or any other candidate.
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In a real application more than formal mathematics is important.

Michel Balinski  Judge: Don’t Vote!
References


To vote in the French Socialist primaries with majority judgment:

Slate.fr (type “jugement majoritaire”)