Comparing Strategic Voting Incentives in Plurality and Instant-Runoff Elections

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  - also make results more difficult to interpret and impose additional costs on voters

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- **This paper:** how do strategic incentives look like under either system, both qualitatively and quantitatively?

Types of strategic votes in electoral systems

General Framework

Set-up. Let there be K candidates, B admissible ballot types (e.g., in Plurality, $b = 3$), and N voters.

Probability of winning. Let $\mathbf{P}$ denote a $K \times B$ matrix where each column is a vector of candidates' winning probability as a function of an additional ballot b.

Voters' utility. Let $\mathbf{U}$ denote a $N \times K$ matrix where each row is a vector of any voter's utilities from a given candidate winning.

Expected utility from any ballot type. Finally, let $\bar{\mathbf{U}} = \mathbf{UP}$ denote the expected utility from each ballot type for any voter.

General Framework (cont'd)

Strategic voting. For every voter i, the strategic voting incentive is defined as:

$$\text{Expected Benefit} = \arg\max_{b} \bar{\mathbf{u}}(b) - \bar{\mathbf{u}}(b_s) \tag{1}$$

where $\bar{\mathbf{u}}$ is the ith row from the expected utility matrix $\bar{\mathbf{U}} = \mathbf{UP}$.

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Example

$$\bar{\mathbf{u}}_{\text{Plur}} = \begin{bmatrix} \mathbf{0.67} & 0.57 & 0.33 \end{bmatrix}$$

$$\bar{\mathbf{u}}_{IRV} = \begin{bmatrix} 0.67 & 0.57 & 0.33 & \mathbf{0.86} & 0.21 & 0.40 \end{bmatrix}$$

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How to model utilities and beliefs / outcome probabilities?

Modelling preferences and beliefs

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Respondents' party like-dislike scores (on a scale from 0 to 10)

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Beliefs

Given reported preferences in survey, model election outcome beliefs using Dirichlet distribution:

$$f(\mathbf{v}) = \text{Dir}(s \times \mathbf{v}_0)$$

Modelling preferences and beliefs (cont'd)

Beliefs (cont'd)

- Expected outcome (mode of distribution): vote shares if everyone in survey voted sincerely $\Rightarrow$ iterative polling algorithm to adjust for 'strategicness'.
- Precision parameter: using previous empirical work, between $s = 10$ and $s = 85$.
- Given the distribution over election outcomes, we can also specify the probabilities of each candidate winning for each type of marginal ballot.

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- For empirics, we set $\lambda = .05$.

Results: Iterative polling algorithm

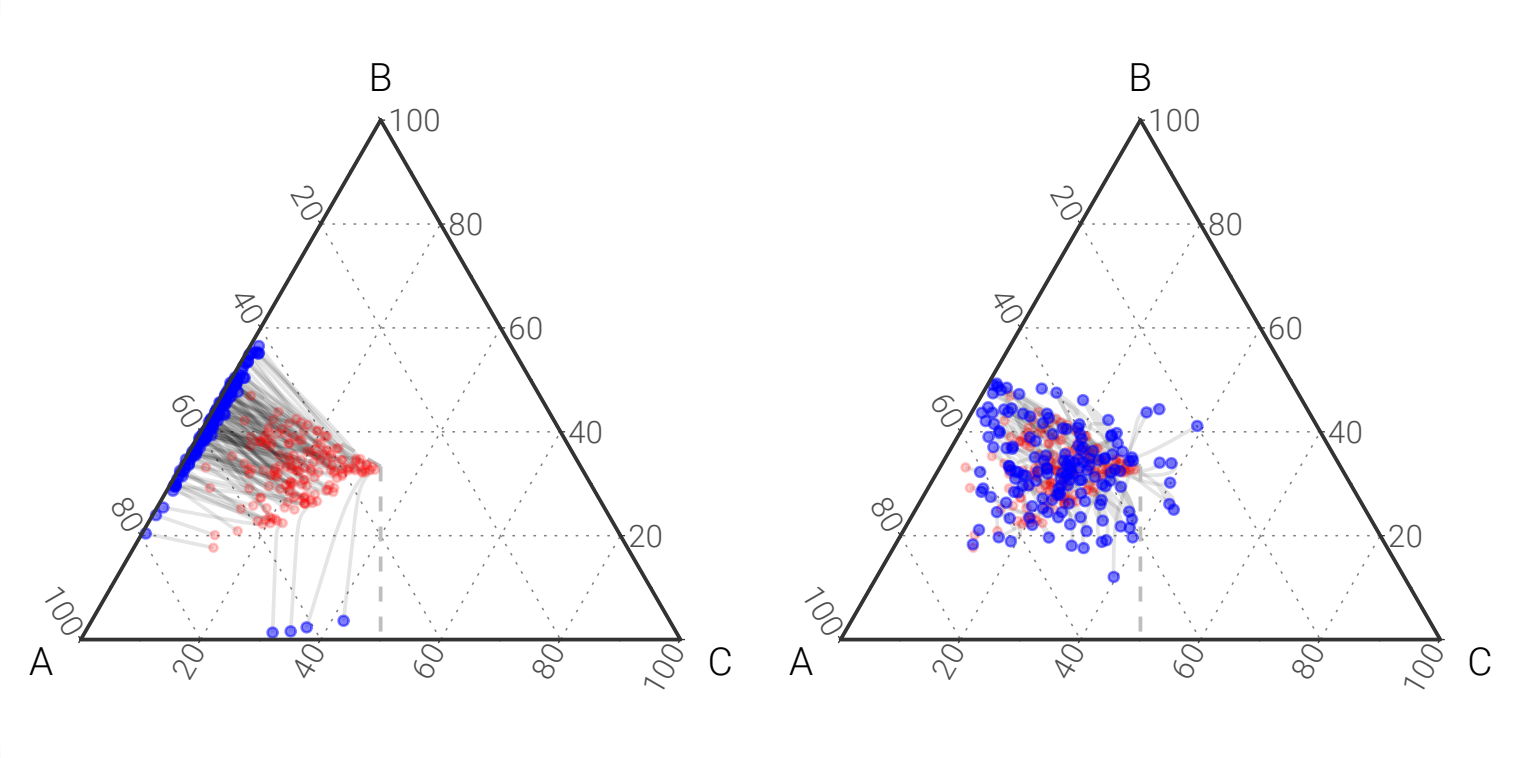

Figure 1: Iterative polling paths in Plurality (left) and IRV (right). Red dots mark sincere profiles, blue dots mark ballot distribution after 60 iterations.

Results: Expected benefit of strategic voting

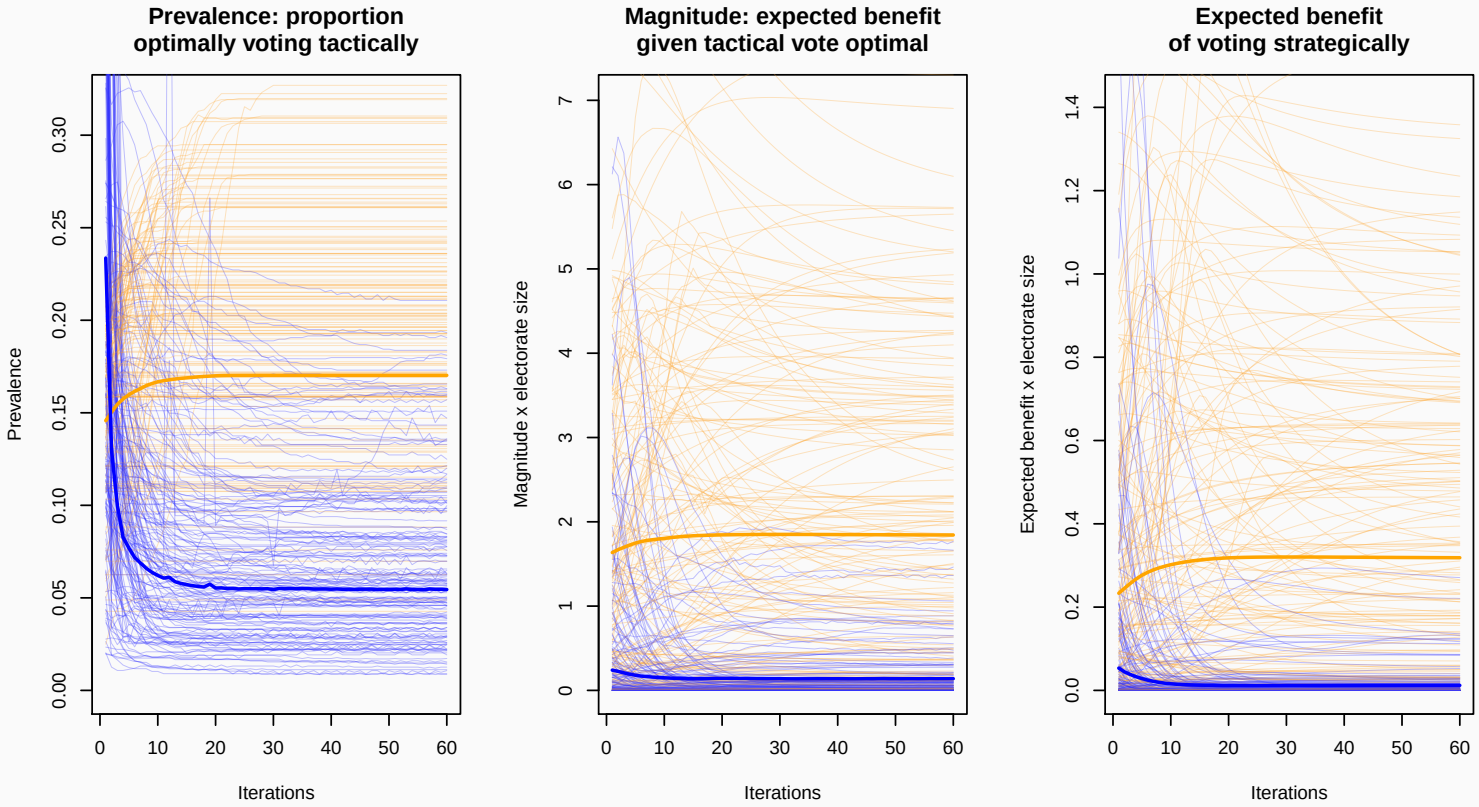

Figure 2: Main results: Prevalence, Magnitude, and Expected Benefit of strategic voting in Plurality (orange) and IRV (blue) for a precision parameter of $s = 85$, where Prevalence $\times$ Magnitude = Expected Benefit [intensive / extensive margin].

Discussion

Key results

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- events that reward strategic vote in IRV are less likely
- strategic voting more likely to backfire in IRV (risk of electing least favoured candidate)
- strategic incentives can be "substitutes" in IRV

Qualitative description of strategic voting in Plurality and IRV (h/t Andy)

Strategic voting in FPTP

Given candidates $\{a, b, c\}$, three possible ballots: $\{a, b, c\}$.

Eggers & Nowacki (2019)

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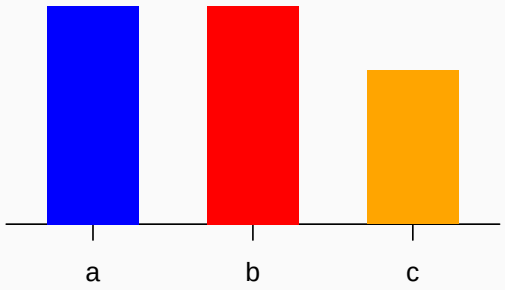
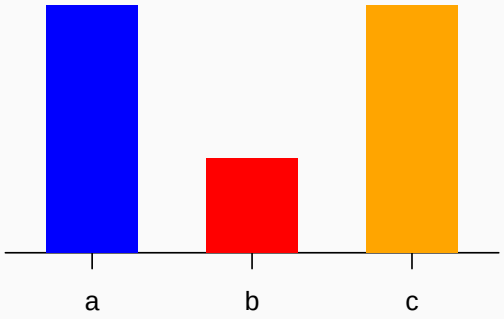
Given candidates $\{a, b, c\}$, three possible ballots: $\{a, b, c\}$.

Three ways to affect outcome:

ab tie



ac tie



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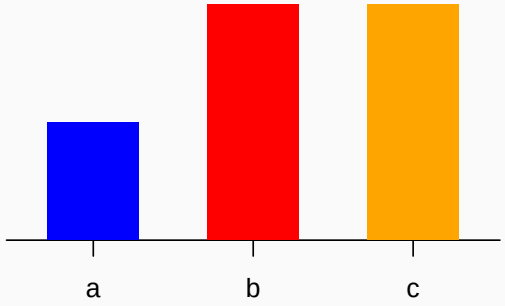

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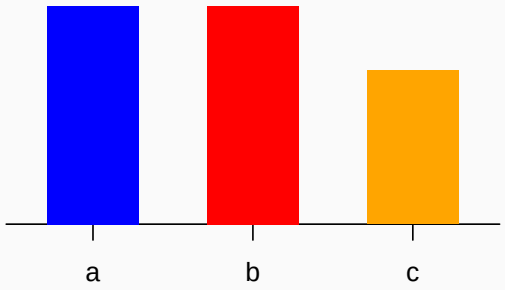

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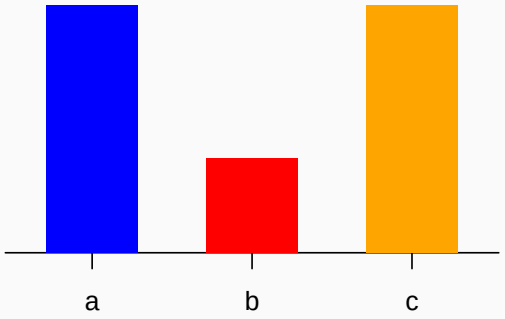

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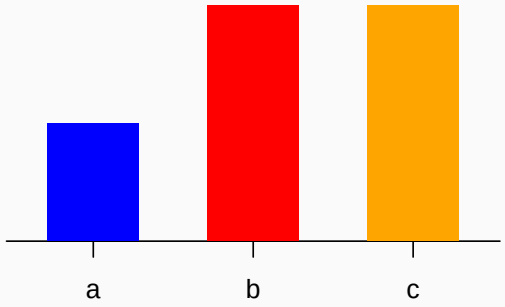

Strategic logic: "Desert a trailing candidate to avoid wasting one's vote."

Eggers & Nowacki (2019)

Strategic voting in IRV

Six possible ballots: $\{abc, acb, bac, bca, cab, cba\}$.

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2. "Desert a trailing candidate to avoid electing one's least favorite"
    - Right-wing voter: 'Le Pen can't beat Macron, so I'll rank Fillon first'

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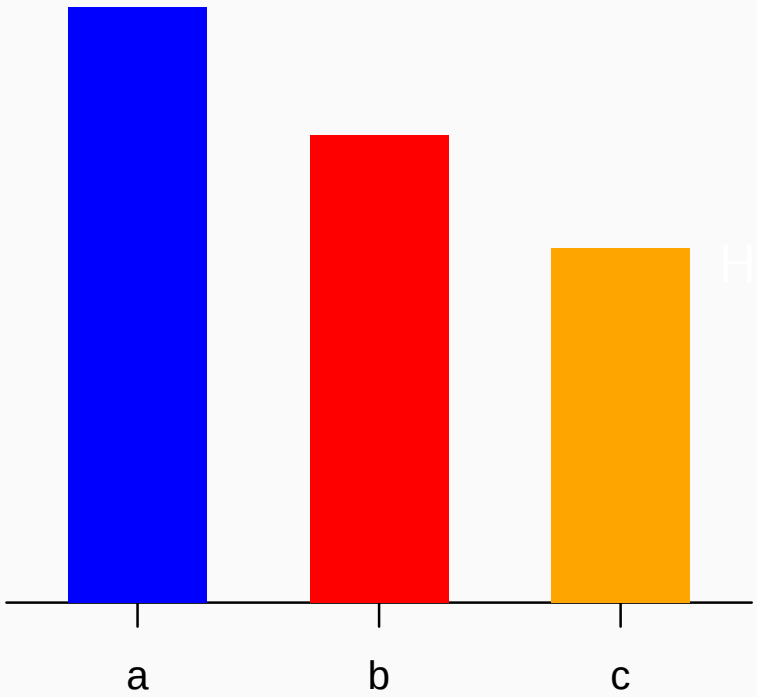
Positive feedback in FPTP elections



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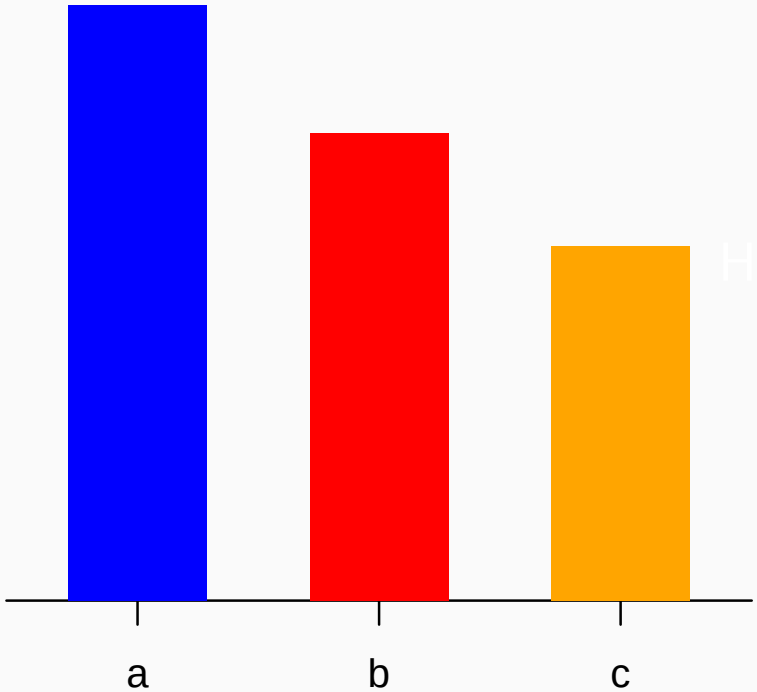

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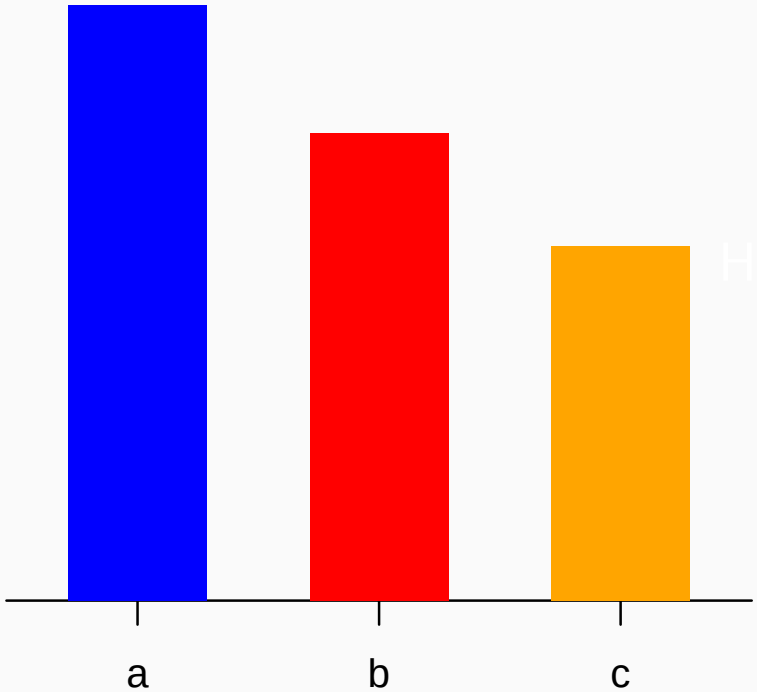

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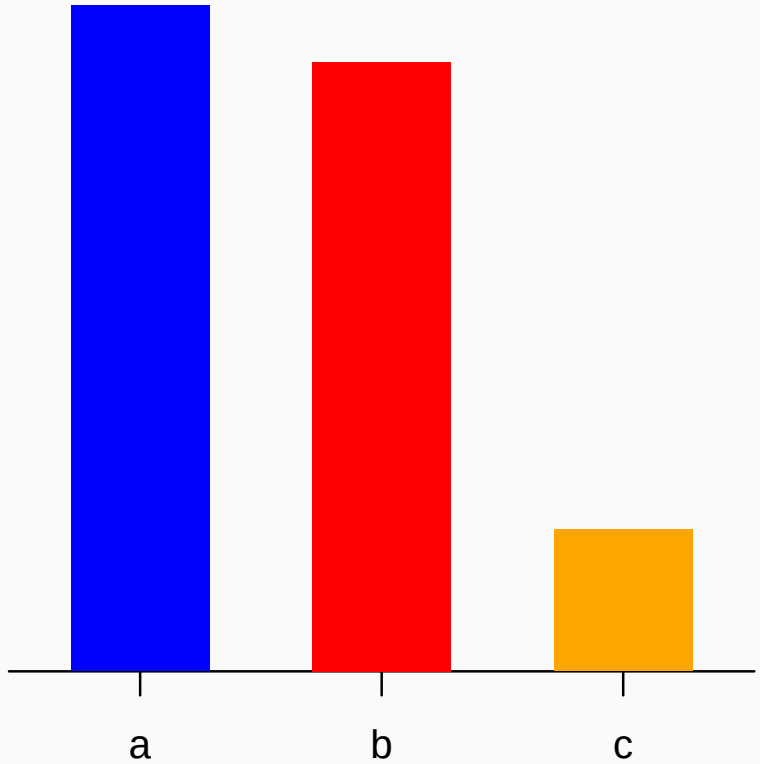

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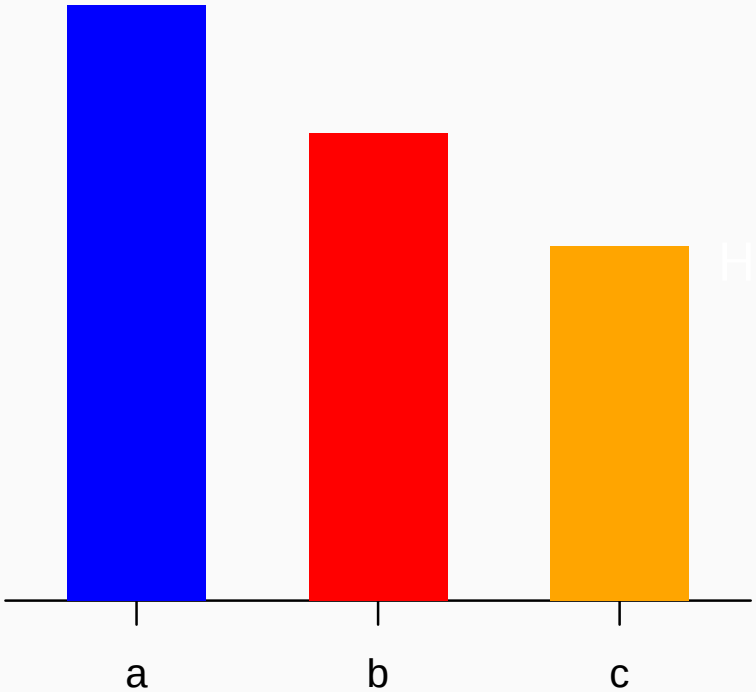

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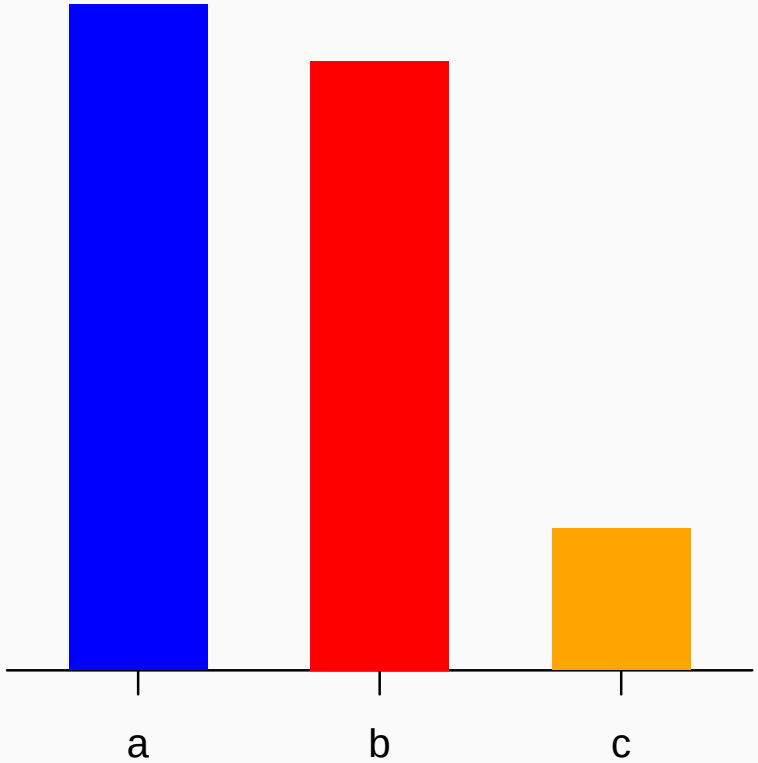

Strategic responses to discrepancy $\implies$ hid discrepancy widens.

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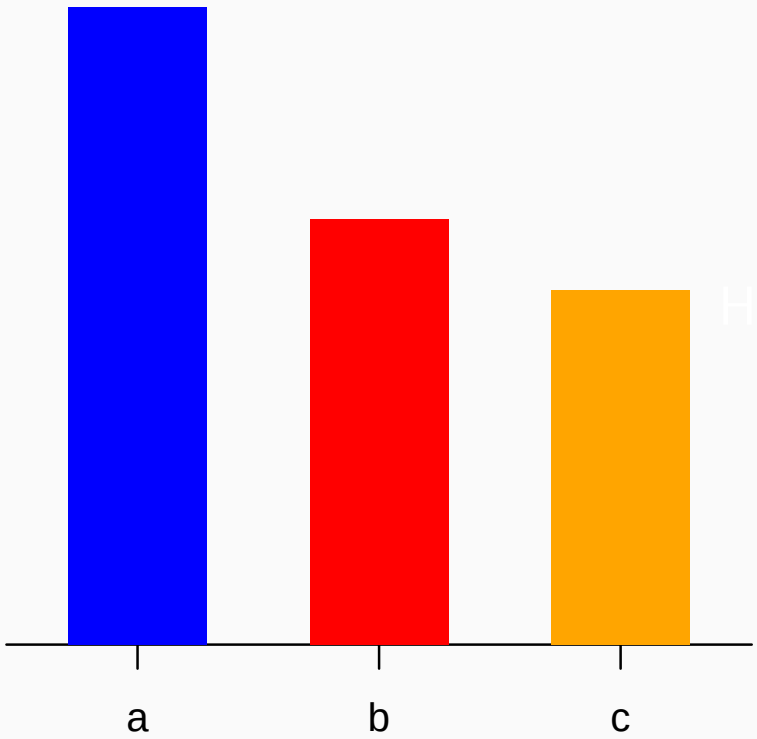

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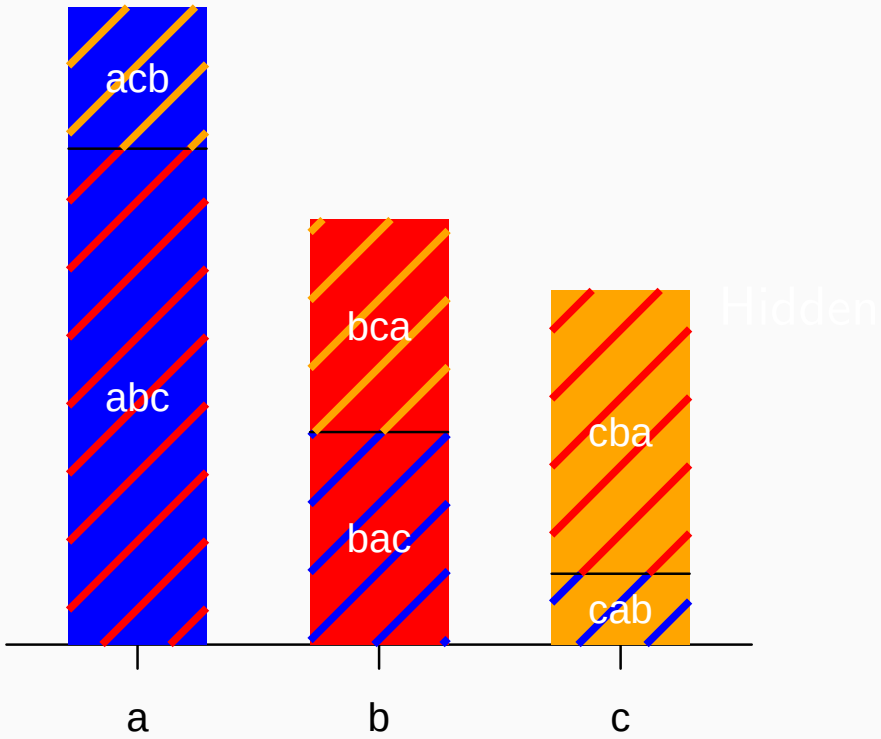

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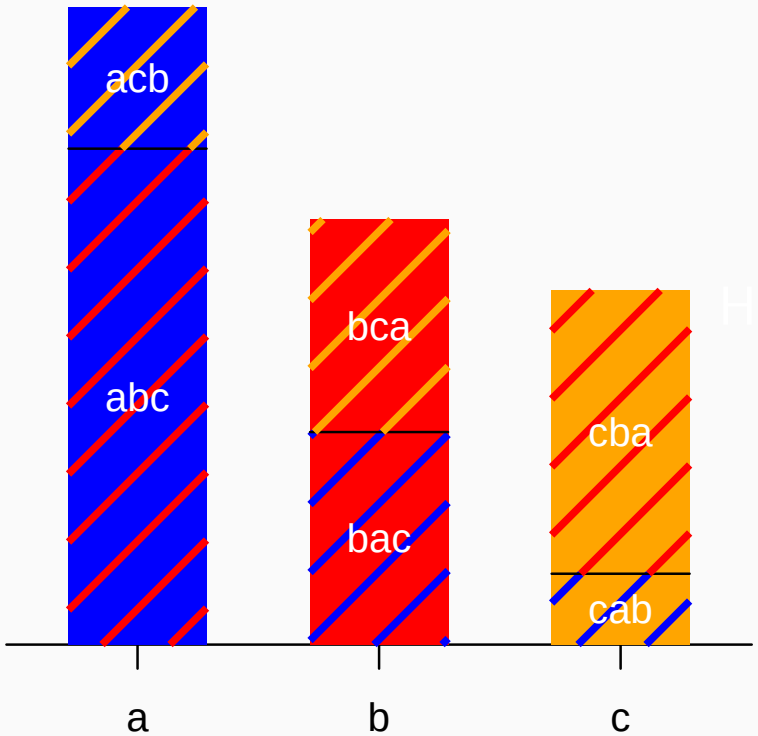

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Discrepancy btw *b*'s and *c*'s 2nd prefs $\Longrightarrow$
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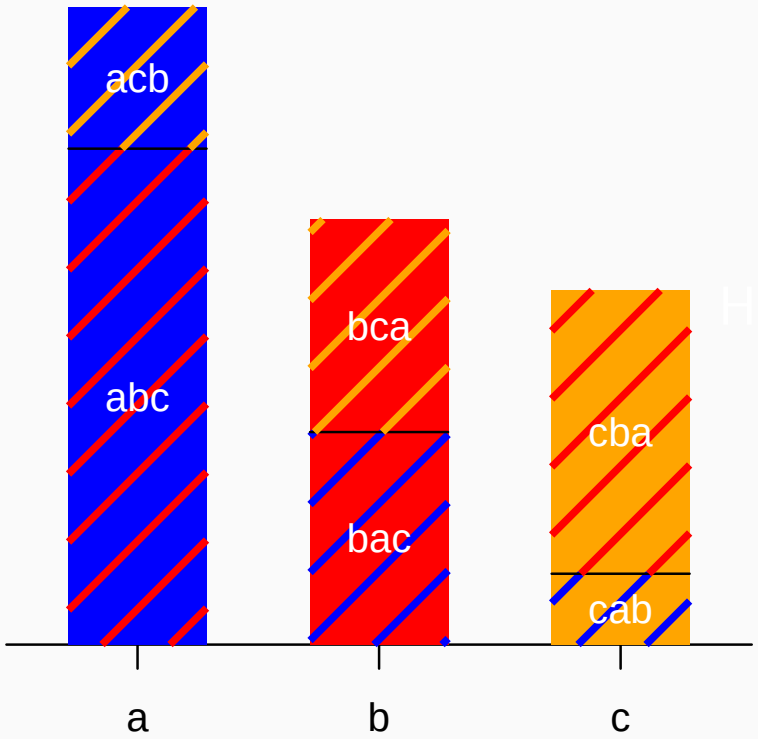

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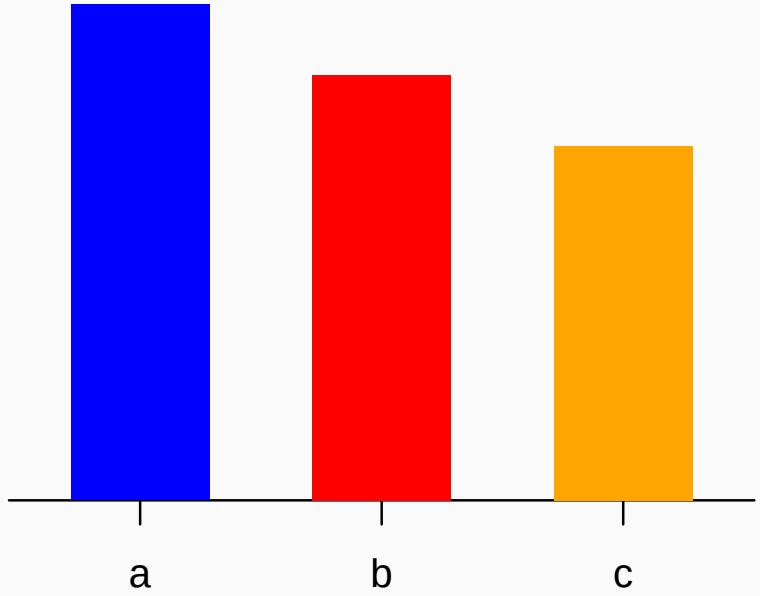

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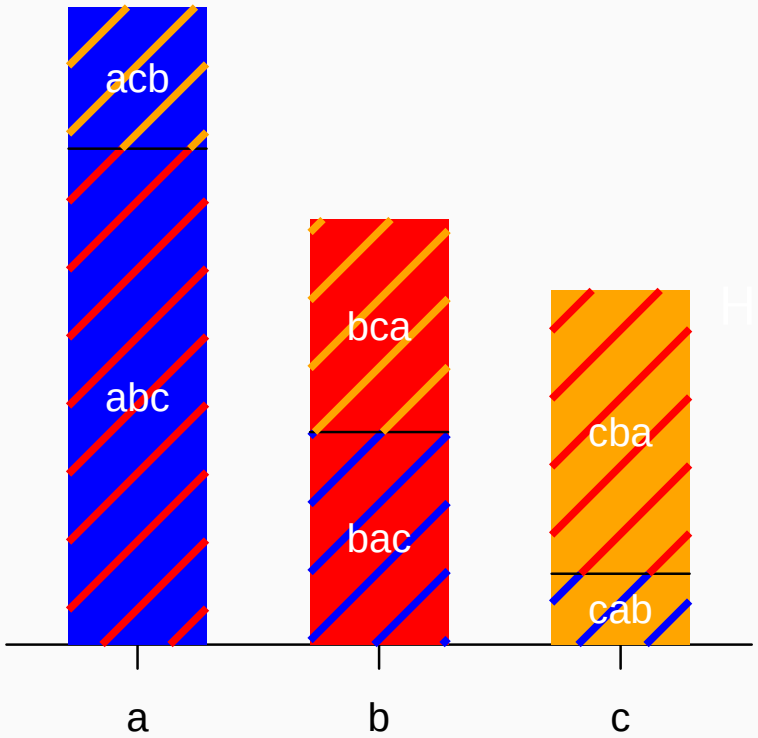

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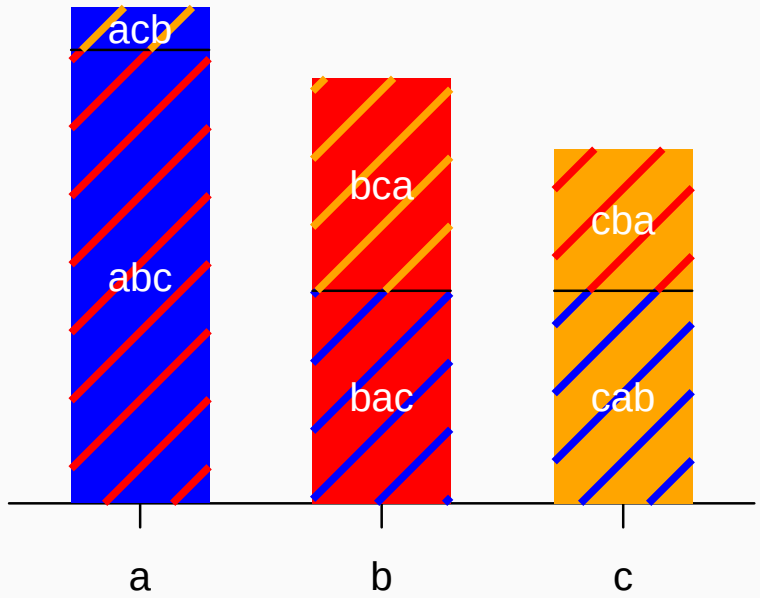

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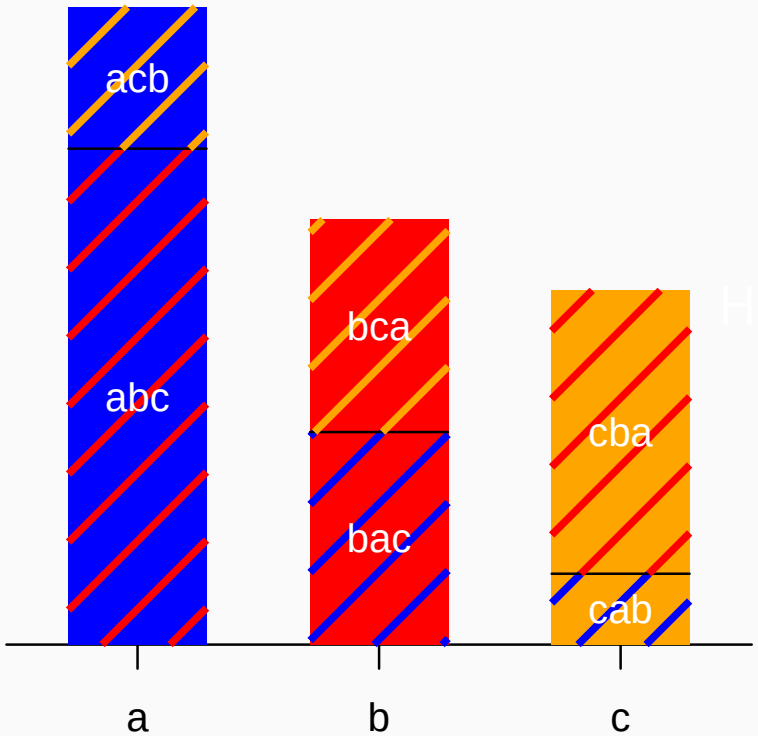

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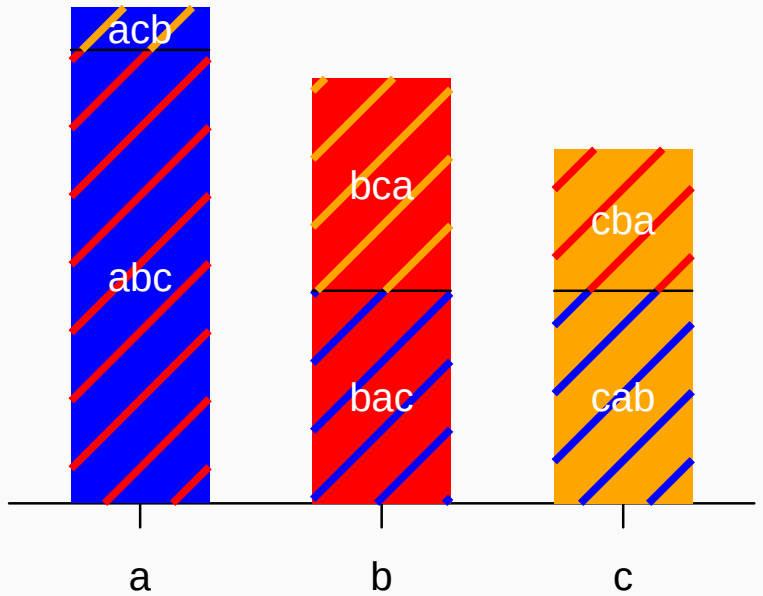

Strategic responses to discrepancy $\Longrightarrow$ hid discrepancy narrows.

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Further discussion of results

Likelihood of 'pivotal events'

Events that reward strategic votes in IRV are less likely

- In Plurality, we need a tie (close result) between the first and and the second candidate.
- In IRV, two candidates must tie in first preferences **and** we need a tie (close result) in second preferences in the run-off.

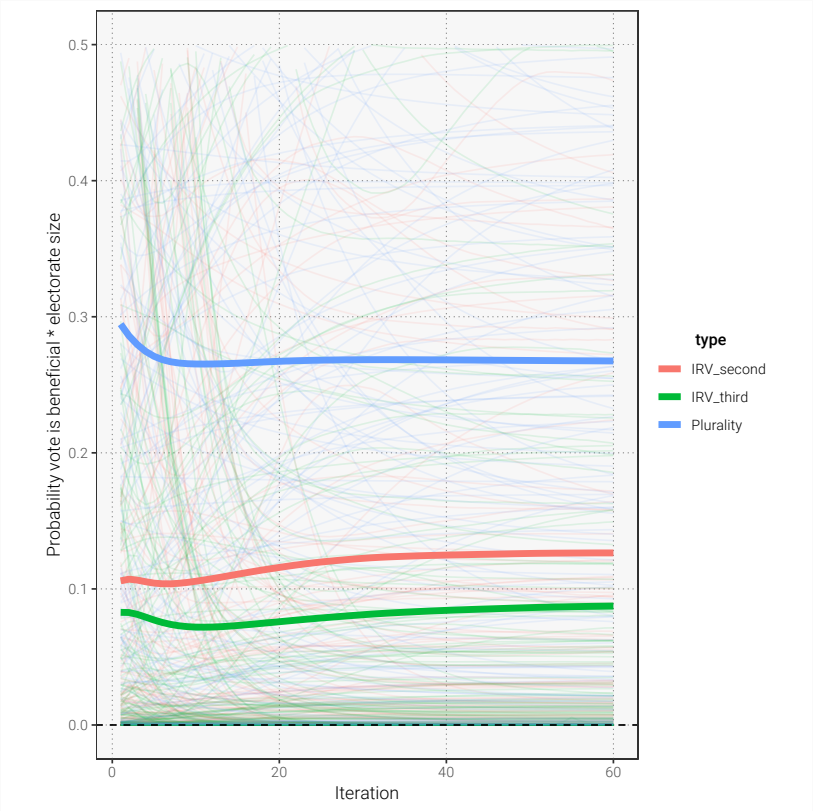

Figure 3: Expected probability of strategic vote being beneficial (weighted by electorate size)

Eggers & Nowacki (2019)

Conflicting events

Strategic voting in IRV is more likely to backfire

- In **Plurality**, only first/second tied: deserted third can be far away
- For strategic voting in **IRV** to be beneficial, all three candidates must be reasonably close to one another – greater risk of backfiring!

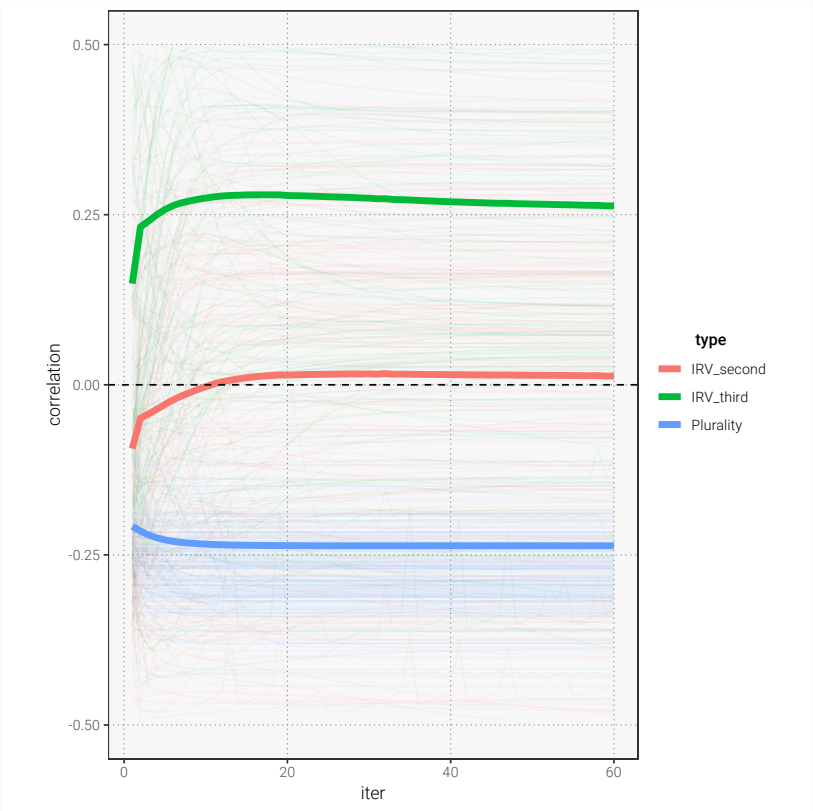

Figure 4: Correlation between costs and benefits of strategic vote

Eggers & Nowacki (2019)

Conflicting events

Strategic voting in IRV is characterised by substitutes

- In **Plurality**, if others desert the third-placed candidate, my incentive to do so, too, grows (C less likely to win overall)
- In **IRV**, if other CBA voters vote ACB, my incentive to do so, too, diminishes: risk of accidentally electing A increases (when A beats C in second round)

Eggers & Nowacki (2019)