STRATEGIC VOTING BEHAVIOR IN DOODLE POLLS

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Joint work with Reshef Meir (Technion) and David Parkes

1. A paper written with James Zou and Reshef Meir that came out of discussions about social choice models
2. Presented at Proc. 18th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2015).
3. Has led to some interesting follow-on discussions on mechanism design.

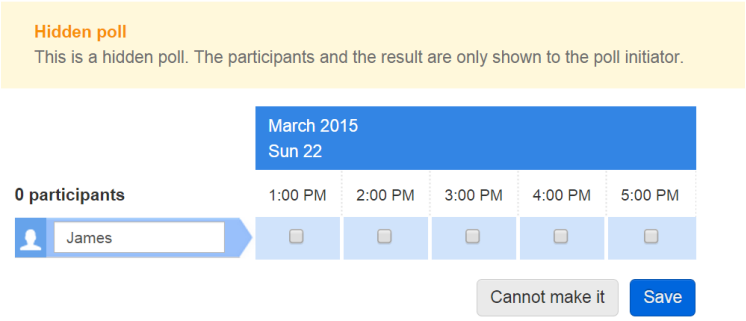
Agreeing on a common time

- Finding a common time slot is an everyday activity.
- Can be a complex process of group decision making.

(open) Doodle example

	July 2014 Wed 2		Thu 3	Fri 4
3 participants	10:00 AM	11:00 AM	10:00 AM	10:00 AM
John (Initiator)	✓	✓	✓	✓
Mary	✓		✓	
Karl		✓	✓	
Your name	☐	☐	☐	☐
	2	2	3	1

(hidden) Doodle example



How do people coordinate?

- Scheduling as a form of group coordination.
- Each participant balances her own interests with the group interest.
- Do people behave strategically? How does that depend on whether the poll is open or hidden?

Outline

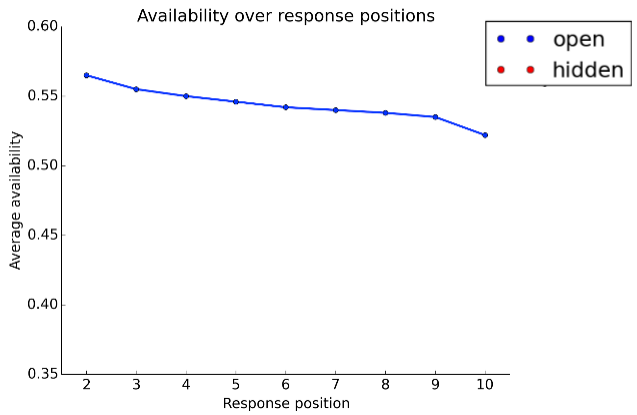
1. Large-scale data mining of all the Doodle polls created during a three months period.
2. Empirical findings: different behaviors in open and hidden polls.
3. Comparisons to behavioral models from voting theory.
4. New model that combines individual and social utility.

Our dataset

- All Doodle polls created in the US between July-September, 2011.
- Two types of polls: open and hidden.
- 345,297 open polls and 7390 hidden polls.
- For each poll, we have the votes of each participant and the order of the participants.

Availability over response positions

The availability of a voter is the fraction of slots that she approves.
The response position of a voter is the order that she participates in.



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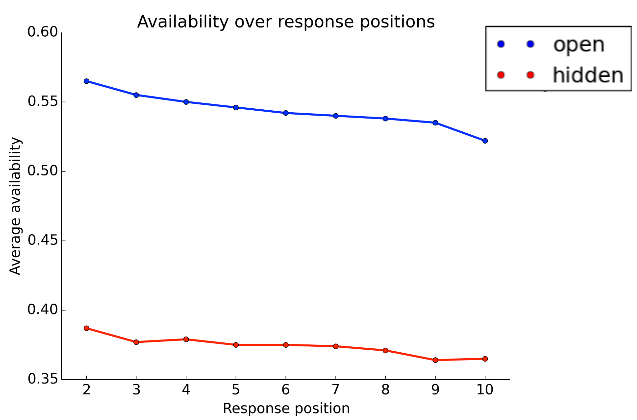
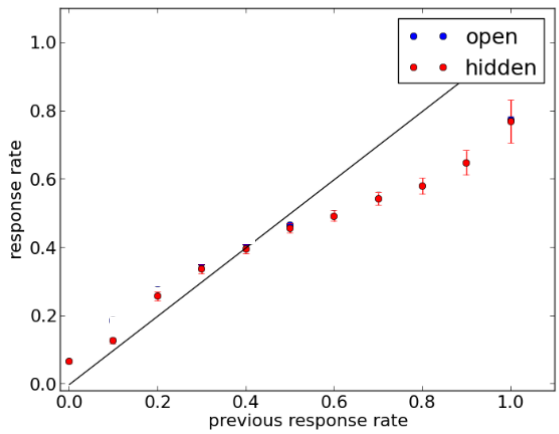


Response curve at 11

Conditioned on a slot approved by x of the first 10 voters, what is the probability that the 11th voter approves it?



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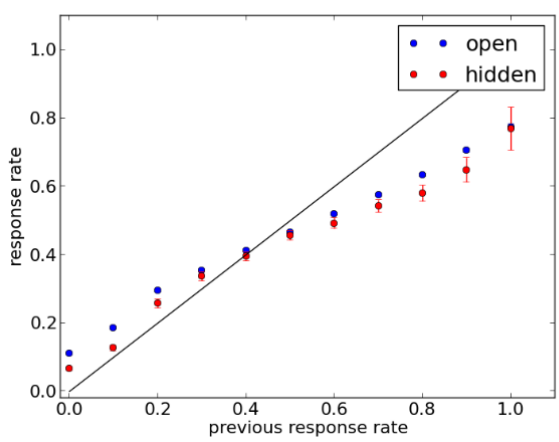

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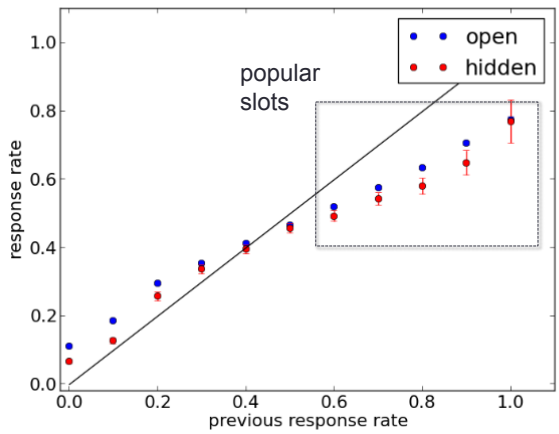

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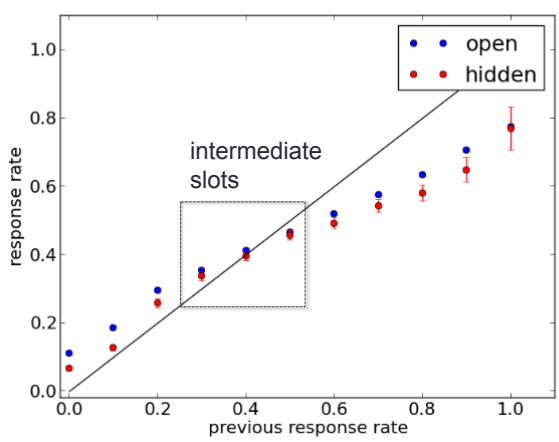

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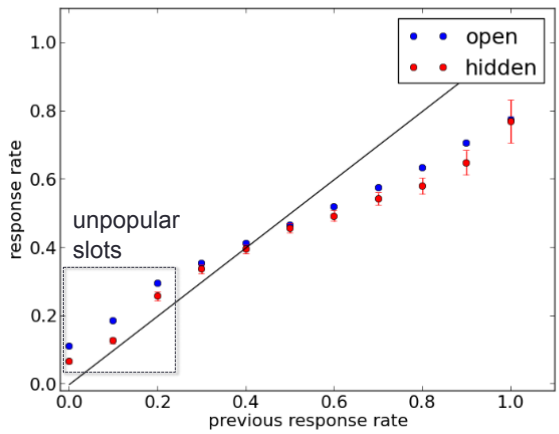
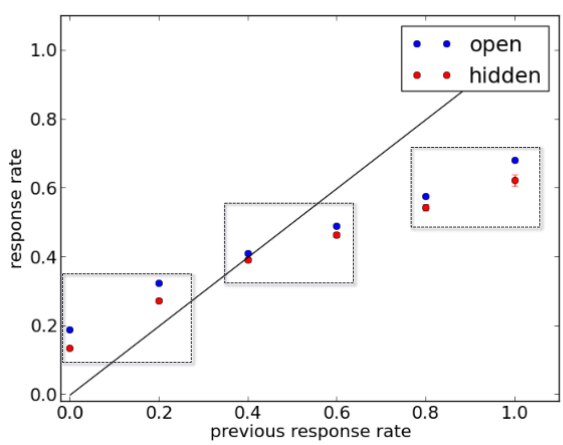


Response curve at 6

Other response curve shows similar bimodal divergence pattern.



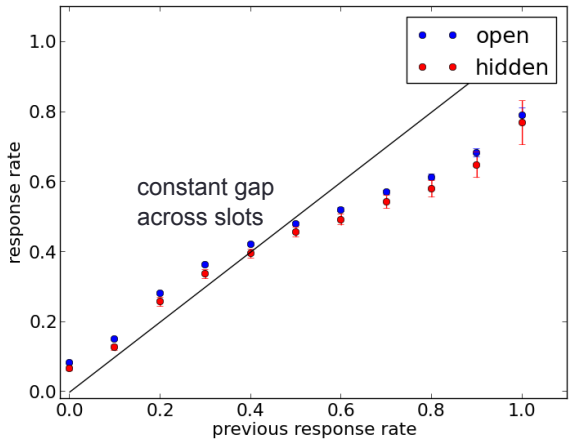
Common voting models cannot explain the data

- **Random cutoff**. Each voter approves her top k slots, k could be random.
- **Lazy voter**. Each voter approves her top k slots as long as those slots are plausible winners.
- **The leader rule**. Let x and y be the two most popular slots till now. Approves all slots z that she prefers over x and also approves x if she prefers x to y.

The leader rule

The leader rule

The leader rule predicts higher response rates across the board. Simulation.



Social voting model

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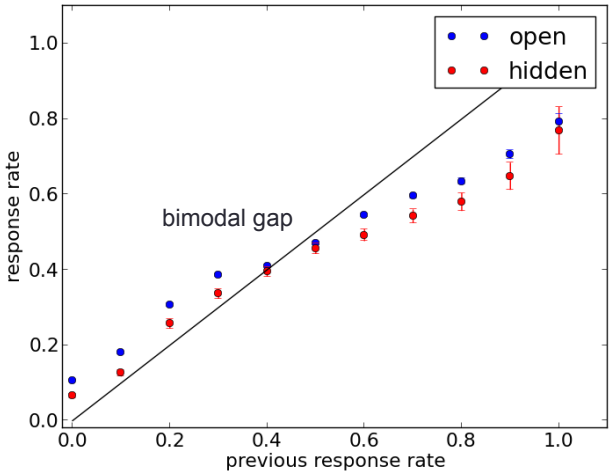
- Assume voter n has 3-level preferences: A_1^n, A_2^n, A_3^n
  She approves: $A_1^n, A_2^n \cap Popular, A_2^n \cap Unpopular$

Social voting simulations

Social voting simulations

Social voting predicts the bimodal divergence in response rates observed in real data.



Discussion

- Large-scale data-mining → insights into how people strategize in scheduling.
- Social-utility model: own interest + other-regarding preferences, and preferences for wanting to appear flexible.
- Implications for poll design.

Coordination problems

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Coordination mechanisms

(with Hongyao Ma)

- Norm: only charge people if they don't do what they promise.
- **Possible applications:**
  - Show up to a social event where food is ordered
  - Show up for a spinning class in a gym
  - Use an EV charging station
  - Use less electricity during a demand-response program
  - Return a shared city bike to a particular station on time
  - Show up at a restaurant reservation

- Idea: by asking people to bid their penalty, can we elicit how reliable they are?

Conclusion

- Nice example of how theoretical research leads to empirical research back to theoretical research back to…