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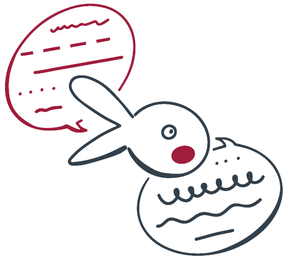
Indirectness as a path to common ground management

Asya Achimova, Michael Franke, Martin V. Butz
University of Tübingen



Background beliefs in the construction of meaning
January 10, 2025
Tübingen

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Collaboration

Michael Franke

Martin Butz

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The power of sharing

- Having shared mental attitudes is important for bonding and group formation (Higgins, 2019)
- Infants below 12 months of age want to share experiences with their caregivers (Tomasello, 2019)
- Pre-linguistic infants prefer others who are like them (Mahajan and Wynn, 2012)
- Discovering shared rare preferences increases bonding (Velez et. al. 2019)

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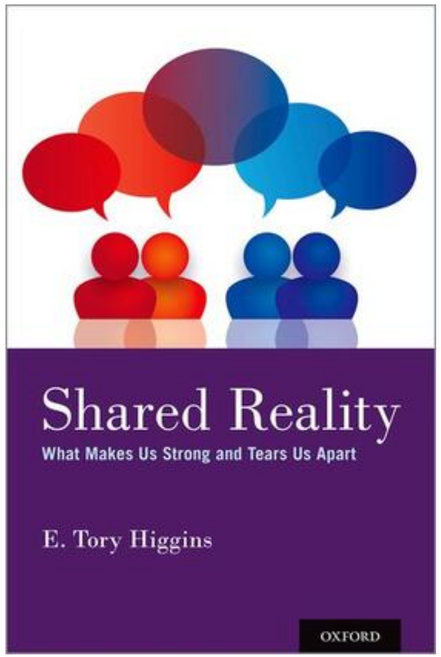
Shared reality

Understanding the world by validating reality

Belonging to a group



I can use my mind as a proxy

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Which beliefs belong to the common ground?

Designed by pch.vector

Cognitive pluralism

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Empirical domain: Predicates of personal taste

❤❤♡♡♡

The results of the election were interesting!

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Empirical domain: Predicates of personal taste

♥♥♥♥♡

The results of the election were interesting!

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Representing utterance valence

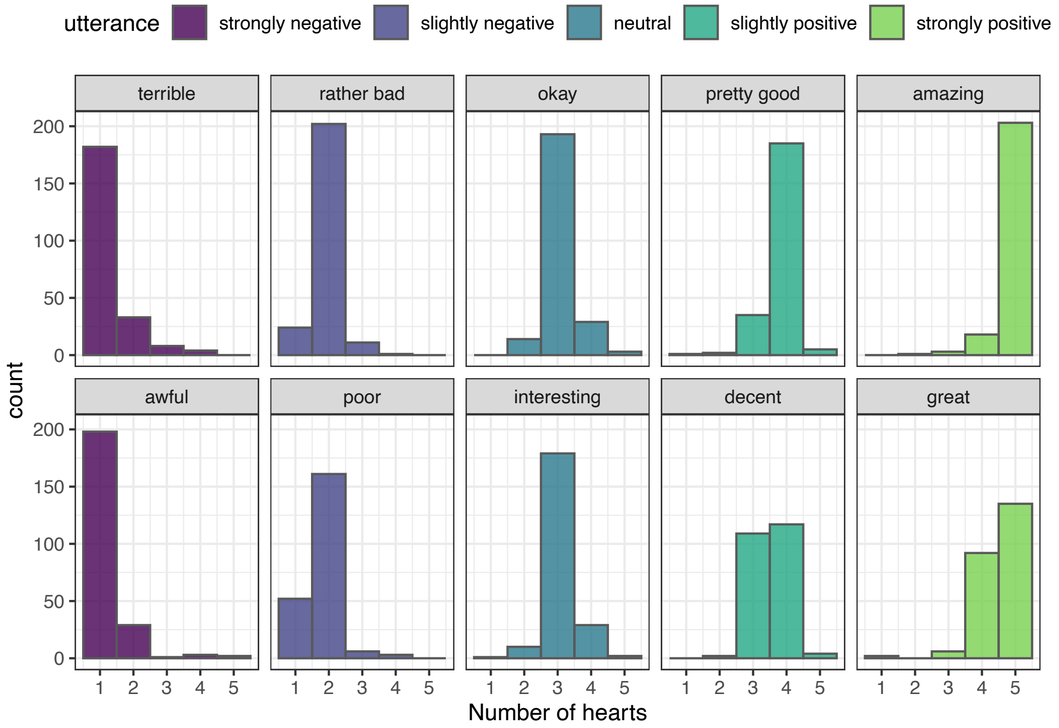
The city's climate policies are terrible.

The speaker's attitude is:

Strongly Negative ❤ ❤ ❤ ❤ ❤ Strongly Positive

Click 'continue' to move on.

Continue



Experiment 1. Mapping of utterances to a value scale (n = 46)

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What makes utterances indirect?

The results of the election were interesting!

The results of the election were interesting!

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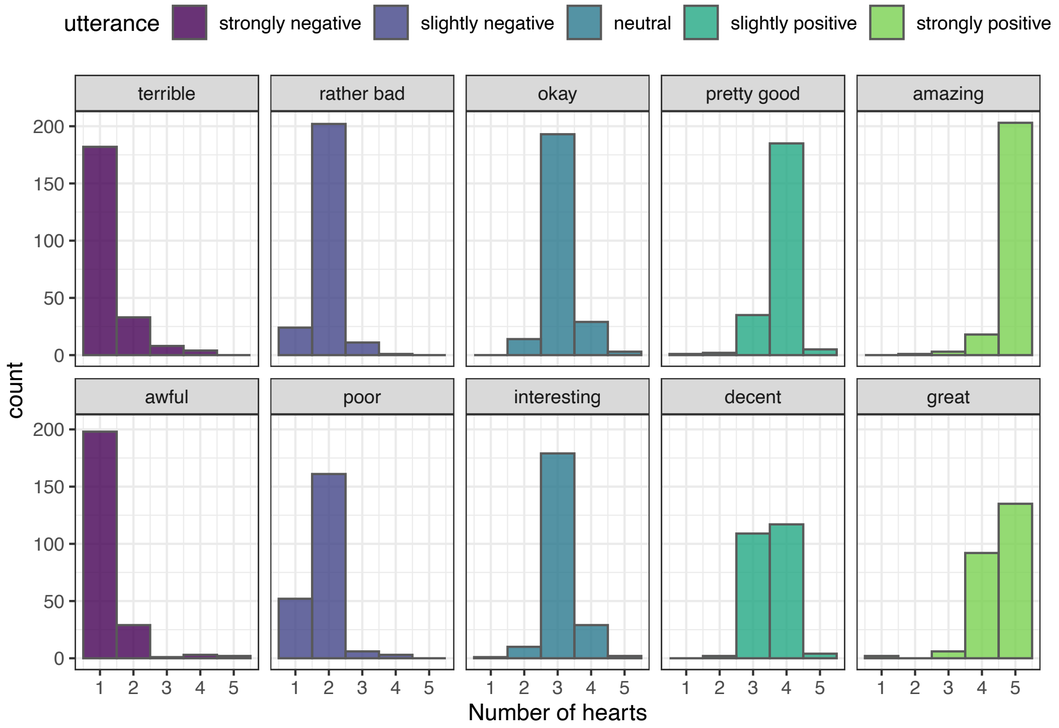

Experiment 1. Mapping of utterances to a valence scale (n = 46)

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Choosing indirect utterances

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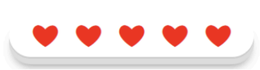
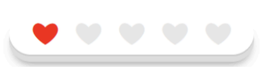
Utterance choice

Adam wants to discuss the election results with Jeff.

Here is how Adam feels about the issue:

Strongly Negative  Strongly Positive

Adam thinks this is how Jeff feels about it, but he is not sure:

Strongly Negative  Strongly Positive

Adam wants to share his opinion and wants to be honest about it.

What would Adam say?

- The election results are awful.
- The election results are poor.
- The election results are interesting.
- The election results are decent.
- The election results are amazing.

Click 'continue' to move on.

Continue

Experiment 2 (n = 98). Sample trial

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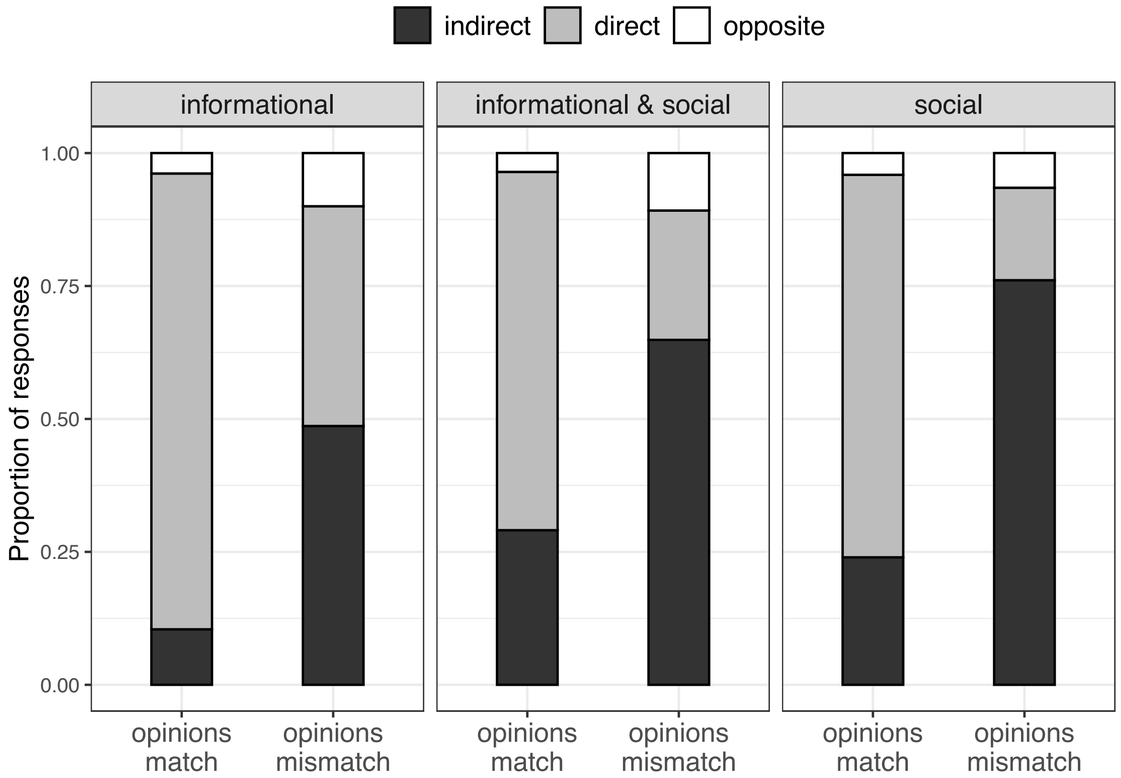
Utterance choice



Speakers were more likely to choose an indirect utterance when they had a social goal

$\beta = 2.422$, $SE = 0.3$, $z = 8.087$, $p < 0.001$

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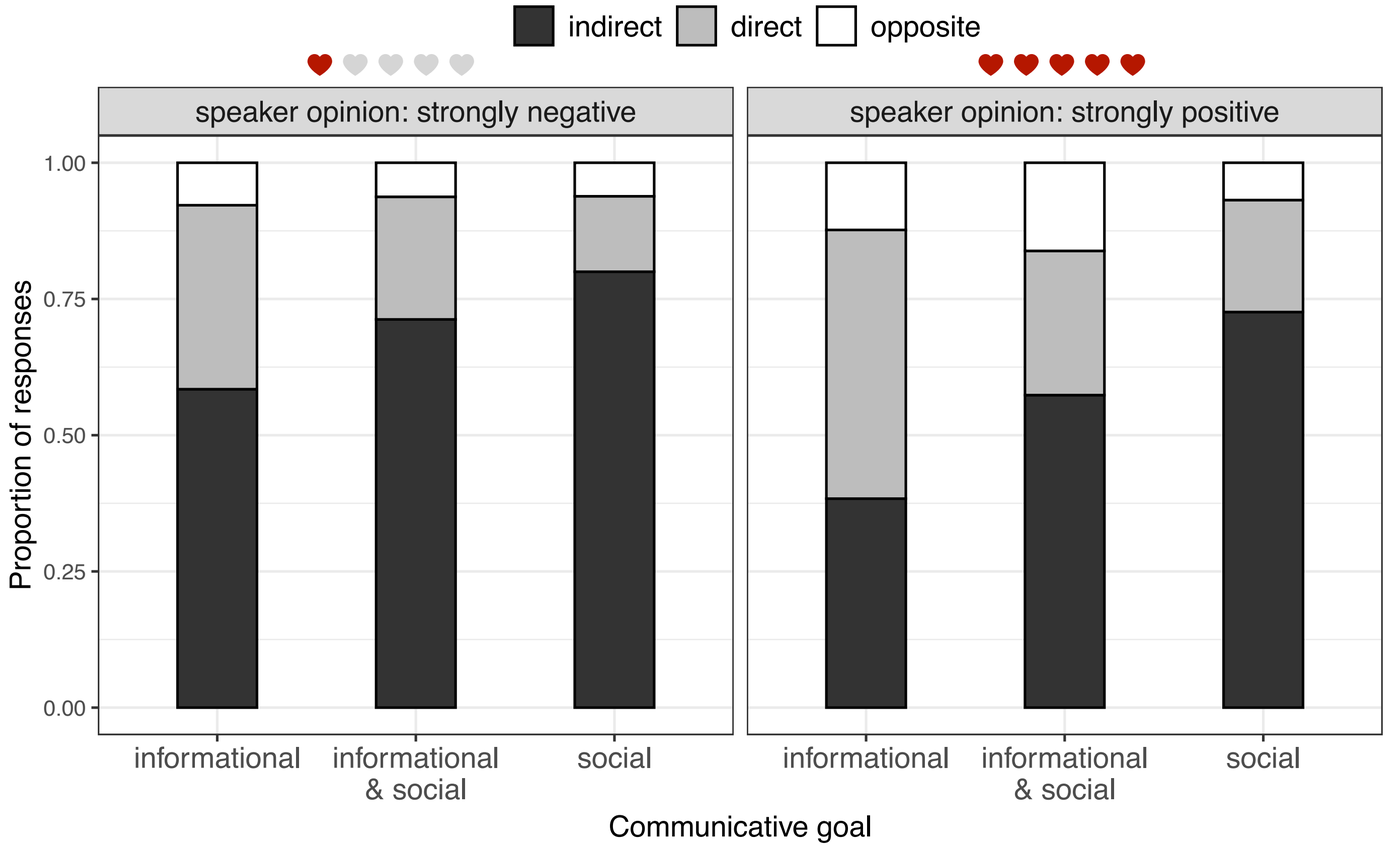
Utterance choice



Speakers were more likely to choose an indirect utterance when the opinions did not match

$\beta = 3.328$, $SE = 0.226$, $z = 12.504$, $p < 0.001$

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Interpreting indirect responses

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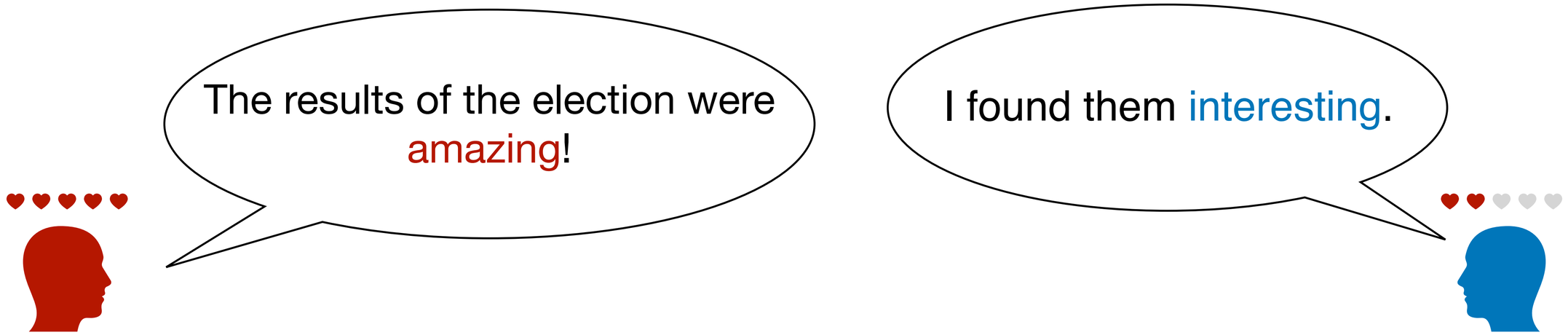
Inference that we want to capture



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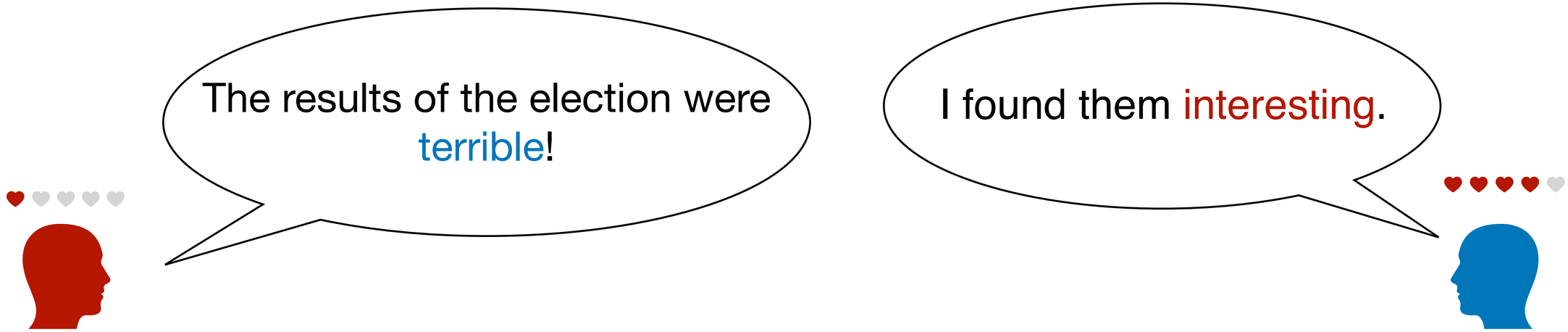
Inference that we want to capture



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Conversation partners infer each other's opinions by reasoning about the utterance-generating process

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Mary and Rachel meet at a mutual friend's birthday party for the first time.
They would like to exchange opinions but don't want to run into a conflict.

Mary says: The election results are poor.

Rachel replies: I find them interesting.

How may Rachel actually feel about the issue?

Strongly Negative Strongly Positive

Click 'continue' to move on.

Continue

Experiment 3 (n = 269)

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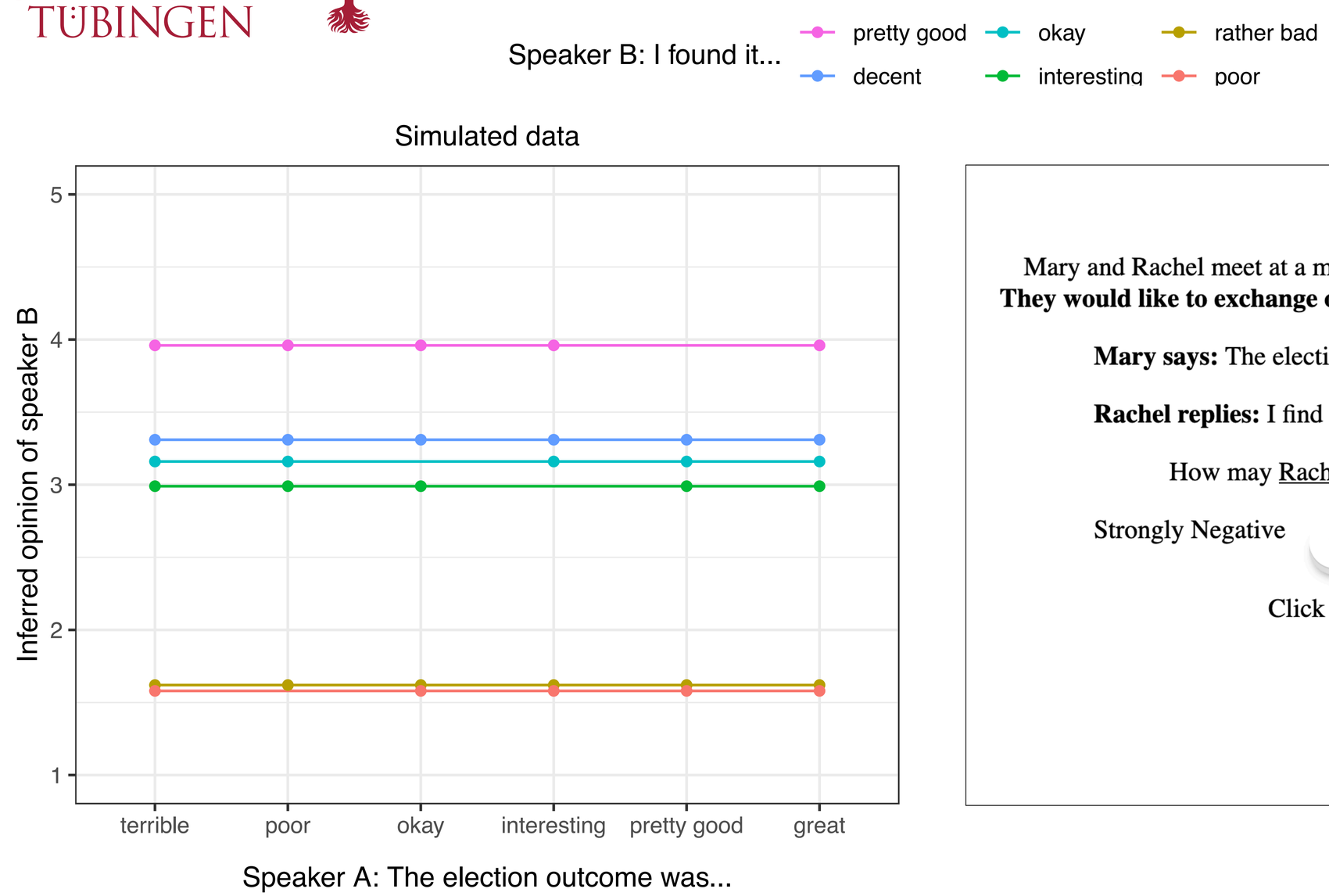

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How may Rachel actually feel about the issue?

Strongly Negative ❤ ❤ ❤ ❤ ❤ Strongly Positive

Click 'continue' to move on.

Continue

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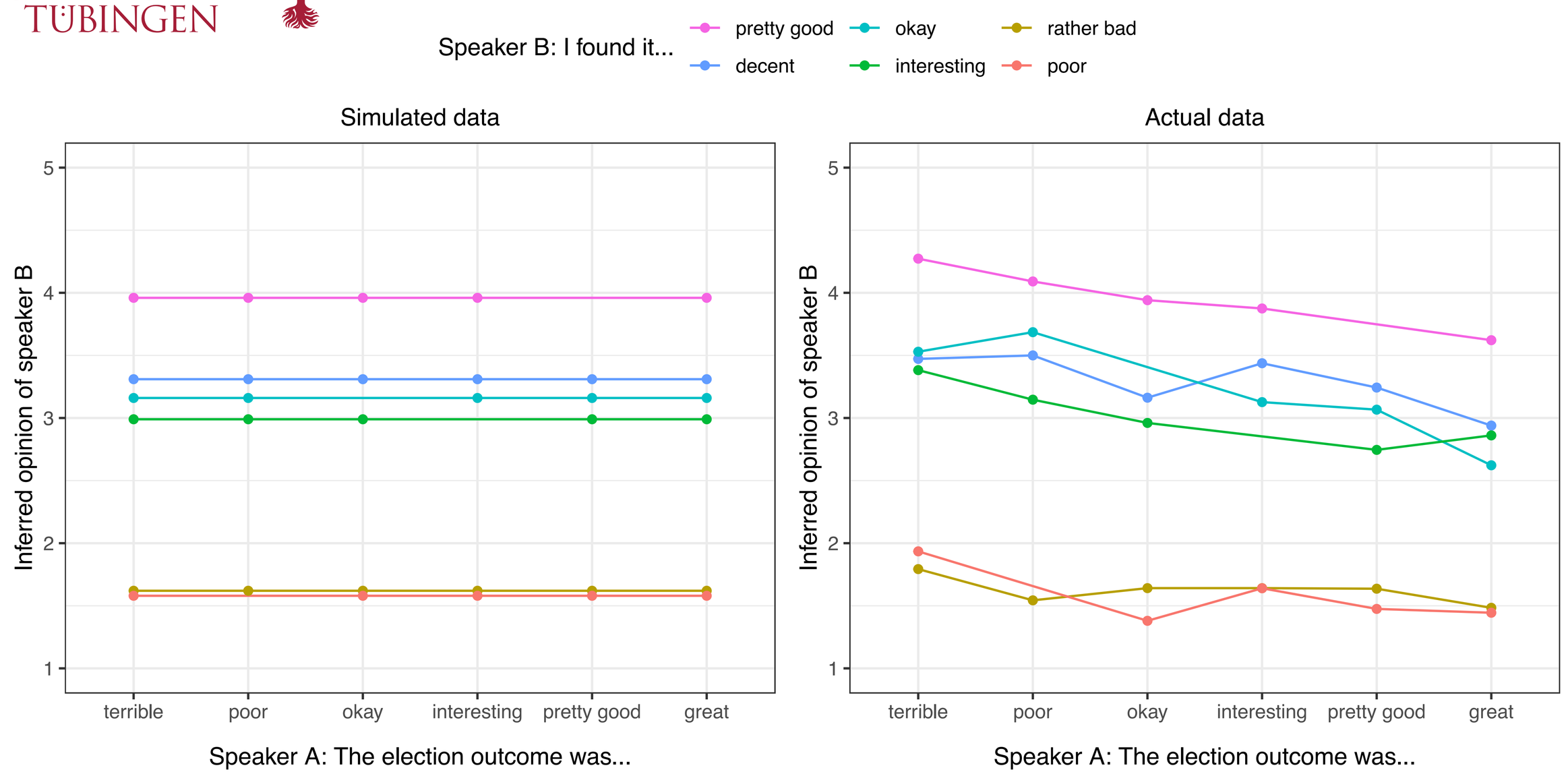

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Modeling

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Model of indirect communication

Utterance choice model

How do listeners choose indirect responses?

Inference model

How do speakers infer the listener's opinion based on these responses?

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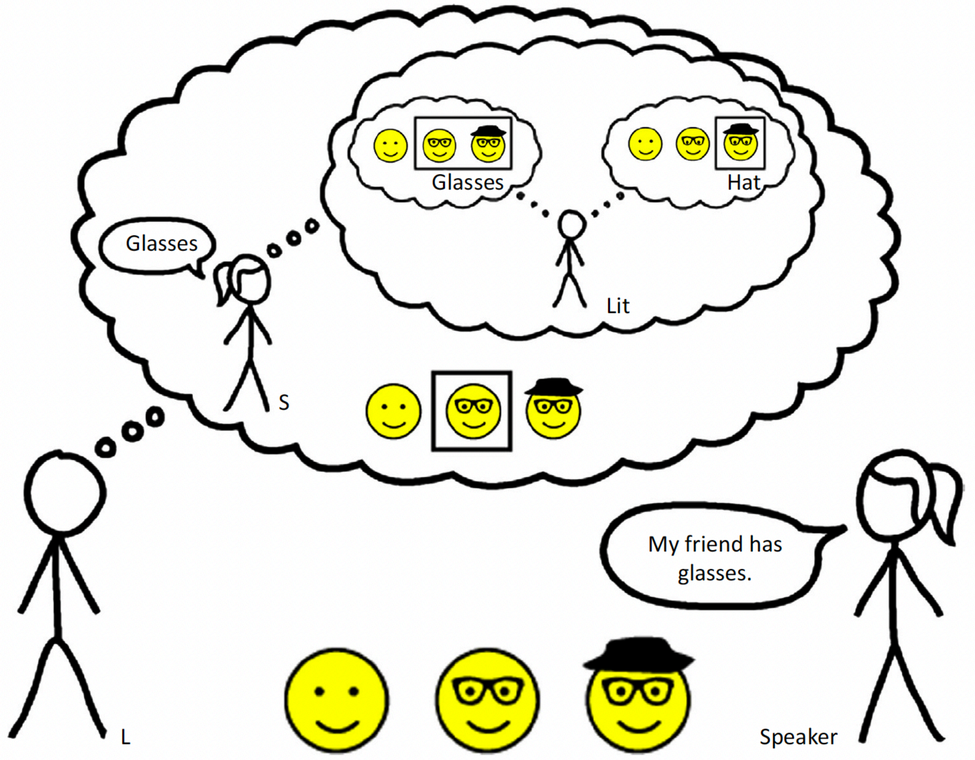
Rational Speech Act framework



Goodman & Frank, 2016

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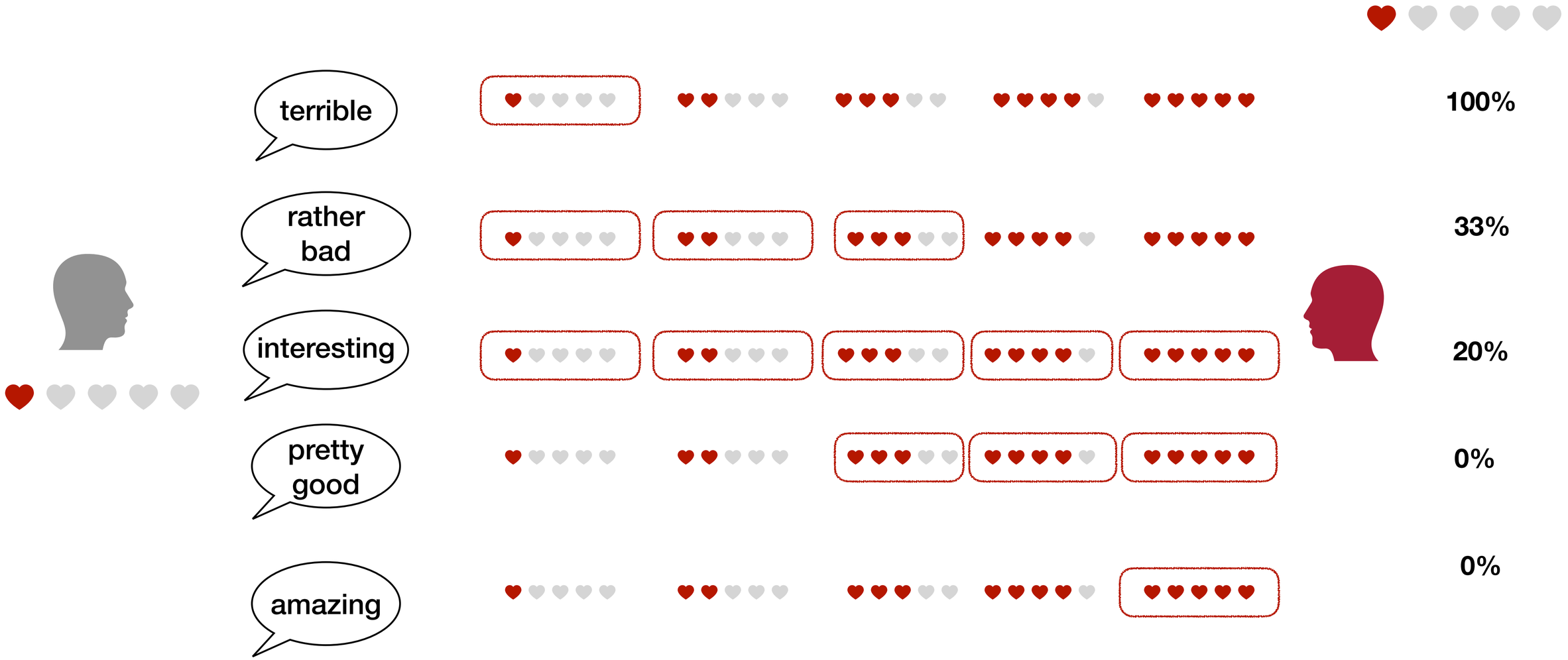
Informational utility



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Choice of indirect utterances

The results of the election were interesting!

The results of the election were interesting!

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Social utility in previous models

Giving positive feedback to the listener

♥♥♥♥♥

Politeness (Brown & Levinson, 1987)

Carcassi & Franke (2023), Yoon et al. (2020)

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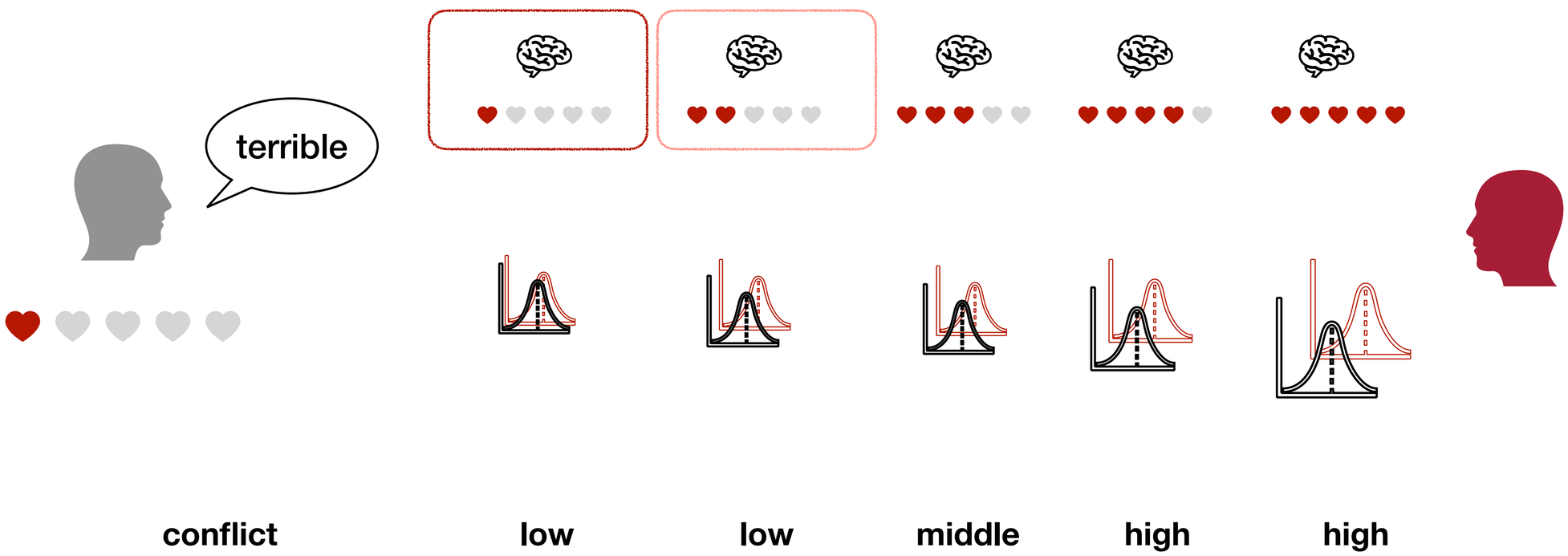
Belief divergence as social utility



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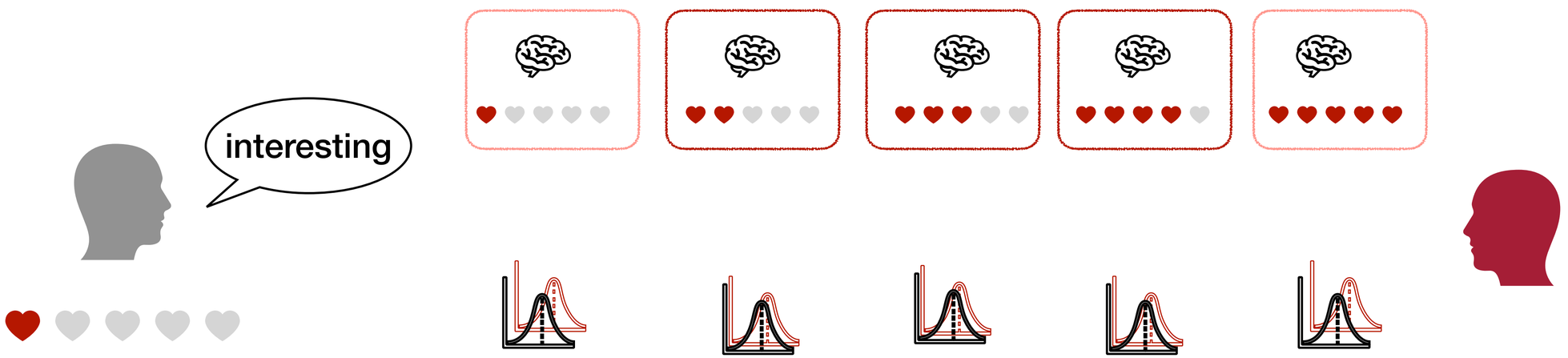
Opinion divergence as social utility



conflict | low | low | low | low | low

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Utterance utility

Utterance utility = w • informational utility + (1-w) • social utility

opinion of the speaker

utterance valence score

$$U_{inform}(O_{S_1}, u) = -\,Div(O_{S_1}, L_0(u))$$

$$U_{soc}(\pi_1^{S_1}, u) = -\int P_{S_1}(O_L \mid \pi_1^{S_1})\; Div(O_L, L_0(u))\; \mathrm{d}O_L$$

opinion of the listener

opinion of the speaker as signalled by her utterance

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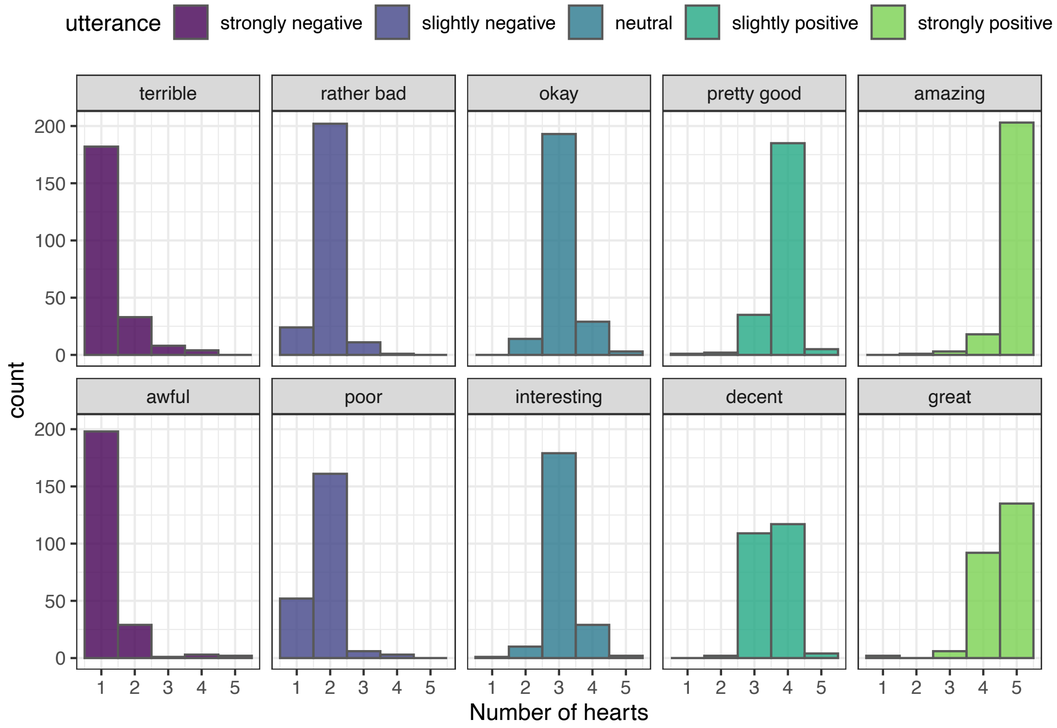
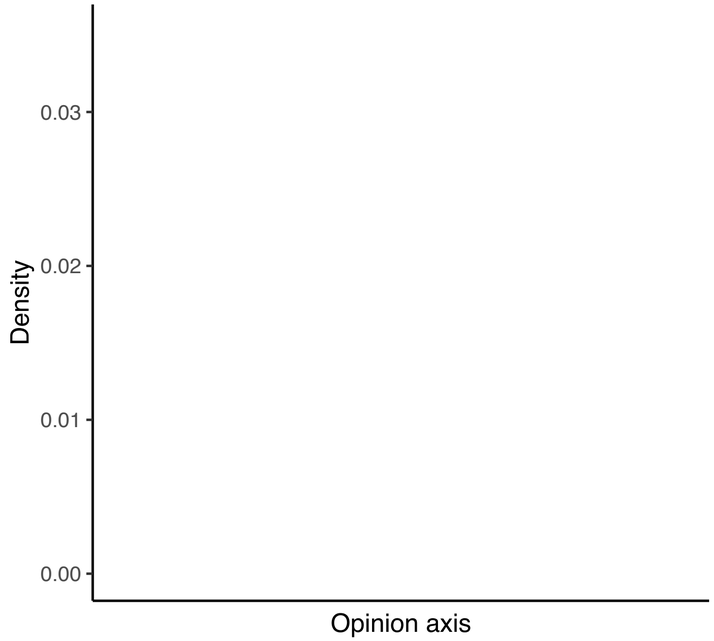
Quantifying social utility



Experiment 2. Mapping of utterances to a value scale (n = 46)



Opinions as distributions

Conflict of ideologies

(Henderson & McCready, 2024)

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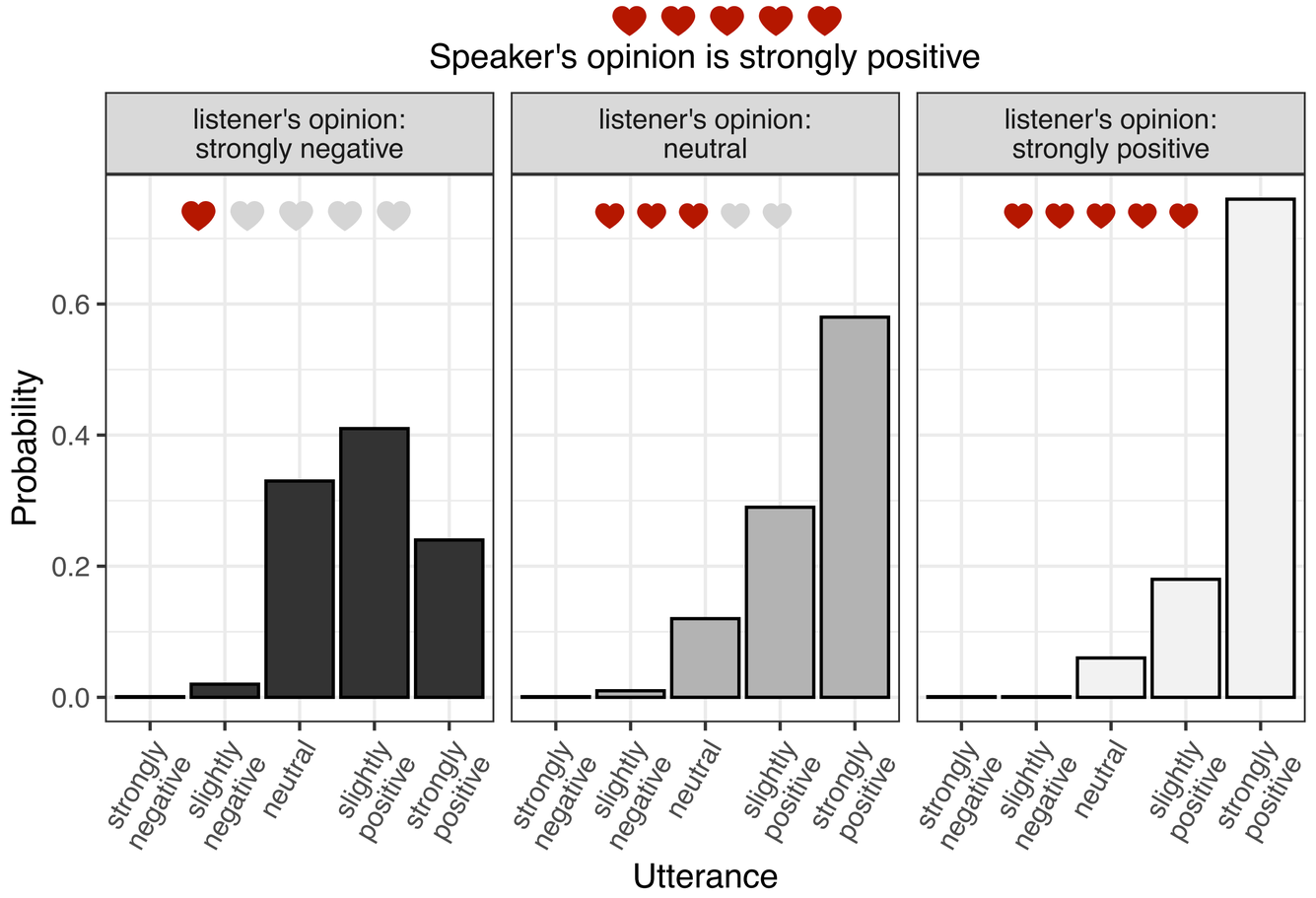
Utterance choice: model simulation



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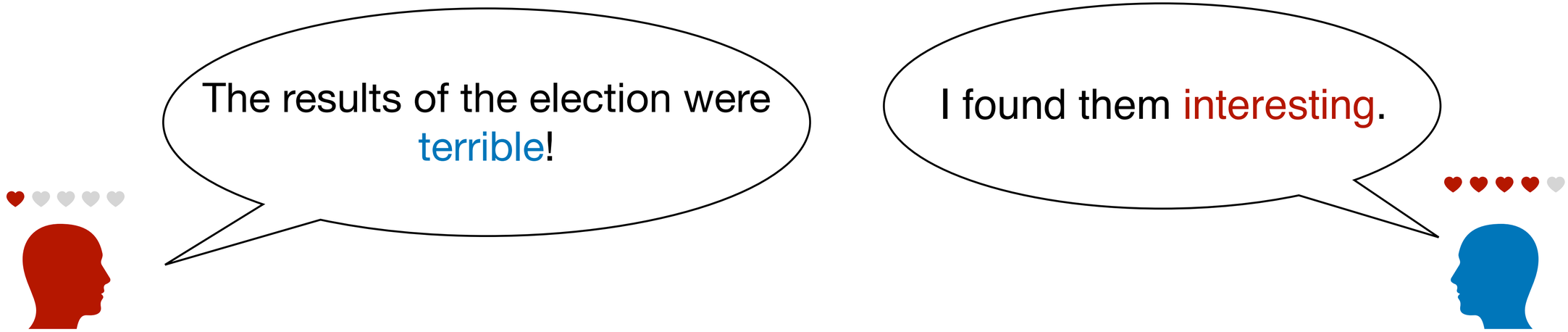
Inference that we want to capture



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Inference model

$$P(opinion \mid response) \propto P(response \mid opinion) \cdot P(opinion)$$

Infer the opinion of the speaker
by observing her response

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Inference model

$$P(opinion \mid response) \propto P(response \mid opinion) \cdot P(opinion)$$

speaker B's response
speaker A's belief about the speaker B's opinion
speaker A's belief about speaker B's belief about speaker A's opinion

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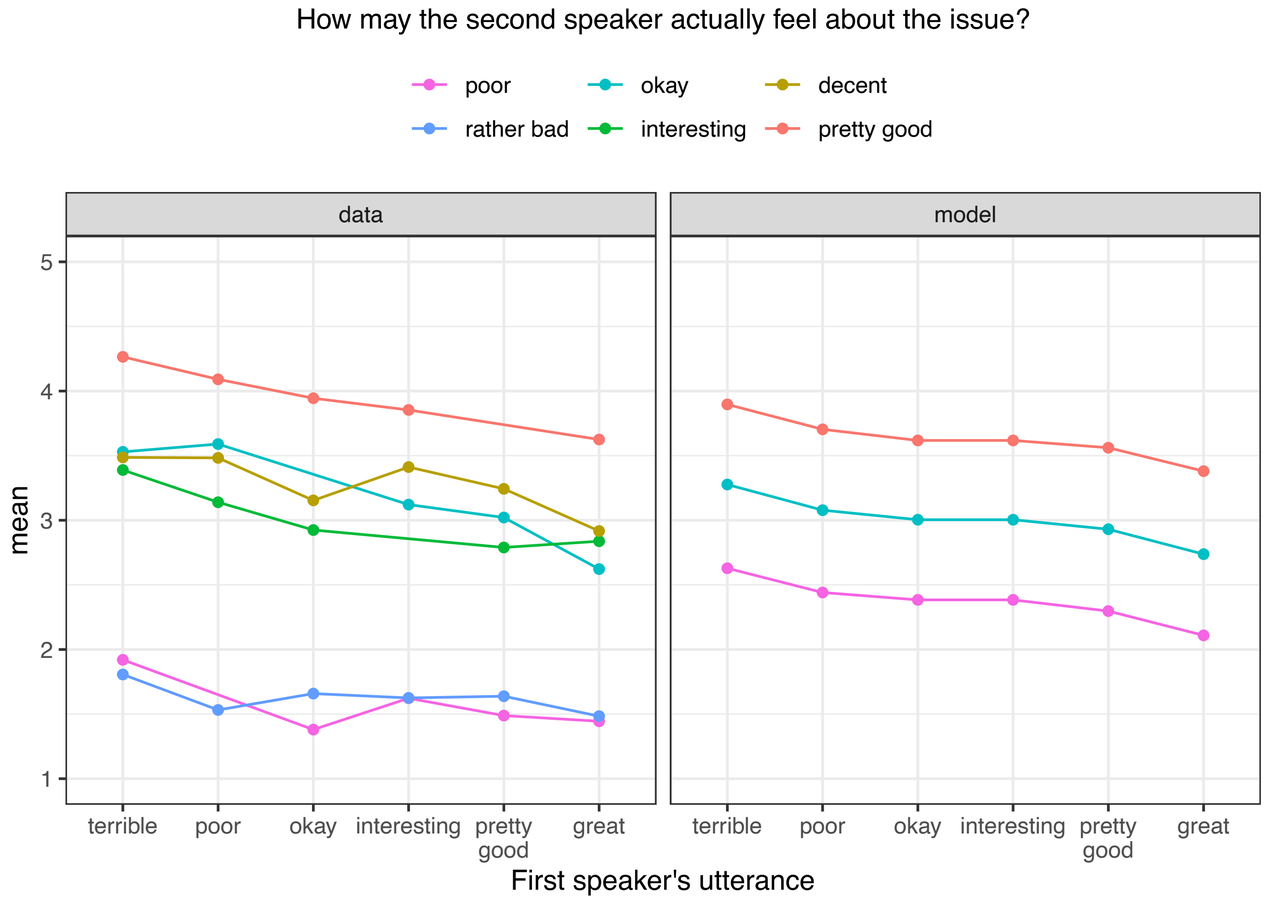
Model predictions vs. human data



Projection inferences

What is the speaker’s belief like such that she chose a particular utterance?

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Conclusion

- Indirect utterances allow the speaker to avoid a potential overt conflict of beliefs in public space
- Indirect utterances offer possibilities for verifying the state of common ground
- The listener's reaction to an indirect utterance can reveal her beliefs
- Adding uncertainty over the speaker's opinion can also extend this model to the model of belief alignment

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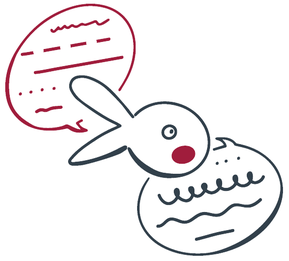
Thank you!

Funded by
DFG Deutsche Forschungsgemeinschaft
German Research Foundation



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