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Advice Taking from Interactive, Self-Explanatory Generative AI

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Background

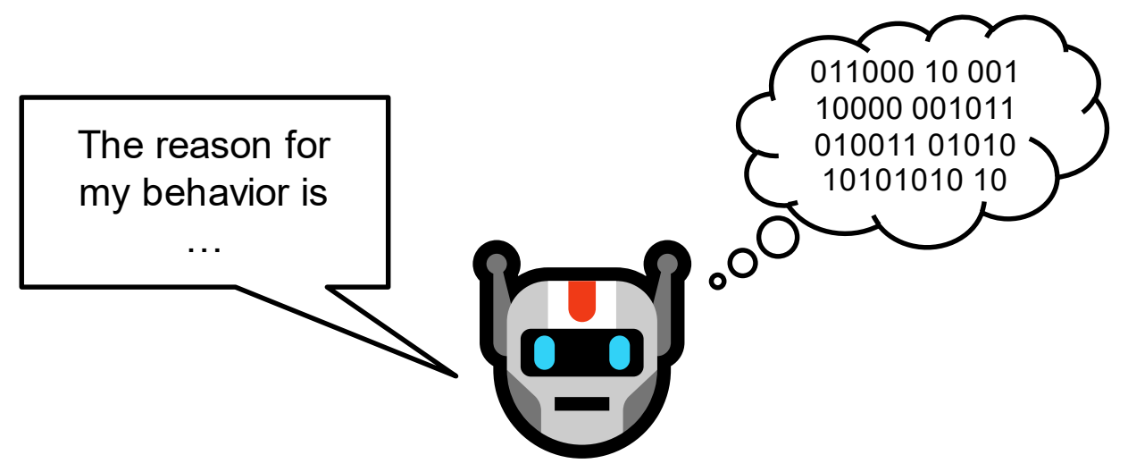
Algorithm Aversion

Individuals' general **preference** for interacting with humans rather than algorithms (Mahmud et al., 2022)

- **Versus:** Natural conversational style of contemporary chatbots (e.g., OpenAI's ChatGPT, Google's Gemini)

Explanation

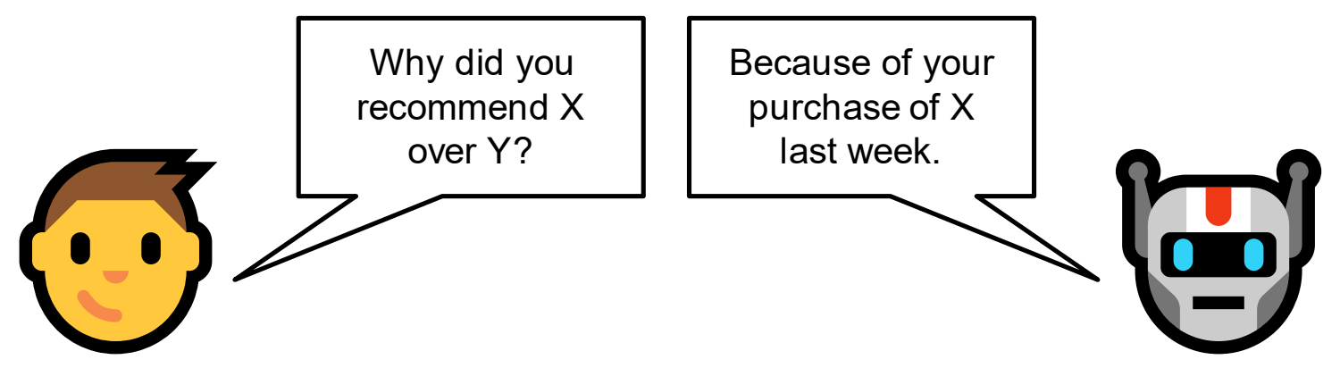
Increases **transparency** of the algorithmic judgment and decision-making process (Papamichail, 2003; van Dongen & van Maanen, 2013)



- Advice from explanatory algorithms is **weighted more strongly** (Gönül et al., 2006; Goodwin et al., 2013)

Interactivity

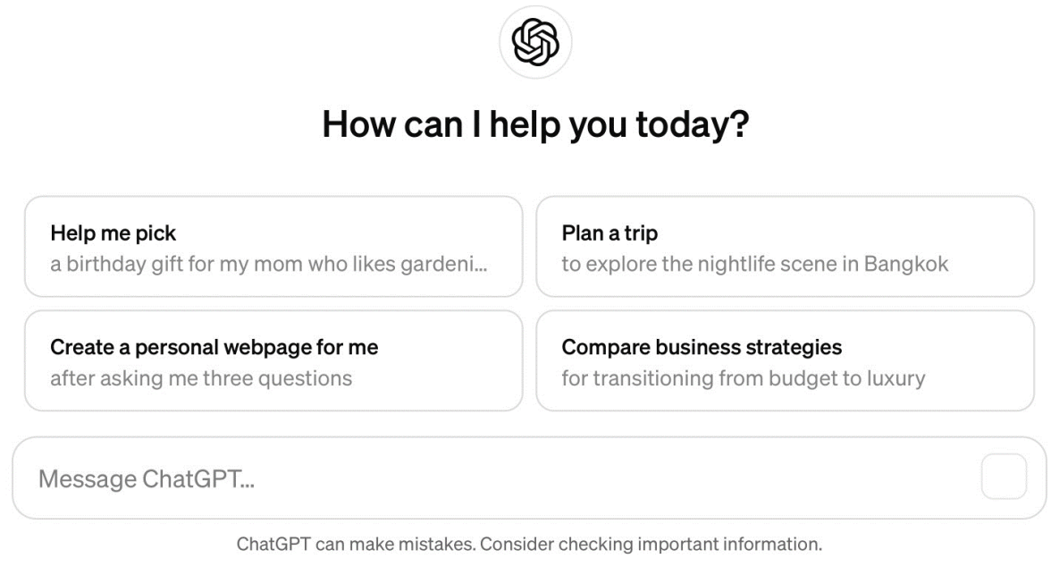
Enhances **trust calibration** and satisfies users' **desire for control** (e.g., Westphal et al., 2023)


Why did you recommend X over Y?
Because of your purchase of X last week.

- More control over the behavior of an algorithm **increases** users' willingness to rely on its output (Dietvorst et al., 2018; van Dongen & van Maanen, 2013)

Conversational User Interfaces

By providing information **upon request**, parties can reduce **informational asymmetry** (van Dongen & van Maanen, 2013)



How can I help you today?

Help me pick
a birthday gift for my mom who likes gardeni...

Plan a trip
to explore the nightlife scene in Bangkok

Create a personal webpage for me
after asking me three questions

Compare business strategies
for transitioning from budget to luxury

Message ChatGPT...

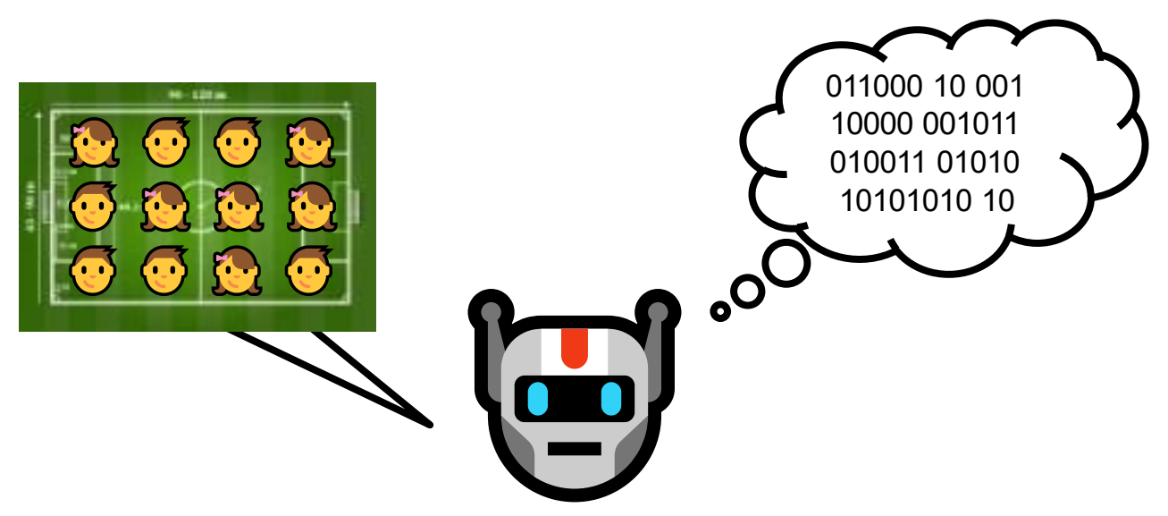
ChatGPT can make mistakes. Consider checking important information.

- Greater **salience** of influencing algorithms' behavior for actively requested than passively provided explanations
- No trust building through explanation if the opportunity to interact is **not used** to solicit an explanation (Goodwin et al., 2013)

Future Research

Multimodal Reasoning

Visual explanations improve users' objective **understanding** of complex algorithms (Cheng et al., 2019)



Method

Design

2 (**explanation**: provided vs. not provided) × 2 (**interactivity**: possible vs. not possible)

Participants

N = 472 university students (313 female, 154 male)

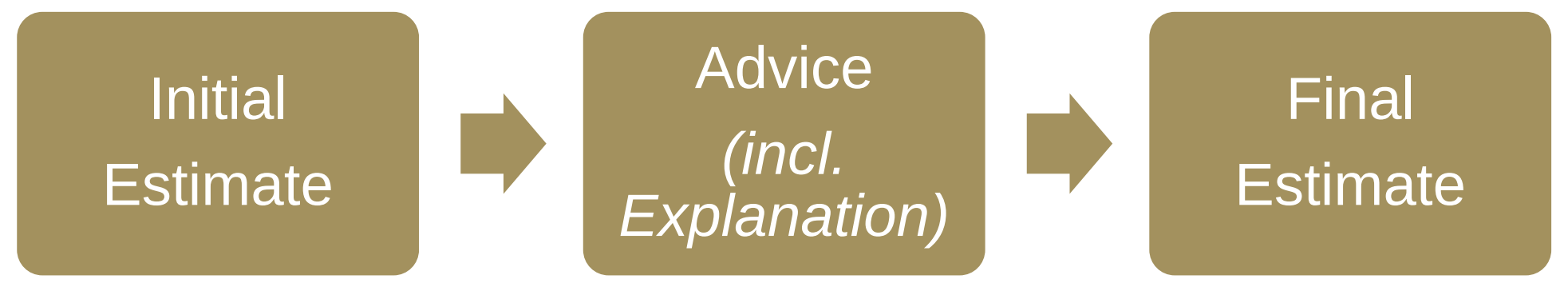
Material

10 Fermi problems (i.e., numerical judgment tasks)

- **Example:** How many soccer pitches would it take to accommodate all the inhabitants of Germany?

Procedure

Extended Judge-Advisor System (JAS) (Sniezek & Buckley, 1995)



Initial Estimate → Advice *(incl. Explanation)* → Final Estimate

- **Advice:** Pre-generated output from ChatGPT (gpt-3.5-turbo model with temperature = 0)

Dependent Variable

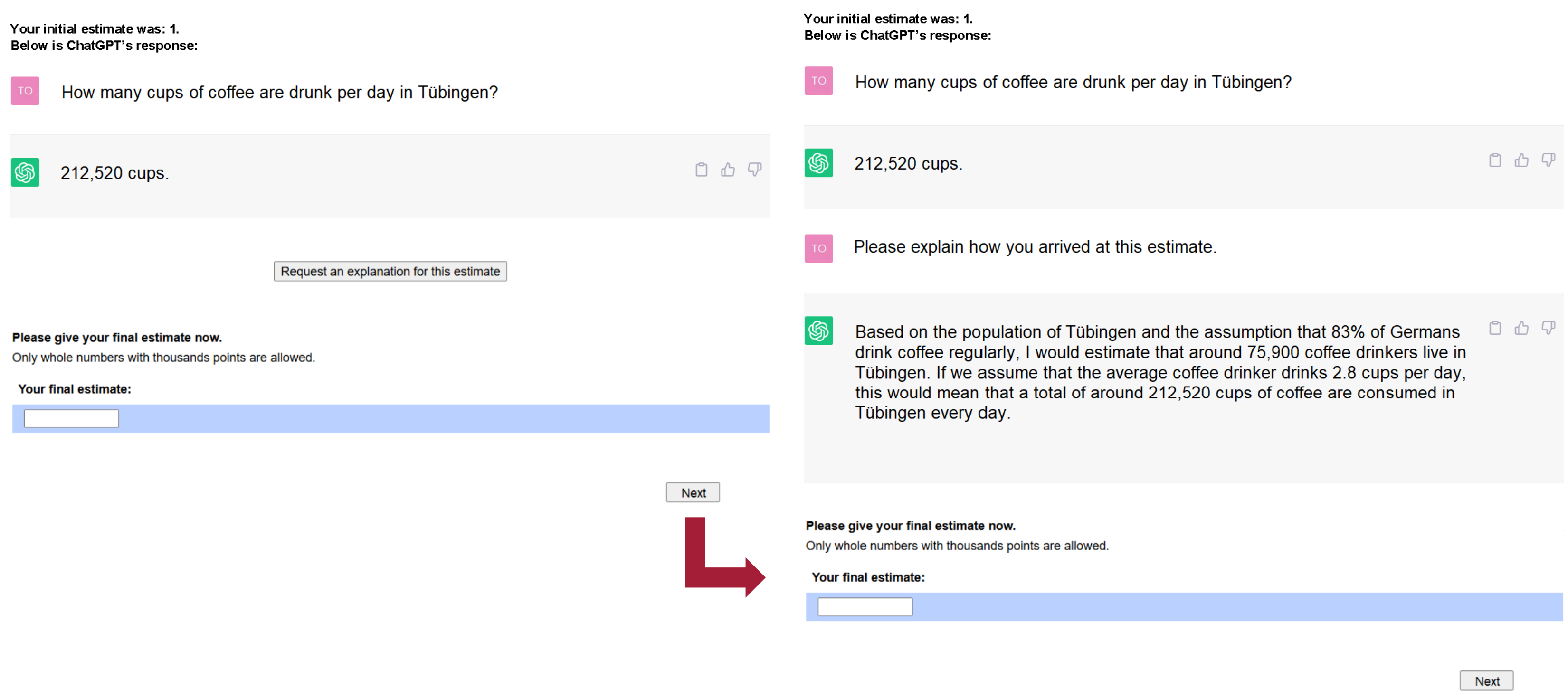
Weight of Advice (WOA) (Harvey & Fischer, 1997)

$$\text{WOA} = \frac{\text{Final Estimate} - \text{Initial Estimate}}{\text{Advice} - \text{Initial Estimate}}$$

Limitations

Interactivity

Limited to **pressing a button** for more information



Your initial estimate was: 1.
Below is ChatGPT's response:

TO How many cups of coffee are drunk per day in Tübingen?

212,520 cups.

Request an explanation for this estimate

Please give your final estimate now.
Only whole numbers with thousands points are allowed.

Your final estimate:

Next

Your initial estimate was: 1.
Below is ChatGPT's response:

TO How many cups of coffee are drunk per day in Tübingen?

212,520 cups.

TO Please explain how you arrived at this estimate.

Based on the population of Tübingen and the assumption that 83% of Germans drink coffee regularly, I would estimate that around 75,900 coffee drinkers live in Tübingen. If we assume that the average coffee drinker drinks 2.8 cups per day, this would mean that a total of around 212,520 cups of coffee are consumed in Tübingen every day.

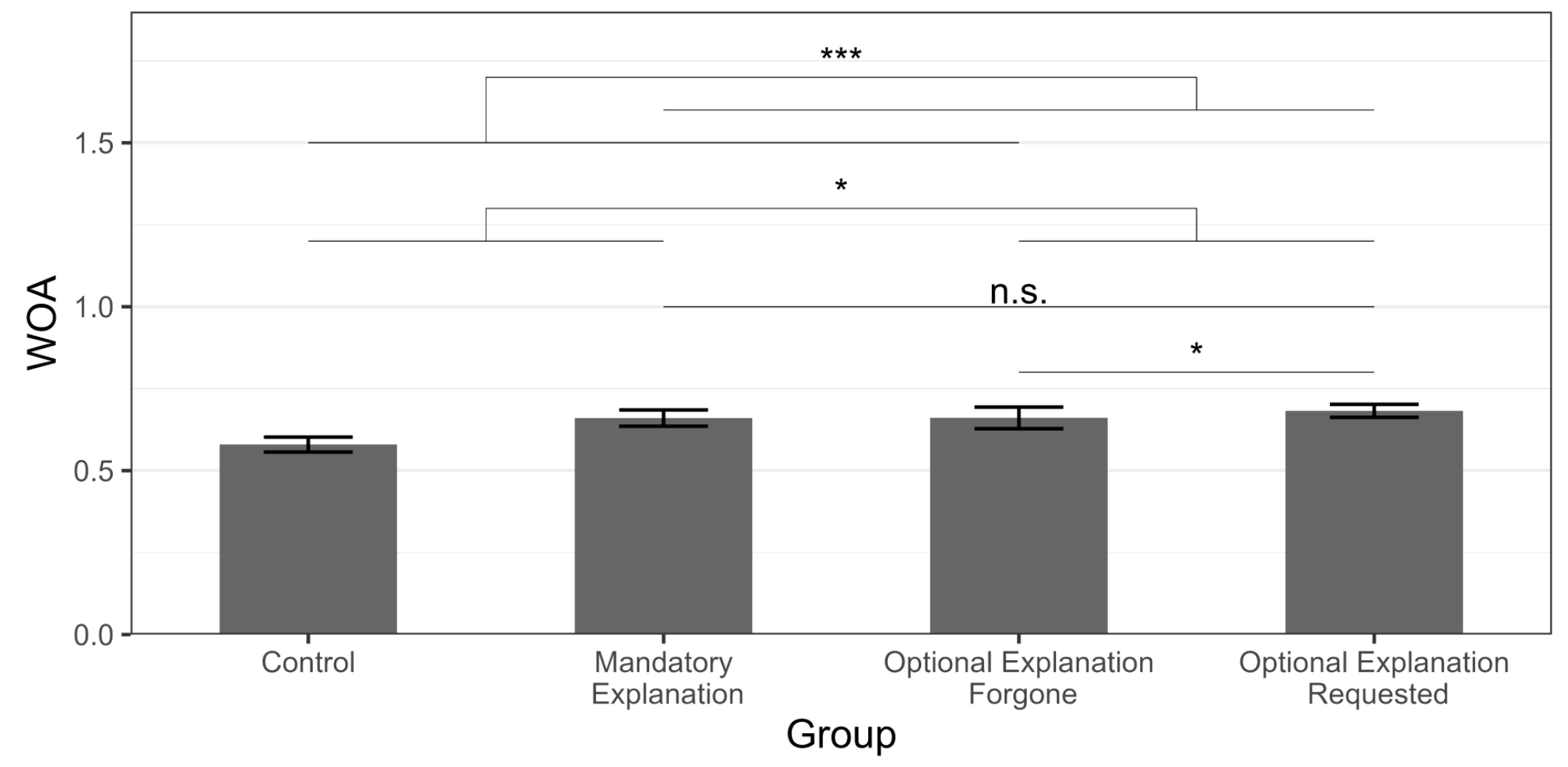
Please give your final estimate now.
Only whole numbers with thousands points are allowed.

Your final estimate:

Next

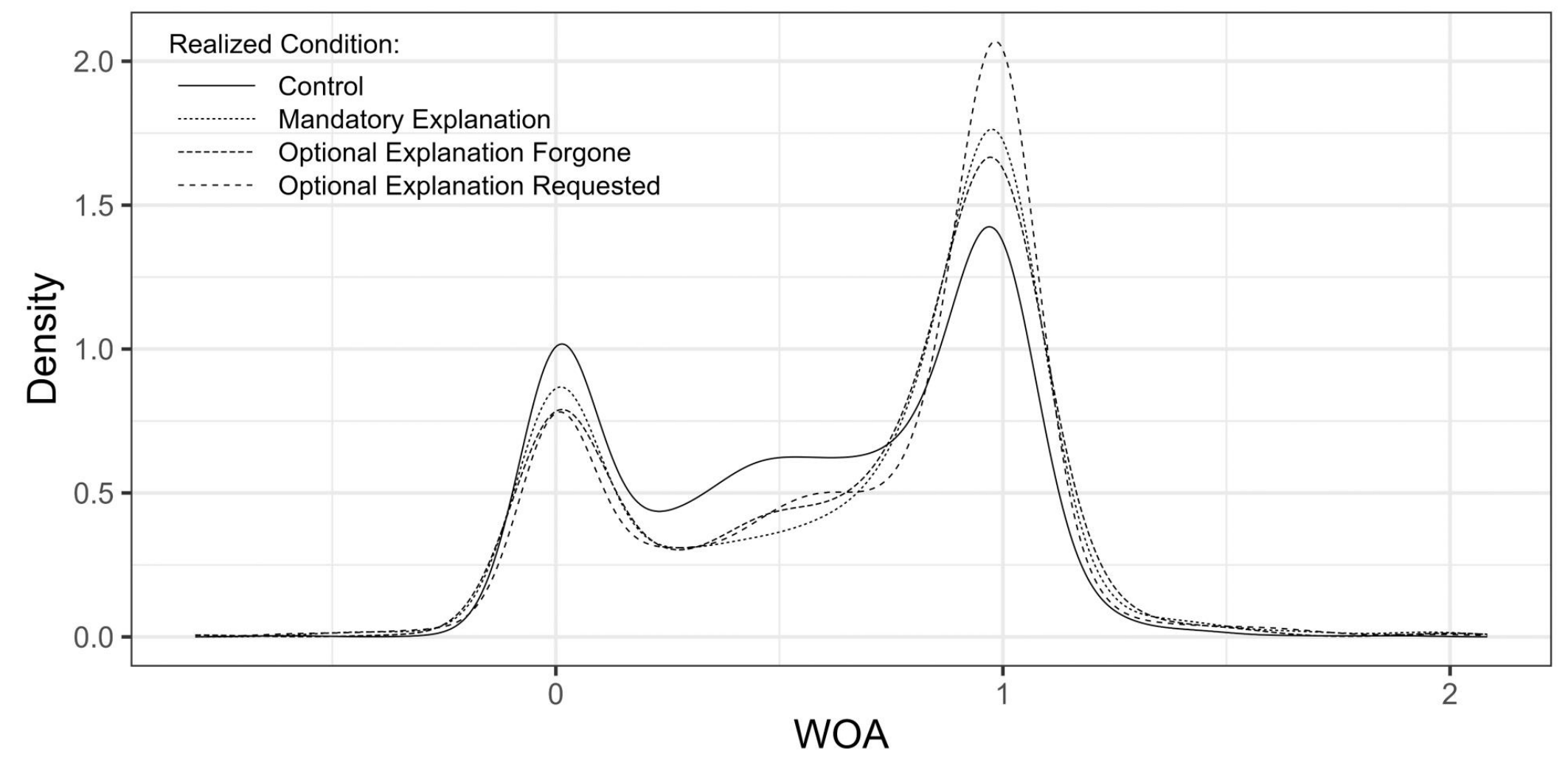
Results

Mean WOA per Group



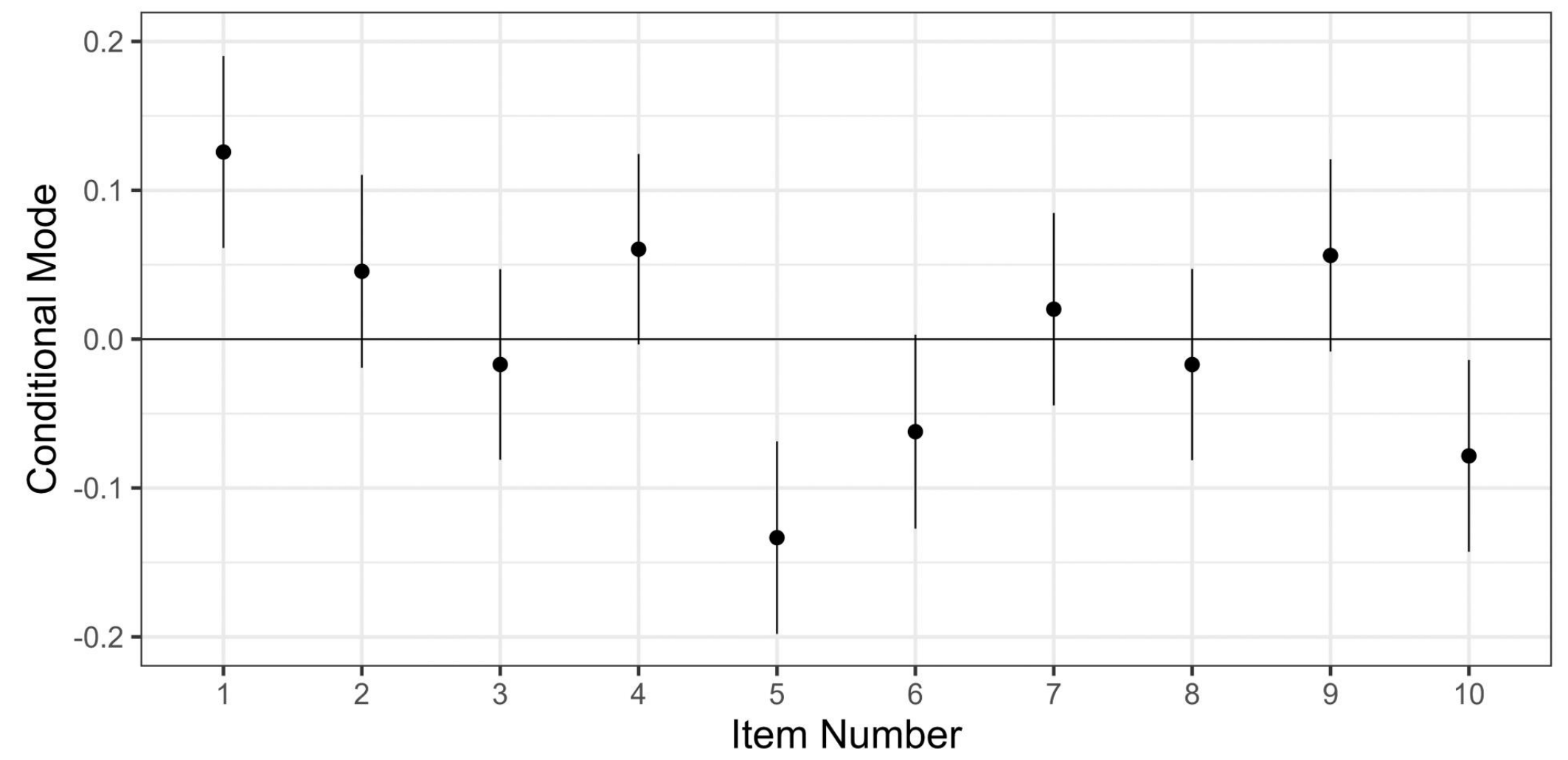
Note. Error bars show the 95% CI. Outliers of WOA are excluded based on Tukey's (1977) fences. * p < .05, ** p < .01, *** p < .001, two-sided. Adapted from Rebholz et al. (2024). CC BY 4.0.

Distribution of WOA per Group



Note. Gaussian kernel density plots with the bandwidth chosen according to Silverman's (1986) rule of thumb. Outliers of WOA are excluded based on Tukey's (1977) fences. From Rebholz et al. (2024). CC BY 4.0.

Deviations from Mean WOA per Item

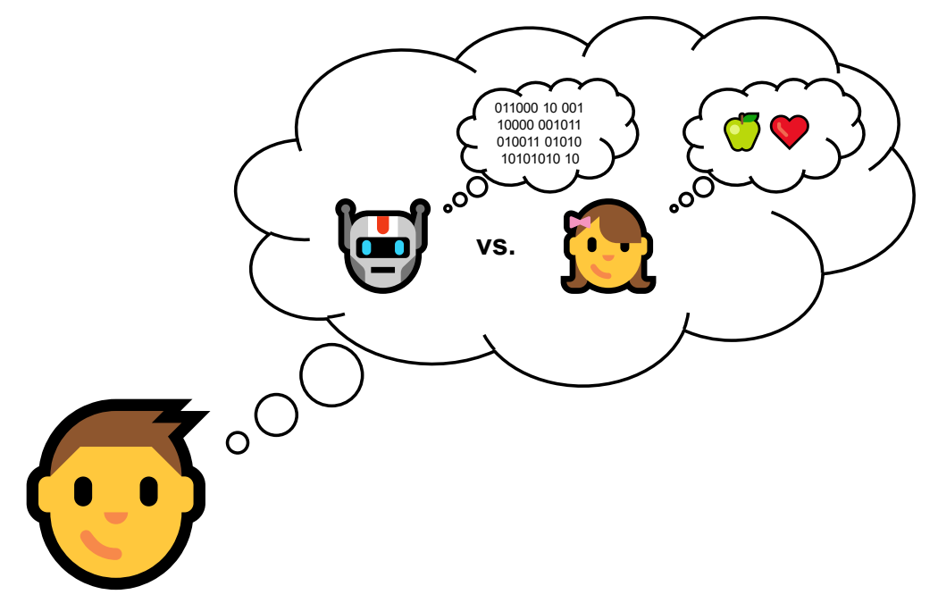


Note. Error bars show the 95% *CI*. The underlying extended multilevel model includes participant and item random slopes of explanation. From Rebholz et al. (2024). CC BY 4.0.

Implications

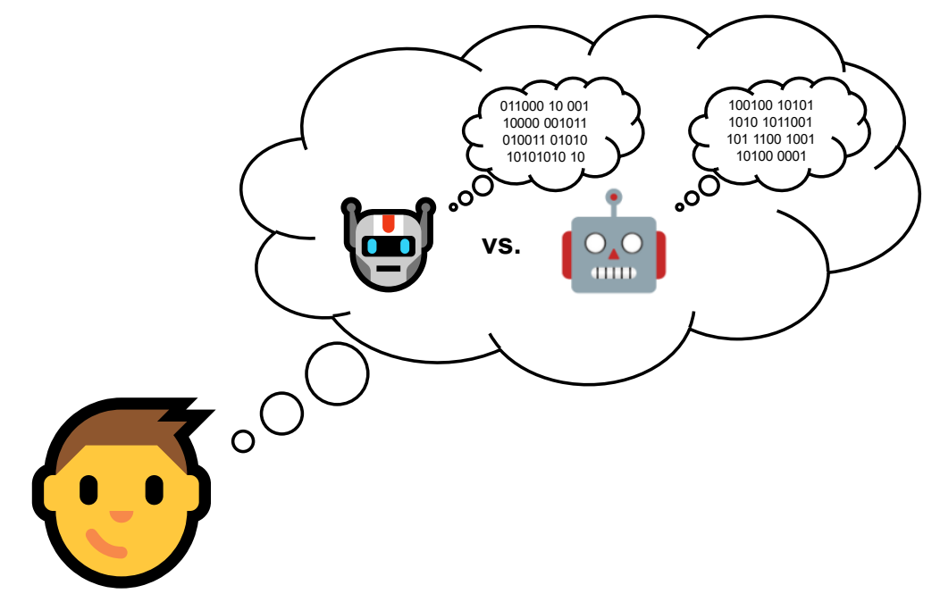
Theory of Machine

(Logg, 2022)



Theory of Machine 2.0

(Rebholz, 2024)



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