

Disbelief, Belief Updating, and Polarization

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August 2, 2025

Kyoto Summer Workshop on Applied Economics 2025

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- This paper: Roles of **Disbeliefs in out-group knowledge** in **belief updating**

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1. Do people **underestimate out-group knowledge** on factual information?
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2. Do people **overweigh in-group judgments** when evaluating what is true?
 - Existence of **In-group bias in belief updating**
3. Can **correcting disbelief** reduce **in-group bias in belief updating**?
 - Yes

Surveys

- US and South Korea (today: only US)
- Two surveys
 - Study 1 (N=295): Document disbelief in out-group knowledge
 - Study 2 (N=301):
 - Document in-group bias in belief updating
 - Experiment if correcting disbelief reduces the in-group bias
- Recruit participants through PureSpectrum, an online survey panel provider
- **Today: PILOT, not Real**

Today's Plan

Study 1. Baseline Evidence of Disbelief

- Hypotheses and Survey Design

- Disbelief on Out-group's Knowledge

Study 2. Experiment

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- In-group Bias in Belief Updating

- Effects of Correcting Disbelief on In-group Bias

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Hypotheses: Disbelief in out-group knowledge

- H1: Target-based Disbelief
 - RP supporters believe that RP supporters are more knowledgeable
 - DP supporters believe that DP supporters are more knowledgeable
- H2: Perceiver-based Disbelief
 - RP supporters are seen as more knowledgeable by RP than DP
 - DP supporters are seen as more knowledgeable by DP than RP

Study 1: Survey Structure (N=295)

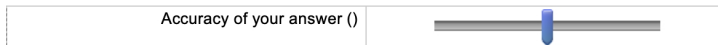
- Ask to evaluate 16 factual questions:
 - political (4), non-political (4), conspiracy theory (8)
- Examples
 - "New Zealand is located in the Middle East."
 - "The country's GDP growth rate in the previous year was lower than 7%."
 - "The Republican administration initiated the Iraq war for oil interests."
 - "The 2020 presidential election was stolen from Donald Trump."
- Ask to give confidence level $a_{i,k} \in [0, 100]$
- Then, for each question, ask to estimate the accuracy rates for two groups
 - Republican supporters (R), Democrat supporters (D)

Q26 Please judge whether the sentence is true or false: **New Zealand is located in the Middle East.**

- ☐ True (1)
- ☐ False (2)

Q27 We would like you to estimate how confident you are in the accuracy of your answer to the true-or-false question. For example, if you believe there is a 50% chance that your answer is correct, please choose 50. If you are completely confident that your answer is correct, please choose 100.

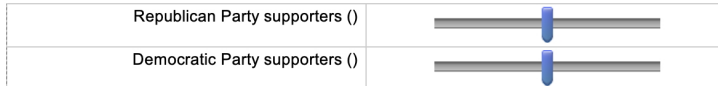
0 10 20 30 40 50 60 70 80 90 100



Q28 Next, we would like you to estimate **the percentage of people in each of the following groups who correctly judge whether the statement is true or false.** For example, if

+everyone in group X makes the correct judgement, the percentage of group X would be 100%.

0 10 20 30 40 50 60 70 80 90 100



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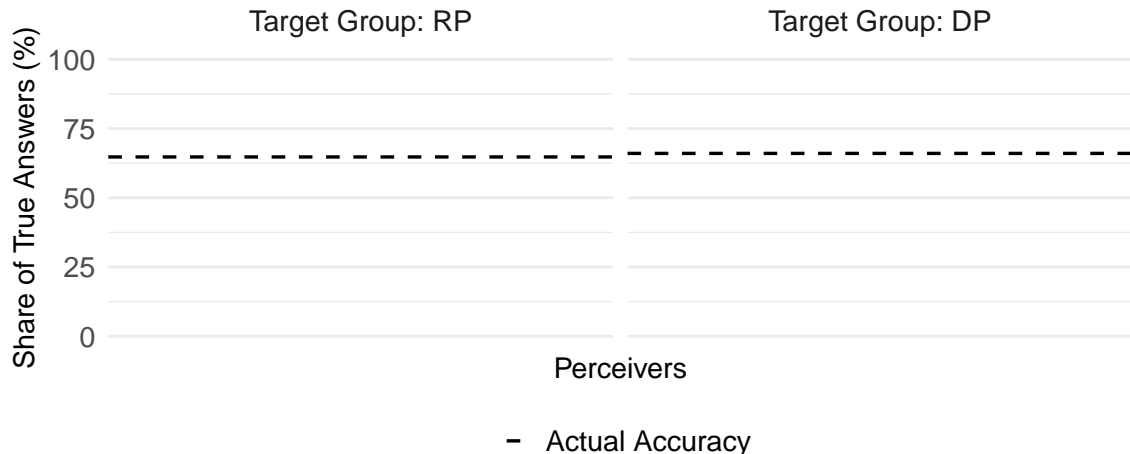
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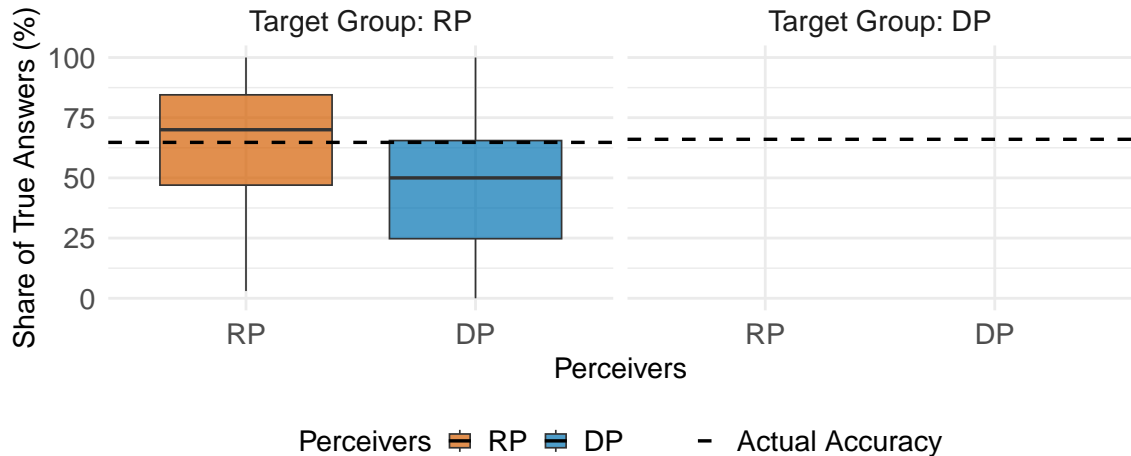
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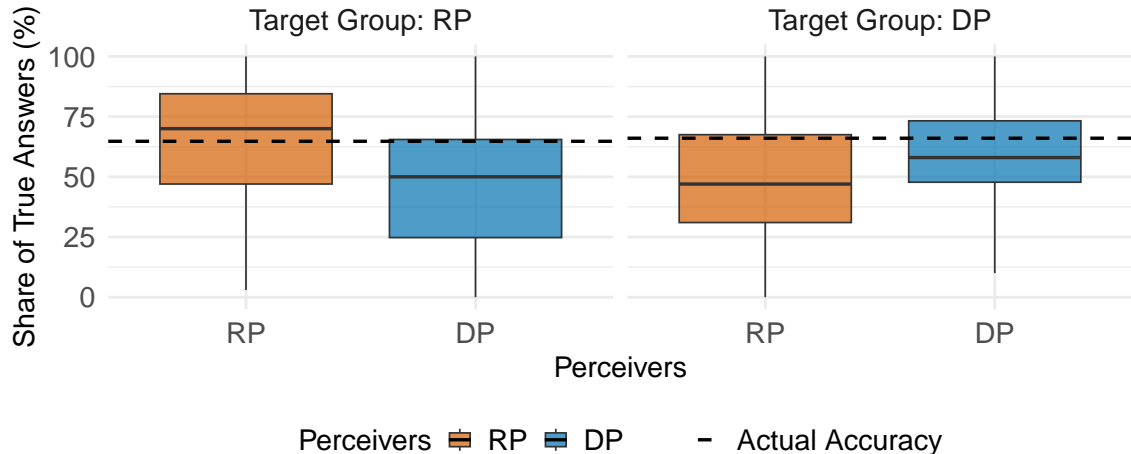
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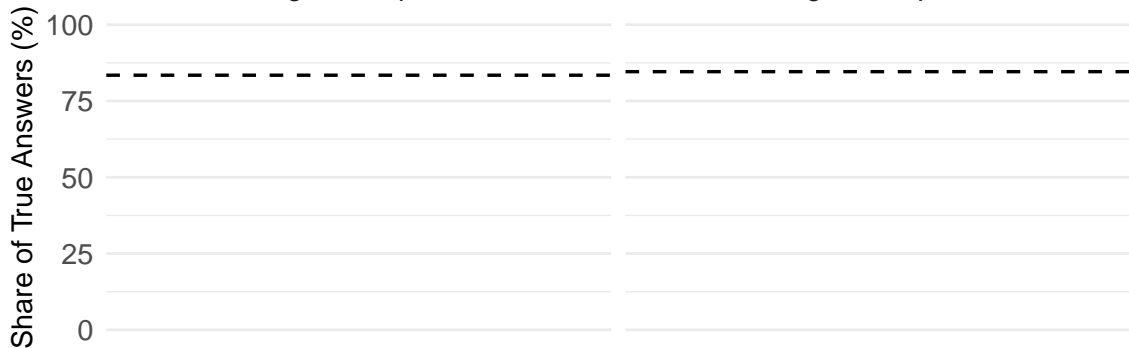


Fact 5: New Zealand is in the Middle East?

Fact 5 : New Zealand is a country located in the Middle East.

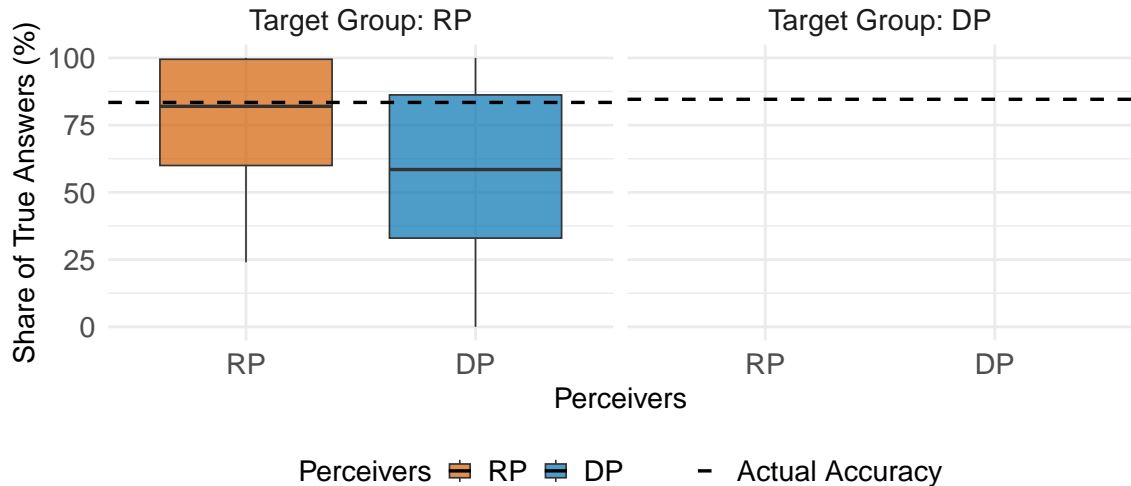
Target Group: RP

Target Group: DP



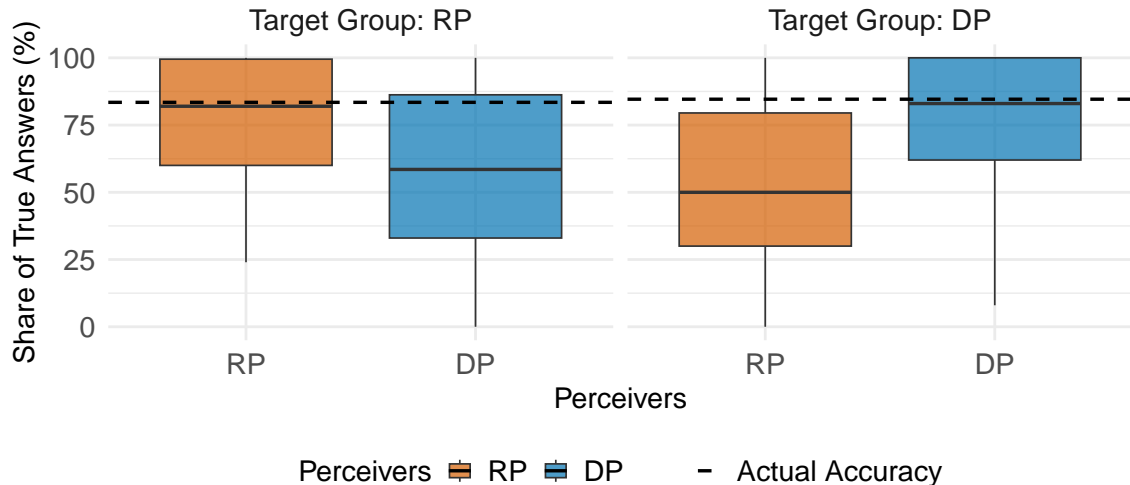
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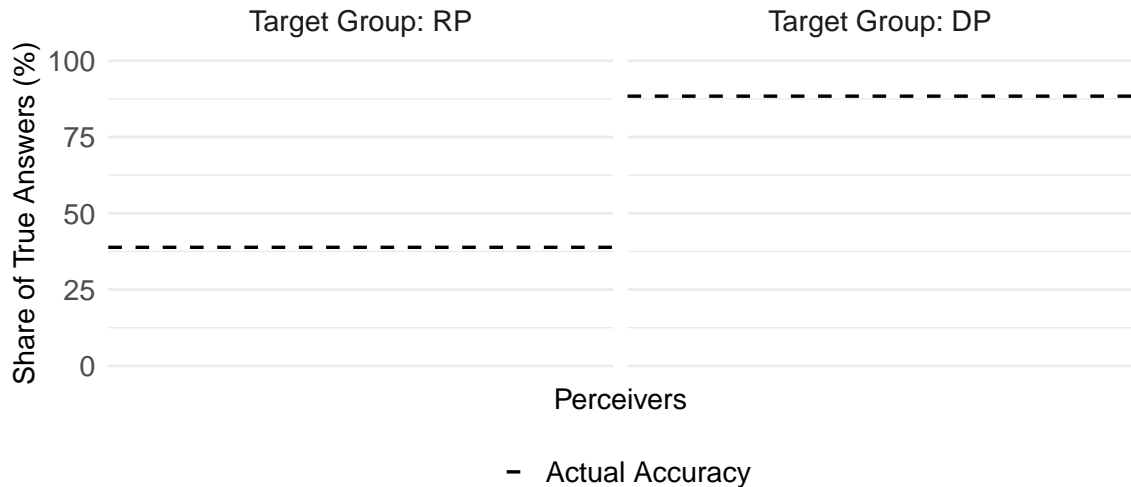
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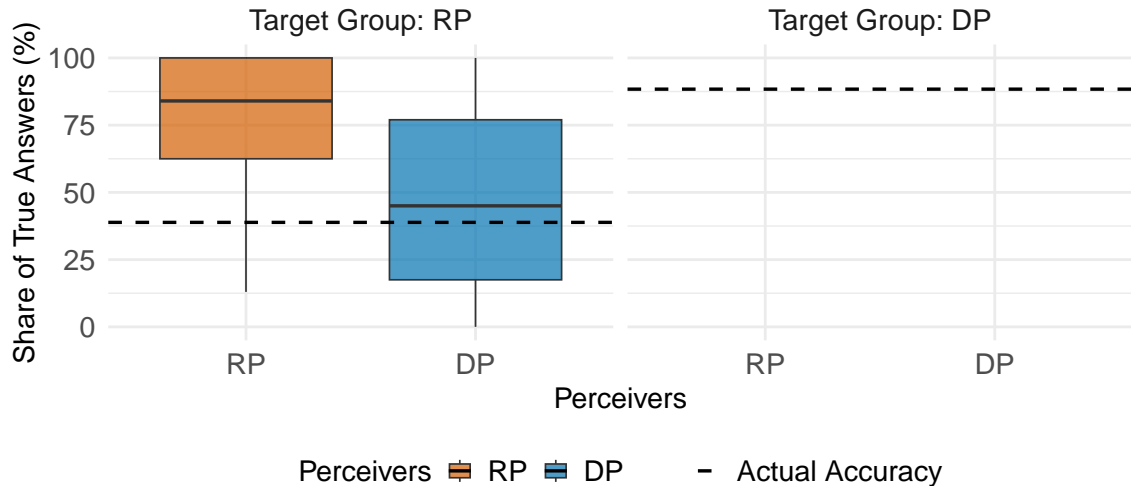
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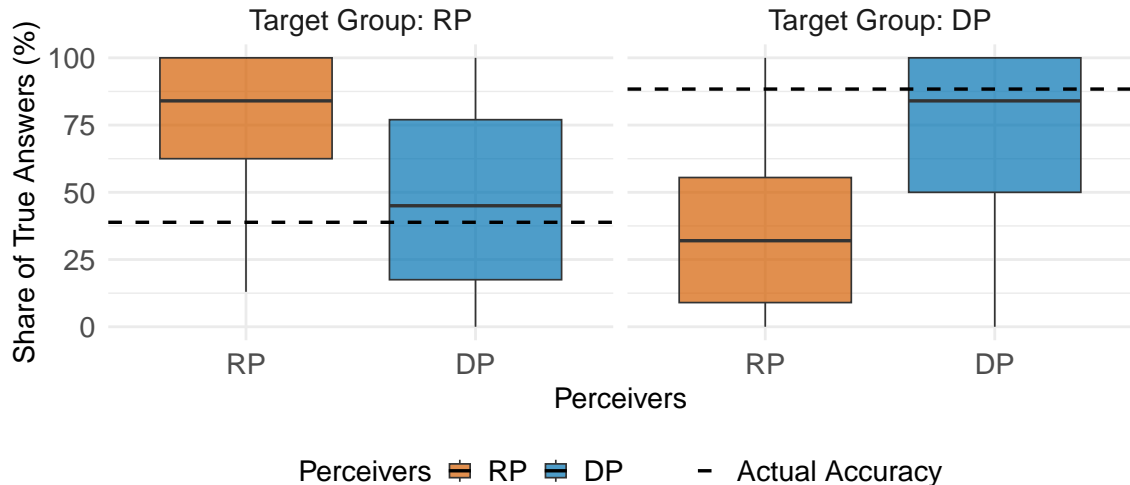
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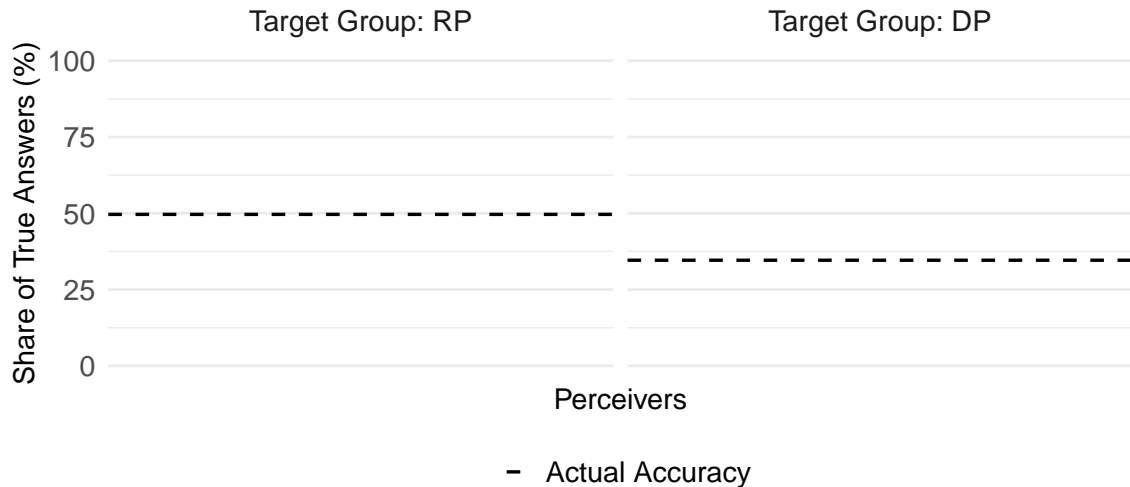
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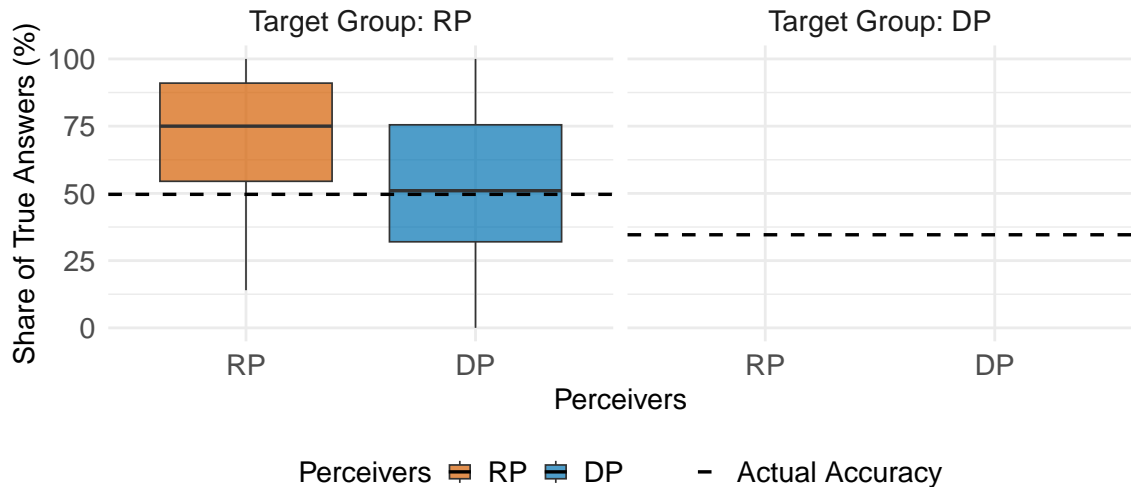
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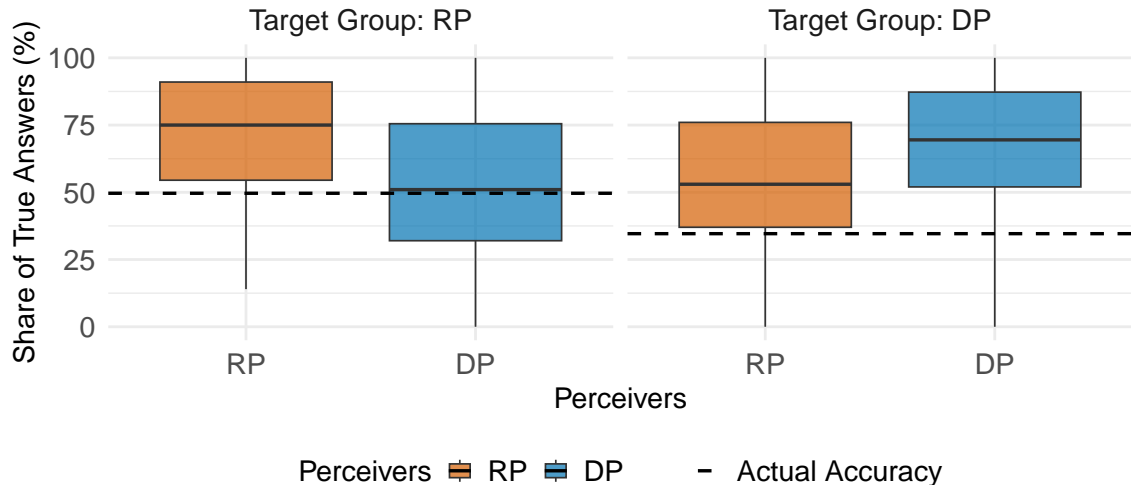
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- Target-based Disbelief (given perceiver)

$$p_{i,g(i),k}^{g'(i)} = \alpha_1 \mathbb{1}_{g \neq g'} + \eta_g + \mu_k + \varepsilon_{i,g',k}$$

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- Suppose $g(i) = RP$ (fix perceiver = Republican Party supporters)
- $\alpha_1 < 0$ iff i perceives DP's knowledge as lower than RP's for each task k

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$$p_{i,g(i),k}^{g'(i)} = \alpha_2 \mathbb{1}_{g \neq g'} + \eta_{g'} + \mu_k + \varepsilon_{i,g',k}$$

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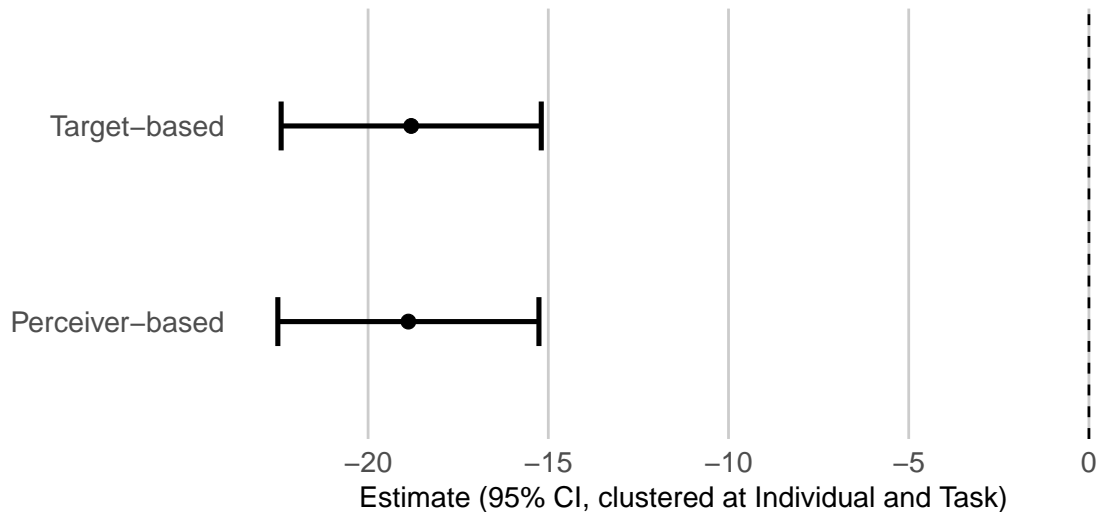
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- $\alpha_2 < 0$ iff RP's knowledge for each task k is perceived lower by DP than RP

Results: Average Disbelief is about 20 pt

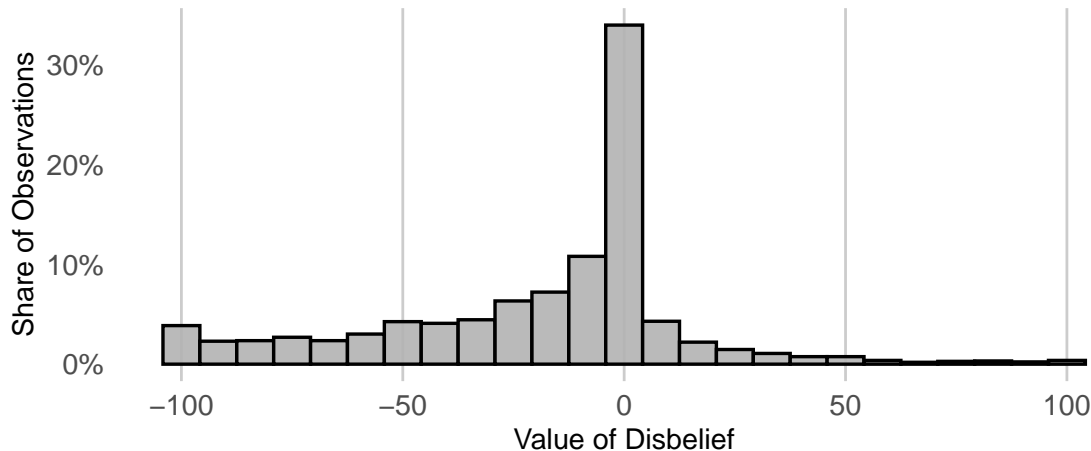
Disbelief in Out-group Knowledge



Heterogeneity in Disbelief

Define out-group disbelief by $q_{i,k} = p_{i,g(i),k}^{g'(i)} - p_{i,g(i),k}^{g(i)}$

Distribution of Disbelief



Summary of Study 1

Existence of disbelief about out-group knowledge

- Both partisans are equally knowledgeable in non-conspiracy items
- However, there are about 20 points of disbelief in out-group knowledge

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Given the baseline results in Study 1, Study 2

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Given the baseline results in Study 1, Study 2

- documents **in-group bias in belief updating**
 - e.g., R overweighs the opinion of R over that of D
- runs experiments if correcting **disbelief** reduces the **in-group bias**
 - Study 1 already shows R and D are equally knowledgeable
 - Treatment = telling the fact above

Study 2: Survey Structure (N=301)

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 - In-group signal: tells that in-groups know the correct answers
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5. Questions about affective polarization (Appendix)

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What we want: See how they update their beliefs (judgement & confidence)

Measurement of Belief Updating

For individual i and task k , construct the following two types of dummy variables

1. Correct Judgement: $y_{i,k}^J \equiv \mathbb{1}\{J_{i,k}^1 - J_{i,k}^0 > 0\}$; mean= 0.163

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 - $J_{i,k}^0$: Correctness before signals ($J_{i,k}^0 = 1$ if Correct and $= 0$ if Wrong)
 - $J_{i,k}^1$: Correctness after signals

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2. Confidence towards Correct Answer: $y_{i,k}^\mu \equiv \mathbb{1}\{\mu_{i,k}^1 - \mu_{i,k}^0 > 0\}$; mean= 0.470

- $\mu_{i,k}^0$: Confidence towards Correct answers before signals

$$\mu_{i,k}^0 = \begin{cases} \frac{a_{i,k}^0}{100} & \text{if } J_{i,k}^0 = 1 \\ 1 - \frac{a_{i,k}^0}{100} & \text{if } J_{i,k}^0 = 0 \end{cases}$$

where $a_{i,k}^0 \in [0, 100]$ is confidence level for their answer

- $\mu_{i,k}^1$: Confidence towards Correct answers after signals

In-group Signals Shift Beliefs More Toward the Truth?

Specification: (i: indiv., k: task)

$$y_{i,k} = \beta \mathbb{1}\{\text{In-group Signal}\}_{i,k} + \eta_k + \varepsilon_{i,k}$$

- $y_{i,k}$: measure of belief updating
- η_k : Task (question) fixed effects

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Table: In-group Bias in Belief Updating

| | Dep. Var.: Belief Updating | |
|-----------------|----------------------------|------------|
| | Judgement | Confidence |
| In-group Signal | | |
| Obs. | 903 | 903 |
| Task FEs | ✓ | ✓ |
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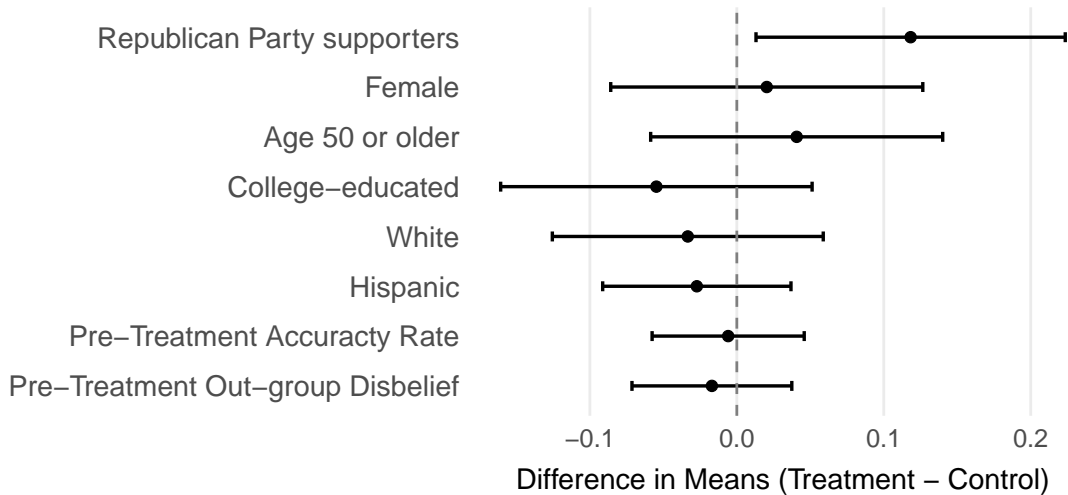
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Balanced Test across Control and Treated



Correcting Disbelief Reduces In-group Bias?

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| | Judgement | | Confidence | |
| | Control | Treated | Control | Treated |
| In-group Signal | | | | |
| Obs. | 453 | 450 | 453 | 450 |
| Task FEs | ✓ | ✓ | ✓ | ✓ |
| Dep. Var Mean | 0.163 | 0.162 | 0.455 | 0.484 |

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Correcting Disbelief Reduces In-group Bias!

Specification: (i: indiv., k: factual task). Run separately for Control and Treated

$$y_{i,k} = \beta \mathbb{1}\{\text{In-group Signal}\}_{i,k} + \eta_k + \varepsilon_{i,k}$$

Table: In-group Bias in Belief Updating by Sub-sample

| | Dep. Var.: Belief Updating | | | |
|-----------------|----------------------------|------------------|----------------|----------------|
| | Judgement | | Confidence | |
| | Control | Treated | Control | Treated |
| In-group Signal | 0.055 (0.025) | 0.012 (0.010) | 0.108 0.036 | 0.042 0.034 |
| Obs. | 453 | 450 | 453 | 450 |
| Task FEs | ✓ | ✓ | ✓ | ✓ |
| Dep. Var Mean | 0.163 | 0.162 | 0.455 | 0.484 |

Correcting Disbelief Reduces In-group Bias

Specification: (i: indiv., k: factual task). Interaction

Correcting Disbelief Reduces In-group Bias

Specification: (i: indiv., k: factual task). Interaction

| | Judgement | Confidence |
|----------------------------|-----------|------------|
| In-group Signal | | |
| Treatment | | |
| In-group Signal \times T | | |
| Obs. | 903 | 903 |
| Task FEs | ✓ | ✓ |
| Dep. Var Mean | 0.163 | 0.470 |
| Min Det. Effect | 0.170 | 0.230 |

Correcting Disbelief Reduces In-group Bias

Specification: (i: indiv., k: factual task). Interaction

| | Judgement | Confidence |
|----------------------------|-------------------|------------|
| In-group Signal | 0.054 (0.025) | |
| Treatment | 0.019 (0.034) | |
| In-group Signal \times T | -0.041 (0.030) | |
| Obs. | 903 | 903 |
| Task FEs | ✓ | ✓ |
| Dep. Var Mean | 0.163 | 0.470 |
| Min Det. Effect | 0.170 | 0.230 |

Correcting Disbelief Reduces In-group Bias

Specification: (i: indiv., k: factual task). Interaction

| | Judgement | Confidence |
|----------------------------|-------------------|-------------------|
| In-group Signal | 0.054 (0.025) | 0.105 (0.037) |
| Treatment | 0.019 (0.034) | 0.061 (0.034) |
| In-group Signal \times T | -0.041 (0.030) | -0.064 (0.007) |
| Obs. | 903 | 903 |
| Task FEs | ✓ | ✓ |
| Dep. Var Mean | 0.163 | 0.470 |
| Min Det. Effect | 0.170 | 0.230 |

Today's Plan

Study 1. Baseline Evidence of Disbelief
Hypotheses and Survey Design
Disbelief on Out-group's Knowledge

Study 2. Experiment
Hypotheses and Survey Design
In-group Bias in Belief Updating
Effects of Correcting Disbelief on In-group Bias

Conclusion

Conclusion

- **Widespread disbelief about out-group knowledge** for factual questions
- **In-group bias in belief updating**
- Correcting the disbelief can reduce the in-group bias

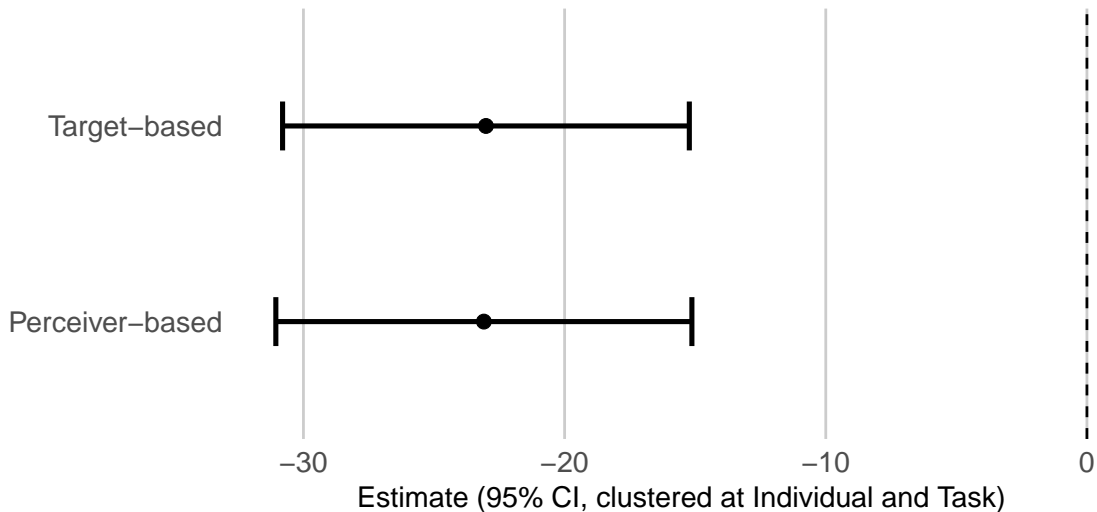
Today's Plan

Appendix: Disbelief in Study 2

Appendix: Affective Polarization

Average Disbelief is about 20 pt also in Study 2

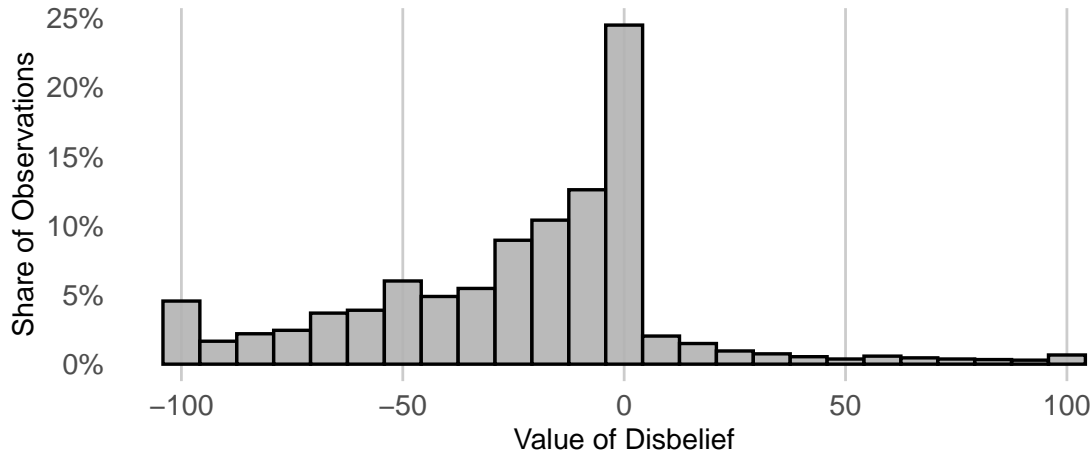
Disbelief in Out-group Knowledge



Heterogeneity in Disbelief in Study 2

Define out-group disbelief by $q_{i,k} = p_{i,g(i),k}^{g'(i)} - p_{i,g(i),k}^{g(i)}$

Distribution of Disbelief



Today's Plan

Appendix: Disbelief in Study 2

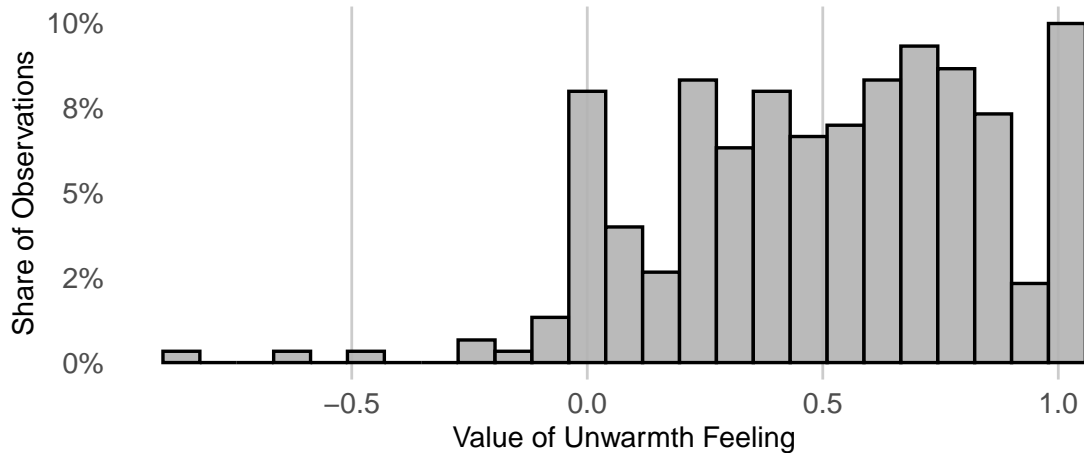
Appendix: Affective Polarization

Measure of Affective Polarization

- Ask the following questions in the end
 - 1 Warmth against people with certain partisanship
 - 2 Uncomfortableness against people with a certain partisanship
 - Colleagues, friend, child's spouse
- Compute relative negative measure against the out-group
- Convert into the $[-1, 1]$ range

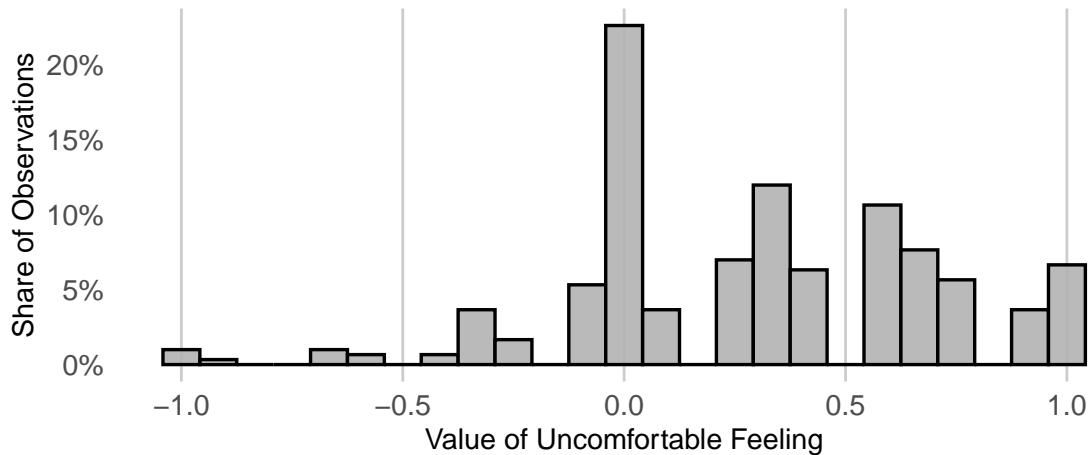
Unwarmth Feeling to Out-group (mean=0.507)

Distribution of Affective Polarization Measure



Uncomfortable Feeling to Out-group (mean=0.292)

Distribution of Affective Polarization Measure



Not Detectable Effects on Affective Polarization

Table: Treatment Effects on Affective Polarization

| | Dep. Var.: Affective Polarization | |
|-------------------|-----------------------------------|-------------------|
| | Unwarmth Feeling | Uncomfortable |
| Treatment | -0.040 (0.039) | -0.019 (0.047) |
| Obs. | 301 | 301 |
| Dep. Var Mean | 0.507 | 0.292 |
| Dep. Var σ | 0.339 | 0.408 |
| MDE | 0.109 | 0.132 |

Current sample size is too small