An online mouse-tracking study of adult belief processing: still no robust evidence of egocentric bias

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Background
- Several theories of belief processing claim that processing another’s false belief involves inhibiting a bias towards one’s own, salient knowledge (e.g., Sommerville et al., 2013; Wang & Leslie, 2016; Epley et al., 2004).
- In our previous studies, we have used Mouse tracking (MT) to measure attraction towards a response option reflecting one’s own knowledge while adults answer questions about another agent’s belief: n evidence supporting egocentric bias.

Research Question & Hypothesis
- Do adults show evidence of egocentric bias when tested on a small number of trials?
- Egocentric bias should manifest as a greater difficulty (lower accuracy, longer RT, more attraction to incorrect answer) for FB compared to TB scenarios, specifically on belief questions.

Design & Methods
- Participants (n = 267) recruited through Prolific.
- Viewed short video scenarios in which an object is hidden, and an agent either has a true belief (TB) or a false belief (FB) as to its location:
  - At the end of each video, participants answer a question by moving their mouse, clicking on one of two possible responses, which are always RED or BLUE.
  - Question types:
    - Belief: Which cup does HE think the toy is in NOW?
    - Reality: Which cup does YOU think the toy is in NOW?
    - Memory: Which cup do you think the toy was in FIRST?

- No evidence FB compared to TB specifically harder for Belief questions: non-significant Scenario x Question interaction effects on both ANOVA and GLMM analyses (all p > .70).
- 104 P’s excluded following: (a) removal of incorrect answers and abnormal trials based on RT; (b) removal of any P without at least one trial remaining per condition combination.
- 145 P’s contributed data to analysis of RT (1505 trials):

Results
- 18 participants initially excluded due to handedness or responses in debrief (cheating / poor video quality).
- 249 P’s contributed data to analysis of accuracy (2988 trials):

<table>
<thead>
<tr>
<th>SCENARIO</th>
<th>True belief</th>
<th>False belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief</td>
<td>71%</td>
<td>68%</td>
</tr>
<tr>
<td>Reality</td>
<td>86%</td>
<td>82%</td>
</tr>
<tr>
<td>Memory</td>
<td>79%</td>
<td>77%</td>
</tr>
</tbody>
</table>

- Again, no evidence FB compared to TB specifically harder for Belief questions (ANOVA interaction p = .29; LLM interaction contrasts for change in Scenario effect for Belief→Reality p = .093 and for Belief→Memory p = .55).
- Further 32 P’s excluded following removal of abnormal trials based on MAD. 113 P’s contributed to analysis of MAD (1133 trials):

<table>
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<tr>
<th>SCENARIO</th>
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<th>False belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief</td>
<td>2435 (±138)</td>
<td>2549 (±128)</td>
</tr>
<tr>
<td>Reality</td>
<td>2460 (±130)</td>
<td>2435 (±125)</td>
</tr>
<tr>
<td>Memory</td>
<td>2633 (±159)</td>
<td>2682 (±128)</td>
</tr>
</tbody>
</table>

- Again, no evidence FB compared to TB specifically harder for Belief questions (interaction on ANOVA and LMM all p > .57).
- Overall, no evidence supporting the presence of an egocentric bias when reporting another’s false belief for this type of task.