Measuring Beliefs in Centimeters: Private Knowledge Biases Preschoolers’ and Adults’ Representation of Others’ Beliefs

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False Belief Task

This is Sally.

This is Ann.

Sally has a ball. She puts it into her basket.

Sally goes out for a walk.
Ann takes the ball out of the basket.

Ann then puts the ball in the box.

Now Sally comes back.
She wants to play with the ball.

Where will Sally look for the ball?
One’s own knowledge can Contaminate Perspective-taking abilities
Purpose

- To investigate the *degree* to which an adult/child’s own knowledge of where an object is hidden biases their estimates of where a protagonist, who holds a false belief, will search for an object
How?
If personal knowledge biases the representation of mental states, then the participant will believe that Saliy will search for the object in a location biased closer to the object’s actual location.
Current Study

- Two experiments: Sandbox is used to investigate 3 year olds, 5 year olds, and adults’ ability to estimate where a protagonist will search for a hidden object
Predictions

- Participants in the False Belief task will be biased by their own knowledge.

- There will be a reduction in the extent of this bias with age.
Experiment 1

- **Participants:** Forty 3-year-olds (20 girls, $M = 41$ months, $SD = 2.5$, range $= 37–47$ months), forty 5-year-olds (20 girls, $M = 67$ months, $SD = 3.0$, range $= 61–71$ months), and 40 college students (20 females) participated in the experiment.

- **Method:** Participants are randomly assigned into False Belief (FB) or True Belief (TB) tasks.
False Belief
True Belief
Results

![Bar chart illustrating bias scores for different age groups and conditions at three locations: First Location, Mid-point, and Second Location. The chart shows bias scores in cm for adults with and without false belief, as well as for 5-year-olds and 3-year-olds with and without false belief.]

- **Adults**:
  - No False Belief: [Bias Scores]
  - False Belief: [Bias Scores]

- **5-year-olds**:
  - No False Belief: [Bias Scores]
  - False Belief: [Bias Scores]

- **3-year-olds**:
  - No False Belief: [Bias Scores]
  - False Belief: [Bias Scores]
Results

![Graph showing bias scores for different groups at various locations.](image)
TB Task Contains 2 objects
Results

- Bias scores for FB task were significantly higher than bias scores on the new control task
Children who succeeded on the change-of-location task were less biased by the object’s actual location in the sandbox.
Where was the object originally?
Experiment 2

- Within-subjects experiment in which adult and child participants completed the false-belief condition and a memory condition
Method

- **Participants:** 20 college students (15 females), twenty-three 3-yearolds (15 girls, M = 41 months, SD = 4.2, range =36–47 months) and twenty 5-year-olds (16 girls, M = 62 months, SD = 2.8, range = 60–69 months).

- **Procedure:** Nine trials. Four trials were identical to those of the FB condition of the Sandbox task of Exp 1. Four trials were memory trials in which participants indicated their memory of the object’s original location.
Results

The graph shows bias scores (cm.) at different locations for adults and children of different age groups. The locations are labeled as First Location, Mid-point, and Second Location.

- Adults:
  - Memory: Bias score is slightly above 0 cm.
  - False Belief: Bias score is slightly above 10 cm.

- 5-year-olds:
  - Memory: Bias score is around 25 cm.
  - False Belief: Bias score is around 30 cm.

- 3-year-olds:
  - Memory: Bias score is around 25 cm.
  - False Belief: Bias score is around 30 cm.
Conclusion

• 3-year-olds, 5-year-olds, and adults are biased by their own knowledge of an object’s current location when asked to estimate where a protagonist would search for the object.

• In control conditions when adults and children were asked to estimate the original object location, rather than the protagonist’s belief about the object’s location, they showed significantly less bias.
Why did 5 year-olds fare less well on the Sandbox task?!
• Continuous space?

• Linguistic support?
What role does emotion play in perspective taking abilities?