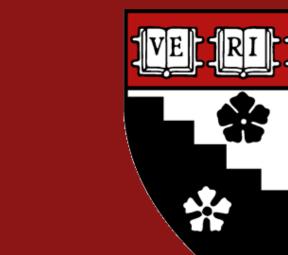


From Possible to Pause-able: Children's hesitancy may mark implicit skepticism of incorrect intuitive beliefs



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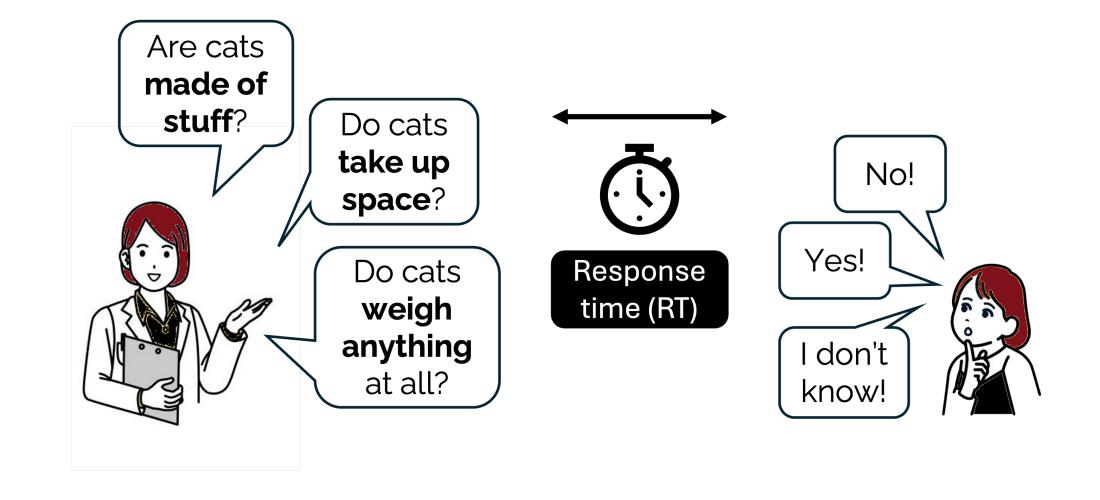
BACKGROUND

- Young children's naive, intuitive beliefs about the material world (e.g., "air is nothing," "a grain of rice weighs nothing") are theory-like but run counter to scientific understanding [1,2]
- Previous work shows aspects of naive beliefs are retained in adulthood expert adults' correct answers are slower for "incongruent" questions (where correct answers run counter to naive beliefs) than "congruent" questions (where correct answers align with naive beliefs) [3]
- Even before acquiring beliefs aligned with scientific understanding, learners' naive beliefs may conflict with other parts of their knowledge (e.g., "air is nothing"; "we need air to breathe")
- Elementary schoolers wrestling with such conflicting beliefs may respond more slowly to "incongruent" questions even before learning the scientifically correct response

en with naive beliefs about the material world, are response times (RTs) slower for "theory-incongruent" questions than for "theory-congruent" questions?

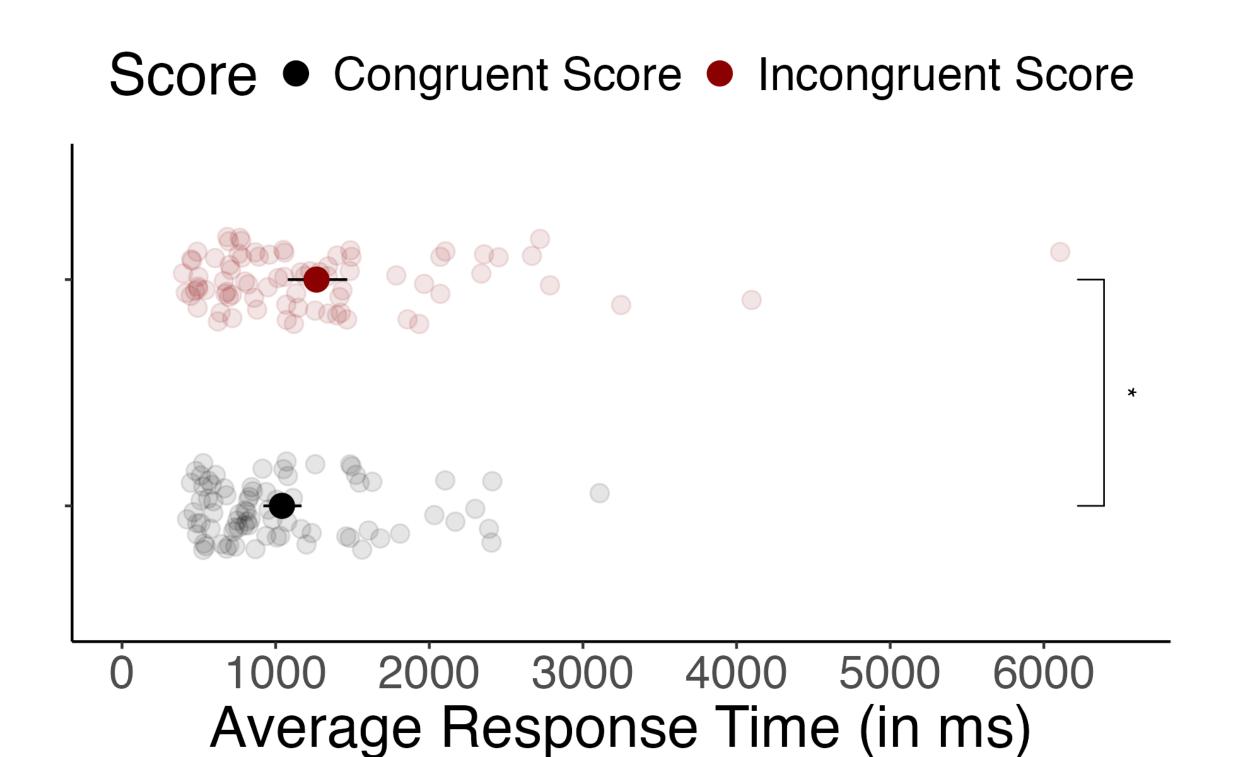
PROCEDURE

Children answered 30 forced-choice questions about 10 entities and their physical properties.



- Congruent questions (n = 5) were those most children answered correctly; incongruent questions (n = 5) were those fewest children answered correctly
- We excluded children's RTs relating to inaccurate and accurate responses, respectively
- Based on video, we **coded children's RTs** (time between end of question and start of response)

RESULTS





N = 81 five- to nine-year-old children

Mean diff. = 225 ms, d = .24, 95% CIs, [-.06, .54], p = .041; paired t-test (two-tailed)

- Second coder blind to hypotheses coded 100% of data; ICC = , p < .001
- Overall, children were marginally slower to respond to incongruent questions than congruent ones
- RTs correlated with EFs and domain knowledge (r = 1).28, p = .021; r = .31, p = .005)
- Variance in RTs did not correlate with children's error monitoring or cognitive reflection abilities

DISCUSSION & FUTURE DIRECTIONS

Children's RTs may be informative of their being at the cusp of overturning naive, intuitive beliefs about the material world.

- Even before acquiring a scientific understanding of matter and its properties, preschool children show signs of hesitancy when producing and communicating responses aligned with incorrect naive beliefs
- Learners vary in their degree of hesitancy; individual differences relate to levels of EF and overall domain knowledge
- We plan to replicate and extend this finding using a question set a) including items beyond the physical reasoning domain, and b), explicitly controlling for age of acquisition and processing-relevant variables (word frequency and length, no. of syllables)

REFERENCES

^[1] Carey, S. (2009). The Origin of Concepts. Oxford University Press.

^[2] Shtulman, A. (2017). Scienceblind: Why Our Intuitive Theories About the World Are So Often Wrong. Hachette UK.

^[3] Shtulman, A., & Valcarcel, J. (2012). Scientific knowledge suppresses but does not supplant earlier intuitions. Cognition, 124(2), 209-215. https://doi.org/10.1016/j.cognition.2012.04.005