Children Use Causal Knowledge to Ask Informative Questions

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Question

Can children use their ***causal knowledge*** to guide question asking?

Background

*In question asking, learners are faced with a **near-infinite space of possibilities** for a single query.*

- Determining what information is **relevant for their goal** is challenging for learners (Davidson, 1991; Ruggeri et al., 2021; Jirout & Klahr, 2020).
- Young children are **adept causal reasoners** and utilize their abstract causal knowledge to guide inference (Gopnik & Schulz, 2007).
- Thus, **causal knowledge** may provide a powerful top-down constraint for question asking (Schulz, 2012; Magid, Sheskin, & Schulz, 2015).
- 5- and 7-year-olds **apply causal knowledge** to **evaluate and select** the most informative questions in a forced-choice task (Lapidow, Stein, & Walker, 2023).

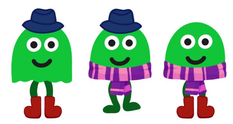
*Can young children also leverage causal knowledge to **generate** good questions themselves?*

Method

Open-Ended Question-Asking Task

- **Problem:** How to get children to produce on-task responses without restricting generation?

"What do we need to know to find out which alien is my best friend?"



- **Solution:** Non-causal warm-up task designed to encourage 'yes/no' questions, with feedback and examples if needed.
- **Main Task:** Story about an event with an unknown cause, including three details suggesting features of the true cause. Followed by open-ended generation of two to five responses.

"What do we need to know about Amy's pets to find out which one made the mess?"



Question Coding Scheme

Using causal understanding to guide information search was defined as...

Causality → inference to link to story:

What does it like to play with? ✓

Who took the ball? ✗

Reference → mentions (at least) one of the three story details:

Can it jump up high? ✓

Who makes messes? ✗

Scope → targets the hypothesis space or a single hypothesis:

What pets have black fur? ✓

Is it a black dog? ✗

Results

N = 49 (24 5 yrs ; 25 7 yrs)

- Overall, children produced 162 questions (out of 167 total responses), with an average 3.39 questions from each child (SD = 0.93).

Causality

65.4% (106) ✓ 34.6% (56) ✗

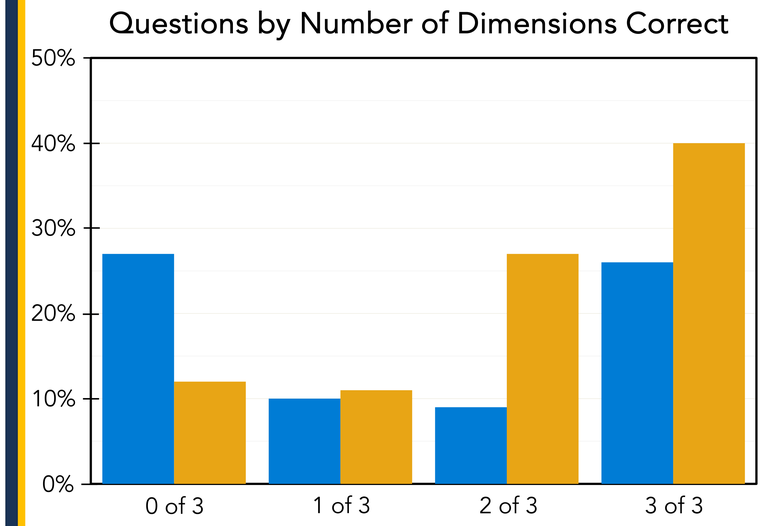
Reference

61.7% (100) ✓ 38.3% (62) ✗

Scope

52.5% (85) ✓ 38.9% (63) ✗ 8.6% (14) ✗

- Proportion of questions coded as correct on 0 to 3 of the scored dimensions differed between ages:



- Both 5-year-olds and 7-year-olds used causal knowledge in their questions (52.8%; 75.6%), but differed in how many questions were also clearly related (Reference: 48.6%; 72.2%) and efficient (Scope: 31.9%; 57.8%).

Conclusion

Causality provides an effective guide to question asking in childhood, even as our ability to ask good questions *in general* is still developing.

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