**Language facilitates 2.5-year-olds’ reasoning by the disjunctive syllogism**

Myrto Grigoroglou, Sharon Chan, & Patricia A. Ganea
m.grigoroglou@utoronto.ca

**Background**

Reasoning by elimination is a logical process of becoming increasingly sure of an answer as you eliminate other possibilities.

- Children successfully pass reasoning by elimination tasks when information about “emptiness” is conveyed visually or verbally:
  - Children successfully pick the location containing a reward (B) once they see versus what they are told.

However, it is unclear whether children succeeded in these tasks by using the disjunctive syllogism or simpler reasoning strategies.6

- In a task targeting disjunctive reasoning, only children older than age 3 succeeded but 2.5-year-olds failed.6
  - Perhaps children younger than 3 cannot represent logical disjunction (OR) and negation (NOT).

**Current Study**

- Do young children have a sophisticated understanding of negation which they can apply in reasoning with the disjunctive syllogism?
  - Older two-year-olds who solved simple reasoning by elimination tasks by comprehending negative statements2–5 may not have had a fully developed (logical) understanding of negation.

**Methods**

Participants

Test trials: 24 2.5-year-olds (Mage = 32.3 months, range = 27.3–35.6) and 27 3-year-olds (Mage = 41.5 months, range = 36.0–47.5)

**Results**

- Children have a robust understanding of negation,3–5 which they can apply to logical reasoning since a very young age.
  - In test trials that required children to reason with the disjunctive syllogism, both 3- and 2.5-year-olds chose the target cup significantly above chance.

- Providing cues to “emptiness” linguistically facilitated children’s reasoning with the disjunctive syllogism.
  - In our linguistic version of the 4-cups task, 2.5-year-olds showed signs of engaging in disjunctive syllogism, while in the non-linguistic version of the task6 only children older than 3 succeeded.

- Providing children with a negative proposition verbally rather than visually may have given them more direct access to the relevant premise “NOT A”.
  - Having to construct the same premise from visual evidence of “emptiness” may have been a less reliable source of evidence, leading to incorrect predictions about the location of the reward.7–8

**Conclusion**

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