

Introduction

- Models of rational action assume that agents maximize reward and minimize costs. These principles guide children's own exploration and their expectations of others¹⁻⁴
- Yet, children and adults at play also find it rewarding to invent and pursue new goals, even at cost and without extrinsic incentive^{5,6} Why?
- We propose that goals scaffold thinking and learning
 - e.g., by defining satisfaction criteria for actions and ideas³
 - e.g., by reducing the complexity of planning and decision-making.
- Here we compare children's willingness to pursue a costly plan vs. switch to an equally valuable goal with lower action cost

Experiment 1:
Will children value their goals beyond associated costs?

Experiment 2:
Will children persist when their goal is devalued and there are costs?

Participants

- Ongoing experiment with children ages 4.5 - 6.5 years
- Exp. 1: Goals-First vs. Joint (between subjects)
 - Preregistered n=30 / condition (osf.io/et6gs; pilot n=19)
- Exp. 2: Goals-First vs. Goals-Devalued (within subjects).
 - Preregistered n=41 (osf.io/5skga; pilot n=10)

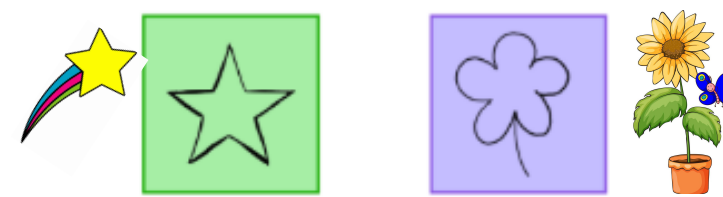
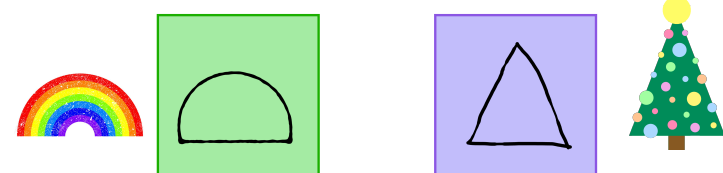
Acknowledgements

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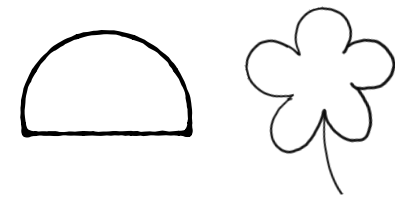
Methods

Familiarization Trials

Which do you want to copy?



Which is harder to draw?

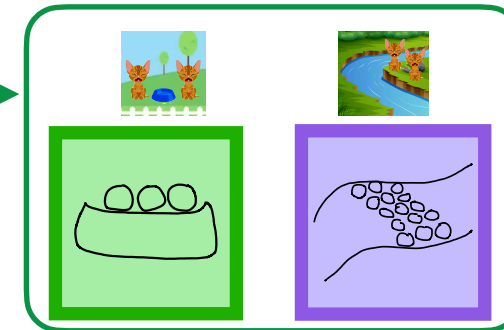


Which is easier to draw?



Joint

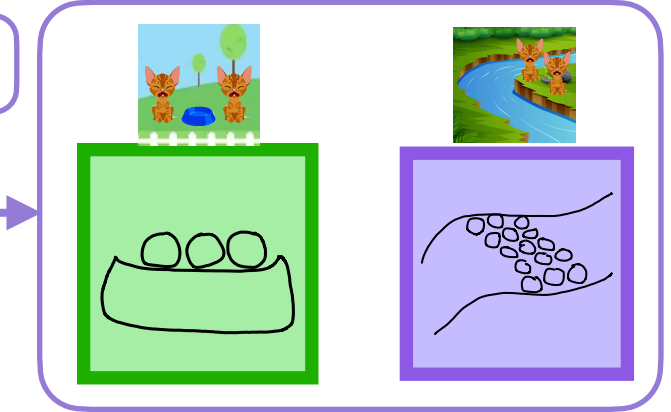
Who do you want to help?



Are you ready to draw your rocks, or do you want to switch to the other picture?

Goals First

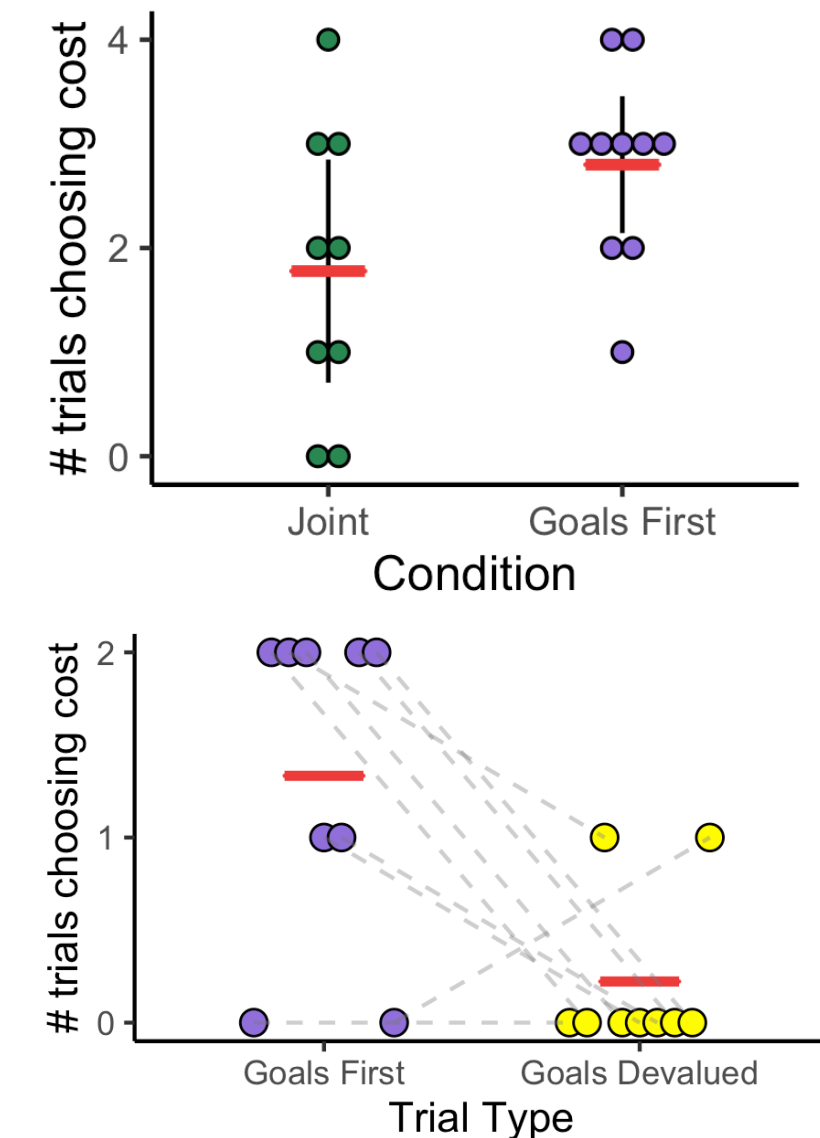
Who do you want to help?



Goals Devalued

Hold on, it looks like Sam also chose to help the hungry kittens, and they already drew the rocks! The lost kittens already got help.

Results



Predictions

Exp 1 (Joint vs. Goals First): Children who have already chosen a goal will not replan or switch to the alternative goal even if that would reduce children's cost of acting.

Exp 2 (Goals First vs. Devalued): Children will engage in replanning and **switch** to the easier drawing when their original goal loses value but not when their original goal is contrasted with an easier option.

References

- 1) Chu & Schulz (2020 CogSci; in prep);
- 2) Diggs-Galligan, Chu, Tenenbaum, & Schulz (2020 CogSci; in prep);
- 3) Chu & Schulz (2017 CogSci; 2020 Child Dev.);
- 4) Children deploy effort rationally: Kidd et al. 2013; Leonard et al 2017, 2019; Lucca et al. 2019;
- 5) Children expect agents to behave rationally: Gergely & Csibra 2003; Jara-Ettinger et al. 2017; Liu & Spelke, 2016; Liu et al. 2017;
- 6) Economic theories of rational behavior: Mill, 1863; Bentham, 1879)

Takeaways & Future Directions

- Action costs mattered differently before vs. after children had chosen a goal.
- Hypothesis: people represent utilities hierarchically (e.g., goals and subgoals instead of a flat cost and reward structure).
- If goals help to reduce the costs of thinking and planning, other factors should also shape participants' choice to remain steadfast vs. reevaluate their goals (e.g., the accessibility and ease with which we compare costs).

Future Directions

- Pre-committing to a goal reduces the cost of thinking. What other factors shape the trade-off between thinking and acting?