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Toddler Improvement: Study 1 (#143736)

Created: 09/14/2023 10:02 AM (PT)

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1) Have any data been collected for this study already?
No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?
Can toddlers reason about the temporal structure of their successes and failures? This study will explore how 2-year-old children respond to patterns of evidence that suggest increasing performance (i.e., improvement) vs. random outcomes. More specifically, we hypothesize that 2-year-olds will be more likely to choose to show a toy to a naive adult (e.g., their caregiver) when the temporal structure of their performance indicates that they got better (Improvement condition), versus when performance appears stochastic (Stochastic condition).

3) Describe the key dependent variable(s) specifying how they will be measured.
All children will play sequentially with two toys while their caregiver is seated nearby but not observing them play. Children will always experience consistent success on the first toy, but experience different patterns of performance outcomes on the second toy depending on the condition. Children will then successfully activate both toys each once (side/order of presentation counterbalanced), then be asked to choose a toy to show to their caregiver. The key dependent variable is which toy children choose to demonstrate to the caregiver.

4) How many and which conditions will participants be assigned to?
Children will be randomly assigned to either the Improvement condition or the Stochastic condition (between-subjects). Children always succeed consistently on the first toy. The number of successes and failures children experience on the second (test) toy are matched across conditions, but the key difference is the temporal structure of performance:

- Fail, Fail, Fail, Success, Success, Success (Improvement condition)
- Success, Success, Fail, Fail, Success, Fail (Stochastic condition)
- In both conditions, after the third attempt, the experimenter will explain again how the toy works.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
We will conduct a logistic regression (choice ~ condition). Our key hypothesis is that there will be a main effect of condition on toy choice (i.e., Improvement condition -> higher likelihood of choosing the test toy).

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
Participants will be excluded for interference (e.g., siblings, caregivers, etc.), experimenter error (e.g., large deviations from the study script), failure to complete the study, failing to choose a toy, having caregiver-reported developmental delays, technical errors (e.g., video does not record, toy breaks), or if the caregiver did not follow the experimental instructions (e.g., looked at their child during the study).

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.
We are uncertain as to the size of the effect we will observe (if any), thus we plan a sequential Bayes Factor analysis using the BFpack package in R (Mani et al., 2021). We will test an initial sample of 16 children (2-year-olds) in each condition, then evaluate the Bayes Factor on the hypothesis of a positive effect of condition on choice (i.e., Improvement condition -> higher likelihood of choosing the test toy) after 4 data points in each condition. We will stop testing at either a BF > 10 in favor of the hypothesis, a BF > 3 in favor of the null hypothesis (i.e., no difference in toy choice across conditions), or at an N = 36/condition (72 total).

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)
Nothing else to pre-register.