

AsPredicted Questions

1) Data collection. Have any data been collected for this study already?

No.

2) Hypothesis. What's the main question being asked or hypothesis being tested in this study?

Do children use discourse novelty to infer the referent of a novel word? A speaker encounters an object. Later a second object appears and the speaker makes an ambiguous request. Do children expect the speaker to communicate about the object that is new in context?

Here we want to measure how this expectation changes between 2.0 and 4.9 years of age. The data will be used to inform parameters in a probabilistic model for how discourse novelty is integrated with other information.

We collected data using a similar design for a different study. This previous study also included a second condition, which is omitted here. If there is no difference between studies for the condition they have in common, we will combine the two datasets to get a more precise estimate for the developmental trajectory.

3) Dependent variable. Describe the key dependent variable(s) specifying how they will be measured.

Material is presented as a picture book on an iPad. An animal character is placed between two tables. Initially, one table contains an object and the other is empty. Later, a second object appears on the previously empty table. After the novel object has appeared, the speaker requests one object in an ambiguous way.

The dependent variable is choice, i.e. when asked to pick an object, participants touch an object on the iPad. Choice is coded as whether or not the novel object is chosen.

4) Conditions. How many and which conditions will participants be assigned to?

There is only one condition. On each trial, one object is present in the beginning and a second one appears later in time. All objects are unknown to children and were created for the purpose of the study. At test, the animal uses a novel word (e.g. "blicket") to

request an object. Each participant receives 10 test trials, each with different objects. Participants have the option to stop the experiment after 5 trials. Test trials are preceded by training trials in which children are asked to pick out highly familiar objects (car and ball).

5) Analyses. Specify exactly which analyses you will conduct to examine the main question/hypothesis.

To assess the effect of age, we fit a Bayesian generalized linear mixed model using the *r* package *brms* with default priors. We will compare a full model (specified below) to reduced models using WAIC scores and weights as well as Bayes Factors.

$\text{correct} \sim \text{age} + (1 \mid \text{id}) + (\text{age} \mid \text{agent})$

Correct: whether or not the novel object was chosen

agent: animal character asking for the object

Age: numerical age in years (centered)

Id: participant id

To compare the present dataset to the one previously collected we will fit the following model (also using *brms* using default priors)

$\text{correct} \sim \text{age} * \text{experiment} + (1 \mid \text{id}) + (\text{age} * \text{experiment} \mid \text{agent})$

Correct: whether or not the novel object was chosen

agent: animal character asking for the object

Age: numerical age in years (centered)

Id: participant id

Experiment: Present study vs previous data collection

We will compare this model to a model without experiment as a predictor. If the Bayes Factor in favor of the full model is 5 or lower, we will combine the two datasets.

6) Outliers and Exclusions. Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Participants will be replaced if they finish fewer than half of the test trials or choose incorrect on both training trials.

7) Sample Size. How many observations will be collected or what will determine sample size?

We will collect data from children in three age groups (2-, 3- and 4-year-olds) Our target is to have 150 data points per age group. If each child completes the whole experiment (10 trials), this amounts to 15 children per age group (45 total). Children are recruited from local children's museums.

8) Other. Anything else you would like to pre-register?