I forgot but it's okay:
Learning about island constraints under child-like memory constraints

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Fragment Grammar learners, who look for efficient chunks, can learn about many *wh*-dependency constraints even with memory limitations.

Empirical data = Acquisition target

wh-dependencies that cross islands are very unacceptable (Pearl & Sprouse 2013) and dispreferred (de Villiers et al. 2008)

Use Bayesian inference over possible **Fragment Grammars** (O'Donnell et al. 2011) to identify the most efficient fragments that can represent the *wh*-dependencies in the input.

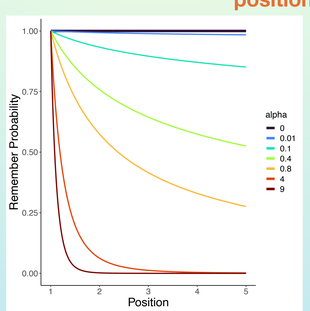
- Efficient = a balance between the simplicity of the representation and ability to capture the data

Dickson et al. 2022: Most efficient representation automatically yielded correct *wh*-dependency judgments when learning from a **realistic sample of child-directed speech**

But…that modeled learner had perfect memory for the input. What happens if it doesn't? Children have cognitive limitations that impact their ability to accurately represent and process their input (Gathercole et al. 2004, Liter et al. 2022) - they have **noisy input**.

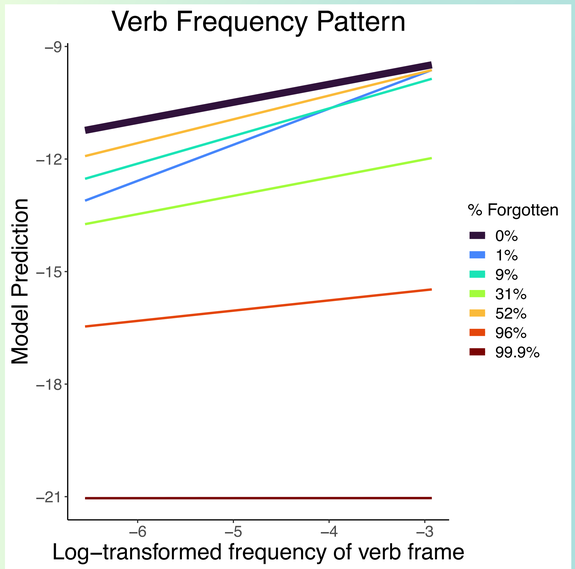
Implementing a recency effect (Anderson and Milson 1989)

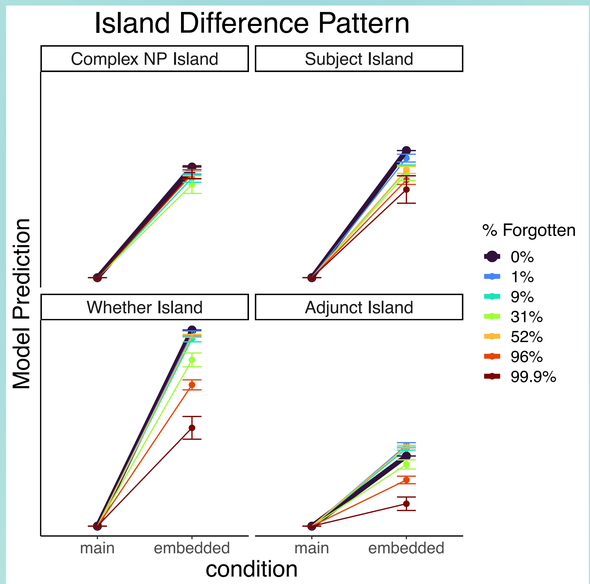
$$\textbf{remember probability} = \frac{1}{\textbf{position}^{\alpha}}$$

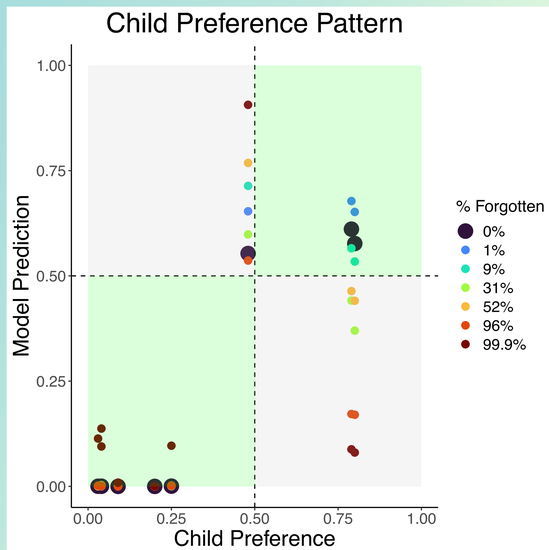


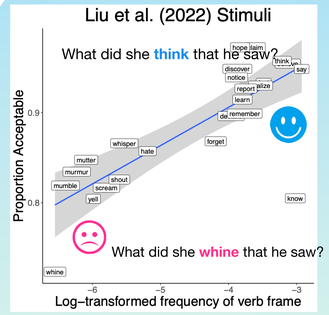
This investigation:

- Different α levels to represent different levels of noise
- 10 runs per modeled learner to create different noisy input samples to learn from



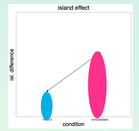






✓ - ✓ = smaller difference

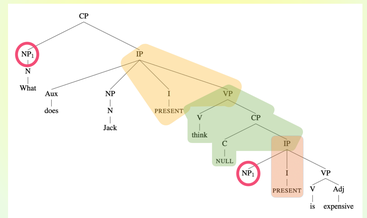
✓ - ✗ = larger difference



Who ✓ thinks the necklace is expensive?
Who ✓ thinks the necklace for Lily is expensive?
What does Jack think ✓ is expensive?
Who does Jack think the necklace for ✗ is expensive?

What did the boy fix [the cat [that was lying on the table]] with __ ?

What did the boy fix [the cat [that was lying on the table with __]] ?



- Sample: 12,704 *wh*-dependencies from CHILDES Treebank (Pearl & Sprouse 2013)
- How much input a 4-year-old would have, between age 18 months (Perkins and Lidz 2021) and age 4 (from Bates & Pearl 2021):
- waking hours x utterances/hour x *wh*-dependencies/utterances = 2,057,886 *wh*-dependencies distributed according to the sample

Future work: other implementations of noisy input, the impact of noisy input on other learning models, more cognitively-plausible model implementations.