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Learning reduplication, but not syllable reversal

UCSC

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Click **here** to come talk to us about this poster at the AMP Zoom session, on September 20th at 5:05pm (ET)!

1. Introduction

- Structure of phonological memory could make repetitions easy to discover, because they match and reactivate a stored chunk [10, 9, 12, 2, 8].
- Reduplication is common, but reversal is rare, even in language games [4, 3, 7].
- Implicit vs. explicit learning can affect the relative difficulty of other phonological patterns [11].

Hypotheses:

⇒ **H1:** Repetition will be easier to discover than reversal, regardless of whether learning is explicit/implicit (since both depend on phonological memory).

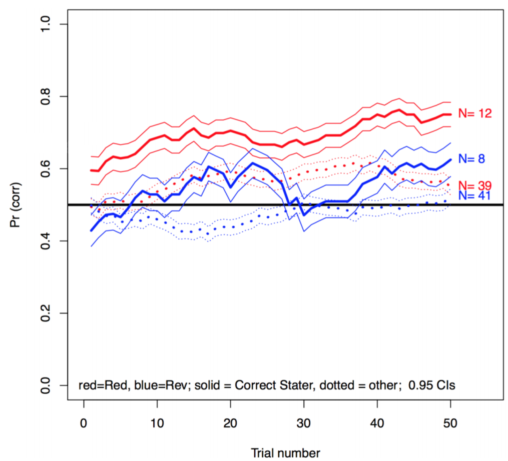
⇒ **H2:** Reversal can only be discovered explicitly (by using working memory to re-order the syllables).

2. Procedure

- Participants were recruited online using Prolific and were randomly assigned to either Red(uplication) or Rev(ersal) pattern groups.
- They heard 50 audio stimuli and were asked to distinguish between conforming and non-conforming "words", with feedback after every trial (to listen to examples of each stimulus type, click the underlined words below).
  - Conforming words followed the template "ABCX _ _ _", where the three final syllables ("_ _ _") were "ABC" in conforming Red words and "CBA" in conforming Rev words.
  - The nonword foils were made by randomly transposing two adjacent syllables of the "_ _ _" from their conforming counterpart.
- Participants in Exp. 1 had a variety of L1s; those in Exp. 2 all reported an L1 of English.

3. Experiment 1: Pattern Discovery

- Participants were categorized as either explicit or implicit learners, based on whether they **correctly stated (CS)** or did **not correctly state (NCS)** the relevant rule at the end of the experiment (following [11]).



- The figure above compares CSs (—) vs. NCSs (- - -) in the Red and Rev conditions.
- Within each Pattern group, the CSs outperformed the others, and the Red CSs outperformed the rest starting very early.
- A mixed-effects logistic-regression model was fit to test the two hypotheses from §1:

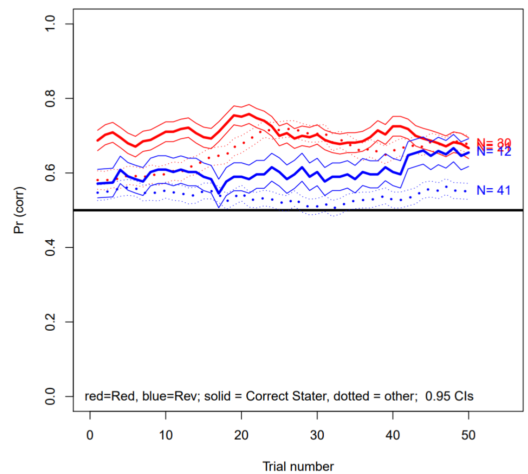
  ⇒ **H1:** Both CSs and NCSs had significantly higher accuracy when trained on Red ($\beta = 1.02$, $p = .004$ and $\beta = 1.75$, $p = .03$, respectively).

  ⇒ **H2:** Rev CSs did marginally better than Rev NCSs (β=0.053, 95% CI=[-0.36,-.47]).

- There were more Red CSs, but this difference was not significant (2-sided Fisher's Exact Test, p= 0.2362).

4. Experiment 2: Applying the Pattern

- Exp. 2 told participants at the start how to identify pattern-conforming words.
- This meant that Exp. 2 participants only had to learn how to *implement* their assigned rule.



- We found that both CSs and NCSs in the Red condition managed to do this relatively quickly, with the Rev NCSs never rising significantly above chance.

5. Discussion (Experiments 1 & 2)

- Both Red and Rev were learned explicitly, although Red seems easier to apply once the patterns have been discovered (in contrast to the proposal in **H1**).
- Implicit learners were unable to identify conforming words in the Rev condition (supporting **H2**), even when given the pattern at the start.
- This phonological bias may be linked with those in music, vision, and elsewhere [13, 5, 6] and could connect to previous work on crossed and nested dependencies (e.g. [1, 14]).

Contact Info

If you have questions or comments about our poster or the corresponding Zoom session, feel free to email us:

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