Like Yoda speak I — Using artificial language learning experiments to study language change

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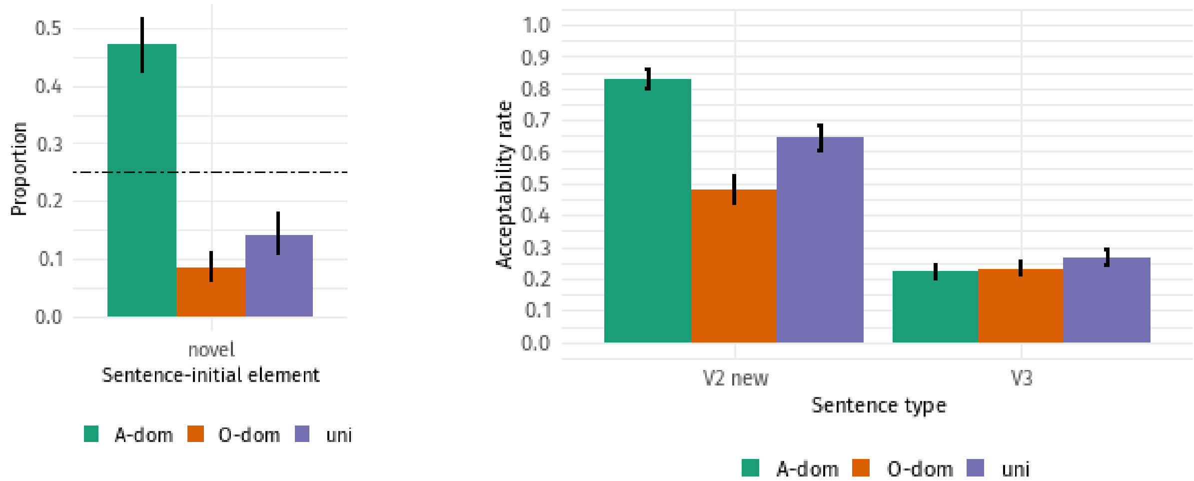
1. Background To study language change, researchers usually examine historical data. This approach, while fruitful, does not establish causality. As for other linguistic disciplines (Sneller & Roberts 2018) causal hypotheses about language change can be tested using artificial language learning (ALL) experiments. Here, we present a case study using ALL to investigate learning to shed light on the mechanisms driving historical loss of verb-second. Lightfoot (1999, 2006) has tied the loss of V2 to insufficient evidence for a V2 grammar in the input, i.e. a low number of non-subject-initial sentences. More generally, lack of variability in the input has been shown to impact learning across different cognitive domains (Raviv, Lupyan & Green 2022). We test the hypothesis that learners exposed to a high level of variation in elements preceding the verb should exhibit the best V2 learning.

2. ALL experiment We tested experimentally whether manipulating the distribution of preverbal elements affects the learning of a V2 language. 314 monolingual English speakers were taught a semi-artificial language with English vocabulary but a strict V2 order: subjects, objects and adjuncts could occur preverbally. In the object-dominant ($n = 78$) and adjunct-dominant ($n = 78$) conditions, the dominant element occurred in 60% of all sentences preverbally whilst in the uniform condition ($n = 74$) each type appeared with equal frequency in the preverbal position. A subject-dominant condition was not included due to high similarity with English. Learning was measured as generalisation of the V2 rule to novel structures (i.e., ditransitives) using judgements of V2 and V3 sentences as well as productions. Mixed-effect logistic regression models showed that learners in the adjunct-dominant condition produced more V2



(a) Production of novel preverbal constituents

(b) Ratings of novel V2 vs. V3 sentences

Figure 1: Results of ALL experiment

sentences with novel initial constituent types (i.e., indirect objects) than those in the uniform condition ($\beta = -2.55, SE = .43, p = 2.75^{-9}$) who in turn exceed learners in the object-dominant condition ($\beta = .91, SE = .45, p = .04$, Fig. 1a). Similar results held for judgement of V2 sentences with novel constituents (uniform vs. adjunct-dominant: $\beta = -1.45, SE = .32, p = 7.01^{-6}$; uniform vs. object-dominant: $\beta = .99, SE = .31, p = .001$; Fig. 1b). Discrimination between novel V2 sentences and V3 sentences is also higher in the adjunct-dominant condition ($\beta = 1.95, SE = .47, p = 2.87^{-5}$) than the uniform condition but there was no significant difference between uniform and object-dominant condition ($\beta = -.82, SE = .45, p = .07$).

3. Discussion The present study provides evidence that changes to distributional properties of the input indeed affect the learning of V2. Our prediction that learners exposed to the most variable (i.e. uniform) language was only partly confirmed. We discuss potential explanations for why V2 was learned best in the adjunct-dominant condition. Our study demonstrates that V2 can be learned relatively quickly in the lab and thereby ALL can be fruitfully used to hypothesised mechanisms for language change.

References

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