Investigating competition between inflectional allomorphs by iterated learning experiments: ecological validity and experimental control

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This paper reports an iterated learning (IL) experiment which investigated a potential competition between inflectional allomorphs. In IL experiments, participants learn and use an artificial language. Their output becomes training input for a subsequent participant, a procedure repeated for several generations. The paradigm has proved useful for studying language transmission and change (Kirby 2017).

Competition between inflectional allomorphs is widely attested. It obtained, for instance between plural {-es} and {+en}, as in Middle English *fliʒ+en* vs. *fly+es* 'flies', *ta+n* vs. *ta+s* 'toes', or *bee+n* vs. *bee+s* 'bees'. Allomorphs can be conceived as cultural analogues to biological 'alleles', representing 'variants' that compete for one (syntagmatic and paradigmatic) 'slot'. Viewing languages as Darwinian systems, one may predict that the outcome of competition will reflect how well each constituent satisfies universal or local constraints on their transmittability. Many such "constraints" are implicitly proposed in literature of morphological change, as in the framework of natural morphology (see e.g. Dressler 1985, Dressler, Mayerthaler, Panagl & Wurzel 1988, Wurzel 2001, Adamczyk 2018).

The present hypothesis was that inflectional suffixes with vowel harmony would be more learnable and thus transmittable than otherwise equal disharmonic variants. Preliminary evidence for this hypothesis comes from artificial, though non-iterated, language learning experiments (e.g. Finley 2015, Baer-Henney et al. 2015).

Our experiment involved German-speaking participants, in six chains of six learners each. In the training, each participant heard artificial words, presented as acoustic stimuli accompanied by pictures. The language displayed unpredictable variation in plural formation. For instance, the plural of  /bo:n/ 'crododile' was sometimes  /bo:n/+/ɔk/, i.e. with a suffix that harmonizes with the stem on the frontness and rounding dimensions, and sometimes as  /bo:n/+/ ɛk/, i.e. with a disharmonic suffix. In the subsequent test, participants labelled pictures by selecting either a harmonic or disharmonic plural variant. Our predictions were (a) that iterated learning would eliminate variation, and (b) that harmonic suffixes would oust disharmonic ones.

Our paper reports the experimental results and discusses their implications. The predictions were not met. Instead, suffix usage approached random variation, showing neither a bias against variation nor a preference for harmonic suffixation. We argue that these results are not falsifications of our hypotheses, but that they reveal an unforeseen effect of our experimental setup, which confronted participants with strong evidence of variation by asking them to choose one of two options rather than by eliciting free production.

The lessons from our experiment are therefore methodological. In particular, we suspect that forced-choice tasks in the test phase (cf. Finley 2015) may entrench the impression of unpredictable variation in the evidence, and select for random choice as the most efficient problem solving strategy. While increasing the controllability of experiments, forced-choice tasks may mask the potential effects of weaker learning or production biases, which might be revealed through less controllable recall tasks. To advance the application of iterated learning designs in the field of evolutionary phonology and morphology, it will remain necessary to adapt methods, achieving a balance between ecological validity and experimental control.

(Word count: 495)

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