

## Agent-based simulations of affix change: Interacting mechanisms under social dynamics

Affixes change over time, especially under social dynamics, such as adult language contact (Lupyan & Dale, 2010; Sinnemäki & Di Garbo, 2018) and dialect contact (Trudgill, 1986). To study the mechanisms behind affix change, we propose to simulate communication between speakers using agent-based computer simulations (Smith, 2014) in conjunction with real-world data. We present two case studies, to illustrate how agent-based models allow studying complex interactions between mechanisms in affix change, particularly for conditions which are infeasible to manipulate in the real world.

In Alorese, an Austronesian language spoken in Eastern Indonesia, morphological simplification took place, presumably caused by adult language contact (Klamer, 2020; Moro, 2019). Verbs with suffixing subject marking lost their inflection, while prefixing verbs have retained it. Strikingly, all prefixing verbs are vowel-initial: some phonotactic structures seem less prone to contact-induced simplification. Prefixing verbs (e.g. *n-ala* 3SG-pass) obey the default CV structure of Alorese, while in some suffixing verbs (e.g. *hitun-na* count-3SG), consonant clusters appear. Using an agent-based model, we explore the hypothesis that a tendency of speakers to avoid consonant clusters (Carlisle, 2001; Dziubalska-Kołaczyk & Zydorowicz, 2014) contributes to morphological simplification. A population of agents plays a language game (Steels, 1998) over generations: L2 agents learn the language by communicating with the previous generation, while L1 agents faithfully receive the language. Our results show that when including phonotactic reduction (agents drop affix if it violates CV structure) only the suffixing morphology simplifies with an increasing number of L2 speakers. This confirms the role of both language contact and phonotactic processes in morphological simplification.

In a second case study, we investigate conversational mechanisms fostering spread of innovations in verbal subject affixes and contrast these with frequency of use (Diessel, 2007). In a crosslinguistic dataset of subject markers (Seržant, 2021), we found that 3SG, the most frequent person marker in spoken discourse, is the most conservative, indicating frequency as important mechanism behind affix change. However, cases are attested where 3SG changes faster: for instance, for the verb *eĩti* ‘to go’ in the Lithuanian dialect of Lazūnai (Vidugiris, 2014, pp. 198–200) it is 3SG that changes due to regularisation, compared to the more conservative variant in the Zietela dialect (Rozwadowski, 1995, p. 136). To account for this innovative nature of 3SG, we propose conversational priming in repeating responses (Gipper, 2020) as a factor in the spread of innovations: by repeats in question-answer pairs (Sorjonen, 1996), an innovative form used by one interlocutor gets repeated by the other interlocutor, thereby reinforced, which may lead to a spread through the population (cf. Auer & Hinskens, 2005). We expect that 3SG – which is the same in question and answer, allowing for faithful repetition – changes faster than other forms. In an agent-based model of question-answer interactions between speakers, conversational priming leads to faster convergence between innovators and conservators in 3SG, giving support for our hypothesis.

These case studies show that agent-based computer simulations can shed light on interacting mechanisms behind change of affixes: phonological processes playing a role in morphological simplification and conversational mechanisms influencing spread of innovations.

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