Simulating language change and dynamics – example of Tswana.

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In this study we present a hybrid multi-agent modeling framework '*Kamoso*' (from Tswana 'in the future') which facilitates investigation into sound change by combining the sociophonetic model of Nettle (1999) and the exemplar-based model of Wedel (2004) into a single unified model. *Kamoso* enables simulation scenarios of different social networks with varying interaction schemes and social distances between the speaking/listening agents. The goal of this framework is to allow examination of competition between different phonetic forms. We illustrate it with the case of phonetically intuitive /mb/ and unintuitive [mp] voicing variants of post-nasal stops in Tswana (unintuitive because it requires more articulatory effort than producing sequences of nasal followed by a voiced stop [Wesbury & Keating, 1986]). In our simulation, the structure of an individual agent's mental lexicon is embedded in an exemplar theoretic setting, whereas the /mb/ → [mp] transition over populations is adapted from Nettle's Social Impact Theory model (1999) where interacting individuals pass through five life stages before death. The population of agents is embedded within a *social network* which defines social relations between the members of the community including some hyper-influential individuals. Moreover, we assume life-long learning and accommodation to the linguistic environment through continuous adding of the new linguistic experience to the lexicon in each simulation epoch (understood as a life generation).
The goal of the simulation is to examine the complex interplay between social influence/bias, frequency of occurrence and functional biases (ease of speech production/discrimination), in how they might account for unintuitive phonetic transition.

References:

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