Title: Editors preserve complexity in language

Madeline Meyers, Dan Yurovsky

Languages change with every generation of speakers. One possibility is that they evolve because of two dynamic competing pressures: one, for the language to be easily transmitted to new generations—and hence simple—and another, for the language to be a useful, descriptive form of communication—and hence more complex. In two experiments, we attempt to understand how these pressures operate in a novel language. 240 adult users on Amazon Mechanical Turk participated in a baseline iterated learning experiment in which they were told to re-create a randomly-generated dot grid pattern. Each user’s responses represented one generation of language learning, as their patterns became the training input for the subsequent user. Results show a linear reduction in three measures of complexity over six generations, illustrating a dramatic simplification in the languages. However, percent accuracy increased over generations, illustrating that the simplifications made by adults had an adaptive effect on their ability to memorize the patterns.

Much of language learning does not occur alone, instead, we interact with and accept feedback from those who are more competent in a language (e.g. parents or teachers). In a second version of this task, 240 adults on Amazon Mechanical Turk were assigned to be either a “learner” or a “fixer” within a generation. The learners completed the same task described above. The fixers were then tasked with correcting errors on the learner’s pattern in order to match it to a target image—the same target image seen by the learner. Results showed a re-introduction of complexity into the language, as there was a slower decrease in complexity in this dyad task when compared to the previous baseline task. However, percent accuracy was similar across conditions. This illustrates that due to the presence of an editor, users were able to reach a similar level of accuracy while retaining a higher level of complexity in a novel language. Therefore, by correcting other’s language errors as teachers, parents, or peers, not only do we help the individual we are correcting, but we are also maintaining the complexity of the entire language system.