Changes in language reflect simplicity and communicability pressures

Languages change with every generation of speakers—not only by acquiring new vocabulary, but also by adapting to the communicative needs of their users. One working theory is that languages evolve due to two dynamic competing pressures: one, for the language to be simple—and hence easily transmitted—and another, for the language to be an effective system of communication—and hence descriptive. The following study traces the effects of these pressures on a novel language as it is passed through generations of learners. Data collection is ongoing in adult users on Amazon Mechanical Turk and in children ages 6-8 at the Museum of Science and Industry in Chicago. In the first part of this study, 150 adults participated in an iterated learning experiment where they were tasked with re-creating a randomly-generated dot grid pattern. Each users’ responses represented one generation of language learning, as their patterns became the training input for the subsequent user. Results show a linear reduction in four measures of complexity over 6 generations, illustrating a simplification in the languages. The percent accuracy of users’ re-creations increased over the first few generations, showing an increase in transmissibility, but then asymptoted around the 3rd generation. This suggests that simplicity was not the only pressure on the language, in fact, descriptiveness continued to play a role. Therefore, adults seemed to be implicitly altering the language by introducing errors which balanced simplicity and communicability. Data collection for the same task is ongoing in children to understand how these pressures may differentially impact their language changes, as children may experience a greater pressure towards simplicity. Additionally, paired versions of the task, whereby alternating participants re-create and edit grids, are currently being run on adult-adult and child-adult dyads. These conditions aim to see how an editor may reintroduce complexity into the language—thereby playing a vital role in the retention of useful, complex language systems. In sum, current results show that over time, seemingly random languages adapt to become less-random—they are less complex and easier to reproduce—, simply by way of speakers’ unintentional errors.