Language Evolution in the Lab: The Case of Child Learners

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Usage-based theories suggest that the kinds of structures we observe in languages arise from general biases and constraints on individual human capacities [1]. Important to Language Evolution, these theories suggest that the cultural transmission of language over thousands of generations (through a repeated cycle of observation, imitation and induction) can lead to the emergence of linguistic structure as a cumulative byproduct of speakers’ weak individual tendencies [2]. Computational iterated learning models (ILM) simulating cultural transmission show that weak biases become amplified and fixated over time, creating strong linguistic universals without the need to assume strong innate biases [3]. Importantly, ILM studies with adults show that randomly constructed artificial languages become significantly more structured and easier to learn over the course of multiple iterations [4].

However, to date there is no published study showing the emergence of linguistic structure over time with children. The lack of evidence from child learners is a problematic gap in the literature, as children are the most prototypical learners in the actual process of linguistic transmission, and may differ from adults in their language acquisition skills and general cognitive biases [5,6]. Crucially, adult participants may rely on their extensive and explicit knowledge of language when learning an artificial language, undermining the overall validity of such studies [7].

We address this problem by conducting a large-scale study of iterated language learning in both children and adults, using an original, child-friendly paradigm. Results show that despite making more mistakes overall, children’s languages became more learnable over time just like adults’, exhibiting the same trends and pace of change in learnability. Even though we found no significant increase in linguistic structure for children, significantly consistent mapping between meanings and signals emerged in child languages on many occasions, with children creating similar structure as reported in [4]. This provides the first demonstration that cultural transmission affects children and adults similarly, with both age groups guided by the same learnability biases.
References: