



Comment

Language origin from simulation of language evolution
Comment on “Modeling the cultural evolution of language”
by Luc Steels

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The study on language evolution clarifies the process and mechanism of emergence and cultural evolution of human language. By simulating Language Games Steels [3] demonstrates that not only general features of human language such as sharing vocabularies in a population but also characteristics studied in linguistics such as case systems and agreement can emerge through cultural evolution.

In the field of the evolution of language, the language origin has also been explored. It helps understanding the biological evolutionary processes of cognitive and physical mechanisms necessary for evolution of human language. Steels [3] emphasizes that general cognitive abilities are sufficient for the emergence of basic features of human language through cultural evolution. Although such findings are critically important, we cannot say that the problem of language origin is solved. The general human cognitive abilities are not the same as those of non-human animals, while there may be continuity. For example, Tomasello [4] says that joint attention including three-term relationships is necessary for human communication, but chimpanzees can understand only two-term relationships. The success of communication requires mutual understanding of intention to communicate [4], which is suggested to be fundamental for formation of human communication system [1]. Sharing vocabulary as linguistic knowledge, which is described by Naming Game simulations, is necessary but insufficient.

How can we progress in the study of language origin with modeling and simulation? Simulation studies of language evolution have clarified required cognitive mechanisms for the emergence and cultural evolution of linguistic features. Steels indicates three essential functions to achieve shared vocabulary: invention, adoption, and alignment. An iterated learning model [2] demonstrates that generalization learning is insufficient and some cognitive biases are essential for unidirectional meaning change observed in grammaticalization, a characteristic language change phenomenon. Simulations demonstrate that more specific mechanisms are required for specific linguistic characters including case systems and alignment [3]. Cognitive mechanisms of joint attention have also been studied. These cognitive mechanisms and biases are the candidates of dispositions peculiar to human linguistic communication.

The modeling studies including not only computer simulation but also mathematical, robotic, and experimental approaches have illustrated the conditions, dispositions, and mechanisms required for the emergence of characteristics peculiar to human language. These findings advance the exploration of language origins through simulations in more

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details, by investigating how and why such conditions, dispositions, and mechanisms are formed through biological evolutionary processes. It should be noted that modeling studies usually presuppose various functions explicitly and implicitly. We must carefully scrutinize how such presuppositions work for evolution of human linguistic features.

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