

Social Network Limits Language Complexity

Matt Lou-Magnuson

Nanyang Technological University, Singapore, Singapore

Luca Onnis

Nanyang Technological University, Singapore, Singapore

Abstract: Natural languages vary widely in the degree to which they make use of hierarchical composition in their grammars, in particular, the degree to which syntactic versus morphological means of composition are utilized. Languages historically spoken in small communities develop much deeper levels of morphological embedding than those spoken by larger groups, an observation confirmed by a statistical analysis of the World Atlas of Language Structures. However, beyond population alone, social networks change in topological structure as they grow, and it may be the pattern of connectivity rather than number of speakers driving these differences. To examine mechanistically this connection between social and linguistic structure, we propose an agent-based model of grammatical change using complex network methods. We identify global transitivity as a physical parameter of social networks critical for developing morphological structure, and hubs associated with scale-free networks as inhibitory, encouraging syntactic composition instead.