

THE PARADOX OF LINGUISTIC COMPLEXITY AND COMMUNITY SIZE

FLORENCIA REALI

Psychology Department, Universidad de los Andes, Bogotá, DC 11001000, Colombia

NICK CHATER

*Behavioural Science Group, Warwick Business School, University of Warwick, Coventry,
CV4 7AL, UK*

MORTEN H. CHRISTIANSEN

*Department of Psychology, Cornell University, Ithaca, NY 14853, USA
Santa Fe Institute, Santa Fe, NM 87501, USA*

It has been observed that languages with huge numbers of speakers tend to be structurally simple while small communities can sometimes develop languages with great structural complexity. Paradoxically, an apparent opposite pattern appears to be observed in relation to non-structural properties of language such as number of content words. These apparent contradictory patterns pose a challenge for cultural evolution approaches to language evolution. In this paper, we use computational simulations to investigate the hypothesis that the opposite effects of linguistic community size on linguistic structure and vocabulary depend on a single factor: ease of learning. We created a population of simulated agents arranged on a network, such that agents connected by a link on the network are able to communicate and potentially pass linguistic conventions to one another. Each agent can both invent entirely new conventions and replicate conventions that they have previously generated themselves or learned from other agents. Linguistic conventions are divided into two categories *Easy* and *Hard* to learn, depending on how many times an agent needs to hear a convention in order to learn it. The simulation results show that when the population is small, Hard conventions represent a sizable proportion of the total linguistic inventory. As population size increases the number of easy-to-learn properties increases whereas the frequency of those that are hard to learn decreases systematically. The results suggest that the size of a linguistic community can potentially have opposite effects on the richness of different aspects of the language as a function of the ease of learning of different language properties.

1. Introduction

It has often been observed (e.g., Lupyan & Dale, 2010; Trudgill, 2011; Wray & Grace, 2007) that the properties of human languages appear to be influenced, in