Evolutionary influences in learned bird communication signals

Jozsef Arato PhD
University of Vienna, Vienna, Austria

Tecumseh Fitch
University of Vienna, Vienna, Austria

Abstract

What is the extent to which learned communication signals are a product of biological evolution? Songbirds are a good candidate group for studying this question, since songbird species show remarkable similarities but also a large variability in their vocalizations, with many examples of cultural transmission. To this end, in a large sample of songbird species and other birds that do not learn their songs, we analyzed whether evolutionary relations estimated from molecular genetics can predict acoustic similarity between songs. We assessed birdsong similarity with various acoustic features extracted by signal processing methods. Surprisingly, we found that the extent to which learned songs reflect genetic relations is comparable to - if not exceeding - innate vocalizations. These findings suggest that even in communication signals that are largely determined by cultural transmission (eg: human language), evolutionary constraints could manifest, as famously suggested by Chomsky in his theory of universal grammar.