

Categorical rhythms shared between songbirds and humans

Tina Roeske

Max Planck Institute for Empirical Aesthetics, Frankfurt, Hessen, Germany

Ofer Tchernichovski

Hunter College, New York, New York, United States

David Poeppel

Max Planck Institute for Empirical Aesthetics, Frankfurt, Deutschland, Germany

Nori Jacoby

Max Planck Institute for Empirical Aesthetics, Frankfurt, Deutschland, Germany

Abstract

Rhythm the organization of sounds in time is a universal feature of human music. Of the infinite ways of organizing events in time, human rhythms are distributed categorically. We compared rhythms of classical piano playing and finger tapping to rhythms of thrush nightingale songs. Across species, we found similar common rhythms, as relative durations of intervals formed three categories: isochronous 1:1 rhythms, small integer ratio rhythms, and high ratio ornaments. In both species, those categories were invariant within extended ranges of tempi, indicating natural classes. In all cases, the number of rhythm categories decreased with higher tempi. Finally, in birdsong, high ratios (ornaments) were derived from very fast rhythms containing inflexible (probably uncontrollable) interval ratios. These converging results indicate that birds and humans similarly create simple rhythm categories from a continuous temporal space. Such natural categories can promote cultural transmission of rhythmic sounds a feature that songbirds and humans share.