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Phylogenetic Techniques for Musical Rhythm Analysis

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Abstract

Phylogenetic analysis is a tool that was originally developed for studying the evolutionary biological relatedness among a group of organisms. More recently it has been applied to the study of the evolution of a variety of cultural objects including stone projectile points, helmets, swords, pottery compositions, pottery designs, baskets, languages, puberty rituals, marriage patterns, textile designs, written texts, and musical instruments [1]. The time is ripe for viewing music itself as a cultural object, and for placing it under the phylogenetic microscope. This presentation is concerned with the identification and development of phylogenetic analysis tools that are useful for the analysis of rhythm. Phylogenetic analysis consists of an assortment of quantitative, mathematical, and computational tools that raise several new questions when applied to musical rhythm. Some of the fundamental issues at stake include: (1) How should musical rhythms be represented mathematically? (2) What is a good model (in evolutionary terms) of a rhythm mutation operation? (3) How should the distance (or dissimilarity) between two rhythms be measured? (4) How should the geographical (or cultural) distance between two rhythms be measured, especially when these have multiple appearances in different locations in the world? These questions are essentially wide open and beckon multidisciplinary attention. Some attempts at answering them are described, and their employment in the application of phylogenetic analysis to the metric patterns (*compás*) of the flamenco music of southern Spain is illustrated.

[1] C. P. Lipo, M. J. O'Brien, M. Collard, and S. J. Shennan, Eds., *Mapping Our Ancestors: Phylogenetic Approaches in Anthropology and Prehistory*, Transaction Publishers, New Brunswick (U.S.A.), 2006.