

An Analysis of Rhythmic Ratios in Scores of Various Kinds of Music.

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ABSTRACT

The aim of this study is to investigate our daily experience of rhythm. The frequency of occurrence of rhythmic patterns consisting of two intervals was counted in different music corpora. Only subdivisions of metrical units were considered. A very large corpus of diverse kinds of music (western classical music, folk music, national anthems, and popular music) was investigated to obtain appropriate counts for the wide range of frequencies of rhythmic patterns that occur in music. Most of the relations of two intervals could be classified into simple integer ratios and there was an amazingly high consistency among different kinds of music. We conclude that our study showed a universality of fundamental rhythmic components, regardless the style of music.

BACKGROUND AND AIMS

Infinite possibilities for combination of rhythm, melody and harmony contribute to the creation of the different kinds of music. However, there may be a universal (perceptual) preference to use certain ways in which these elements are combined. For instance, Fraisse (1982) showed that duration ratio of frequently used notes in sheet music (western classical music) was often 1:2 and 1:3. It has been demonstrated, not only in studies of scores, that temporal patterns that can be represented as small integer ratios are easier to process than those represented by larger ratios, which may be a reason for their more common occurrence. The aim of this study is to highlight an underlying similarity among different kinds of music by comparing a fundamental aspect of their rhythmic component: the successive duration ratios of short patterns (2 and 3 interval) appearing within a metrical unit.

METHOD

The frequency of occurrence of these rhythmic patterns was counted in various musical corpora: the Essen Folksong Collection (Schaffrath, 1993; 1995), the National Anthems Collection (Shaw & Coleman, 1960), the Dictionary of Musical Themes (Barlow & Morgenstern, 1948; 1983) and the RWC popular music database (Goto et al., 2001).

RESULTS

Result showed an amazing high consistency in the frequency of occurrence of rhythmic patterns among these quite different kinds of music corpora. While simple (small integer) ratios often occurred, larger ratios are much less observed. Furthermore, there was a common tendency on the two-note-patterns to prefer long-short patterns (the first note duration is longer than the second one, e.g., 3:1) over and above short-long patterns (e.g., 1:3).

CONCLUSIONS

These common tendencies reveal evidence of similarity regarding the rhythmic component in various kinds of music. This can be an important cue for investigating restrictions of the human processing of temporal patterns.

TOPIC AREAS

Rhythm, meter, and timing