

Measuring Rhythmic Abilities: The Development of a Computer-Based Test to Assess Individual Differences in Beat Keeping

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ABSTRACT

Background

Although psychological investigations of rhythm have increased in recent years, few studies have addressed the matter of rhythmic ability. There is no universally accepted definition of what it entails and, despite the existence of a number of tools for measuring a variety of different aspects of rhythm perception and performance, a standardised instrument for measuring rhythmic ability across a comprehensive range of dimensions has yet to be developed.

Aims

This study investigates individual differences in beat keeping and developed a prototypical computer-based instrument to administer experimental tasks and capture performance data. The research set out to address the questions of how widely individuals differ in terms of their beat-keeping abilities and how successfully the tasks and measures used in the test identify individual differences in beat keeping.

Method

The test was based on the Beat Alignment Test (BAT) (Iversen and Patel, 2008), which was implemented in its original form, using the software authoring environment Max/MSP (Cycling74, 2017), and to which was added a novel offbeat-tapping task and a feedback section. The overall test consisted of a ten item questionnaire, three metronome-tapping tasks, four offbeat tapping tasks, twelve music tapping tasks, thirty-six beat perception tasks, and an eight item feedback section. The software recorded participants' tap times, which were made by pressing the spacebar on the keyboard. It was administered to 70 college students with and without musical training (66% female, mean age 18.5) and the tapping data were analysed for accuracy and variability.

Results

Results showed that, whilst the majority of people performed with high degrees of accuracy when tapping to a metronome, there was a greater range of performance in terms of variability. Similarly, the majority of people were successful in tapping the offbeat and this task produced a much wider range of performance. The tasks involving tapping and listening to musical excerpts produced the widest range of individual differences. Significant differences were found between the performance of individuals with and without musical training for all the tasks, with musically trained participants tapping more accurately and less variably

than untrained, and achieving significantly higher scores on the beat-perception test. No gender or age differences were found.

Conclusions

The results demonstrate that the BAT is an effective tool for discriminating between different levels of beat keeping ability and the subject is worthy of further investigation. In addition the software prototype proved to be a viable platform, which could be extended in future to assess rhythmic ability on a much broader range of dimensions.

Keywords

rhythm; rhythmic ability; individual differences; beat keeping; computer-based test

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