

The implicit learning of metrical and non-metrical rhythms in a serial recall task

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ABSTRACT

Background

Rhythm is the patterned onsets of sound in regards to timing, accent, and grouping (Patel, 2008). Meter is the sense of strong and weak beats that can be abstracted from a rhythm. According to *dynamic attending theory* (DAT; Jones & Boltz, 1989), expectancies for the timing of onsets are easier to form for metrical rhythms than non-metrical rhythms. Differences between implicit learning (IL) of metrical and non-metrical rhythms have not been explored using a serial recall task (Karabanov & Ullén, 2008), where IL is characterized by decreases in temporal error over blocks containing a repeating rhythm and increases in temporal error when novel rhythms are introduced.

Aims

Two experiments investigated IL of metrical and non-metrical rhythms in the presence and absence of an ordinal pattern using a serial recall paradigm. Based on DAT, it was hypothesized that i), metrical rhythms are learned more readily than non-metrical rhythms, and ii) introducing novel rhythms with a weaker metrical framework in test blocks results in larger timing error increases than novel rhythms with the same metrical strength.

Method

In the serial recall task, an ordinal pattern (auditory spatial locations) was presented with rhythmic timing. Participants were instructed to reproduce the pattern after each presentation. They were not informed of the rhythm. Experiment 1 ($N=64$) examined IL of rhythms in the presence of a correlated ordinal pattern. Experiment 2 ($N=72$) examined IL of rhythms when the ordinal sequence was randomized each trial. In the metrical conditions, participants were trained on a strongly metrical (SM) rhythm, and received novel SM and weakly metrical (WM) rhythms in test blocks.

Results

In Experiment 1, metrical rhythms elicited significantly larger decreases in timing error than non-metrical rhythms in the presence of an ordinal pattern. In Experiment 2, decreases in timing error were not significantly different between metrical and non-metrical rhythms in the absence of an ordinal pattern. In both experiments, the introduction of a novel WM rhythm resulted in significantly larger increases in timing error than the introduction of a novel SM rhythm.

Conclusions

Metrical and non-metrical rhythms were implicitly learned. Metrical patterns were only learned more readily than non-metrical rhythms in the presence of an ordinal pattern. This suggests that meter aids rhythm learning differently depending on the predictability of the ordinal sequence. In line with DAT, meter was abstracted in metrical conditions in the presence and absence of an ordinal pattern.

Keywords

Rhythm, Meter, Implicit Learning, Serial Recall, Dynamic Attending Theory.

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