TIMING RHYTHMS WHEN TEMPO CHANGES

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Background

Finger tapping at a given tempo, self-paced or in synchrony with a metronome, is an experimental task that offers fascinating possibilities for studying the temporal dynamics also underlying more complex behavior like music performance. This is due to the analytical framework introduced by A. Wing and A. B. Kristofferson, which helps explain how temporal precision in self-paced performance is limited by variability from central and from peripheral sources.

Aims

In my presentation, I will briefly sketch extensions of the basic model to self-paced rhythmic tapping, and to synchronized performance, which can serve as a model for cooperative timing. Recent theoretical and experimental studies have shown that synchronization with a metronome subject to tempo perturbations can be accounted for surprisingly well by a linear phase correction mechanism, whereas no evidence has been found for competing models based on period correction. How well do these models predict tracking a metronome that undergoes large systematic tempo changes as in accelerando or ritardando?

Main Contribution

Skilled subjects (amateur musicians) tried to keep synchrony with a tone sequence that smoothly transformed from a constant initial to a constant final tempo; the onset of the transition phase could be signaled or not. In both accelerando and ritardando, subjects systematically first lag, then lead, then lag the metronome again, a pattern not predicted by current period correction models. However, augmenting the phase correction model by the assumption that subjects monitor the tone-tap asynchronies for starting and stopping a linear period correction mechanism can account for these findings. Recent studies from my lab extend these findings to rhythmic synchronized performance.

Implications

These studies contribute to our understanding of the mechanisms underlying complex timing skills, and offer new tools for quantifying the temporal precision of non-expressive aspects of musical performance.

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