Endogenous Contributions to Metrical Perception

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In accordance with Large and Jones (1999), I regard meter as an internal multi-level periodic process that can be elicited and entrained by an external rhythm. The process is organized around a primary beat that represents the most salient periodicity, and it entails recurrent temporal expectancies and action tendencies. Most research has focused on those aspects of a rhythm that most effectively induce perception of a beat, such as the temporal regularity of sound events, and the presence and spacing of accents. However, metrical perception is not entirely dependent on auditory input. For one thing, metrical structures can be generated in the course of rhythmic movement such as walking and solo music performance, even in the absence of auditory feedback (as in performance on a silent keyboard) or overt movement (as in musical imagery from memory or notation). This generative metrical capacity also enables musicians to deliberately manipulate their metrical interpretation of rhythms they hear. Unless the auditory cues to a particular meter are extremely strong, a rhythm is open to different metrical interpretations, which can not only be induced by preceding rhythmic context or concurrent movement but also can be imposed at will, by musicians at least, according to verbal instructions or musical notation. Some of my recent research has focused on this purely mental ability to "hear" the same rhythm as different metrical structures, and my measure of success has been the stability of sensorimotor synchronization (finger tapping on or off a self-determined beat). Although musicians are not always successful in imposing and maintaining a particular metrical interpretation, their basic ability to manipulate their own metrical perception has been clearly demonstrated. The interesting question raised by this research is what kind of self-initiated internal change leads to the subjective change in metrical perception. Two hypotheses, not mutually exclusive, are that attentional energy is being reallocated within a periodic dynamic attending framework and that periodic actions are being simulated in synchrony with a designated beat level. These hypotheses could be addressed with available methods of neuroscience such as EEG, MEG, or TMS, and some preliminary results are already available.