

SENSORY-MOTOR SYNCHRONIZATION WITH MUSICAL AND NON-MUSICAL STIMULI IN PATIENTS WITH PARKINSON'S DISEASE

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– The ability to synchronize with auditory stimuli is ubiquitous. This can be observed when people listening to music spontaneously or deliberately move in synchrony with its beat (e.g. by foot tapping). Sensory-motor synchronization (SMS) has been consistently linked to the activity of the basal ganglia and the cerebellum. Yet, their role in SMS is still unclear. In this study we examined the contribution of the basal ganglia to SMS with auditory stimuli from different domains (i.e. musical vs. non-musical stimuli). To this aim, 23 nondemented medicated Parkinson's disease patients (PD) and matched controls (n = 22) were asked to tap their finger/hand along with 1) a sequence of non-musical stimuli (i.e. a metronome), 2) familiar music, and 3) amplitude-modulated noise derived from music. Three inter-onset-intervals (inter-beat-intervals for music) were used (450, 600, and 750 ms). Moreover, perceptual tests (i.e. detection of anisochrony) were performed. PD patients exhibited a synchronization deficit (e.g. reduced number of synchronized taps and larger variability) with music as well as with non-musical stimuli. Both groups could more easily synchronize with a metronome than with other sounds, in particular at 600 ms IOI. This effect of IOI was less apparent in PD patients than in controls. PD patients exhibited a mild time perception deficit, which could not account for their difficulty with synchronization. These findings are consistent with the basal ganglia supporting domain-independent synchronization mechanisms which would not be engaged in time perception.