



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 126 (2014) 210 – 211

Procedia
Social and Behavioral Sciences

ICTTP 2014

Non-gait related benefits of auditory cueing in Parkinson's Disease

Charles-Etienne Benoit^{1,2,3,*}, Simone Dalla Bella^{1,3,4}, Nicolas Farrugia^{1,2,3},
Hellmuth Obrig², Sonja A. Kotz^{2,5}

¹Department of Cognitive Psychology, University of Finance and Management in Warsaw, Warsaw, Poland

²Max Planck Institute for Human Cognitive and Brain Sciences, Department of Neuropsychology, Leipzig, Germany

³Movement to Health Laboratory (M2H), EuroMov, Montpellier-1 University, Montpellier, France

⁴Institut Universitaire de France, Paris, France

⁵School of Psychological Sciences, The University of Manchester, Manchester, UK

Abstract

Parkinson's disease (PD) is a neurodegenerative disorder that targets mainly dopaminergic neurons of the basal ganglia. PD is characterized by motor symptoms typically leading to dysfunctional gait. External rhythmic auditory cues have shown beneficial effects on gait kinematics in PD patients. These effects are likely to be mediated by a general-purpose neuronal network including a cerebello-thalamo-cortical circuit involved in stimulus-driven allocation of attention (i.e., by entrainment), temporal prediction, and sensorimotor synchronization. This implies that the benefits of auditory rhythmical cueing may extend beyond gait functions, a possibility which has not been assessed so far. In the current study, we investigate whether auditory cueing has a positive effect on perceptual and motor timing. Fifteen PD patients were submitted to a standard auditory cueing program (3 times/week for 30 min, for one month). Gait performance was evaluated using motion capture. In addition, motor (via tapping tasks) and perceptual timing abilities were assessed using the Battery for the Assessment of Auditory Sensorimotor and Timing Abilities (BAASTA). The patients were evaluated before the program, immediately after, and one month after the therapy. Their performance was compared to that of healthy age-matched controls. Improved gait kinematics was observed as a result of the therapy and persisted one month later. Interestingly, these benefits extended to timing abilities. Improved duration discrimination, enhanced detection of misaligned sounds to the beat of music and benefits in paced tapping to a metronome were observed. Our findings indicate that the effects of auditory cueing in PD extend to both perceptual and motor timing. Sensorimotor coupling is likely to foster brain plasticity leading to non-gait related effects. These findings raise the possibility of applying cueing therapy for the rehabilitation of timing and motor functions in other basal ganglia disorders (e.g., Huntington's disease, stroke).

© 2014 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of the Organizing Committee of the International Conference on Timing and Time Perception.

* Corresponding author. Tel.: +49 341 9940-000.
E-mail address: charles.etienne.benoit@gmail.com

Keywords: Cueing; Parkinson; Timing abilities
