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Title: Sensorimotor synchronization and continuation is partially impaired in children with Cerebral Palsy.

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Abstract:

Introduction: The natural tendency to synchronize movements to rhythmic auditory stimulations (RAS) is used in rehabilitation [1]. RAS has shown motor benefits in population with CP [2]. However, little is known about the capacity of children with CP to intentionally synchronize to RAS and continue to produce the required rhythm.

Methods: 10 children with CP, 9 typically-developed (TD) children and 9 TD adults (1) produced spontaneous tempo with their dominant hand tapping on a buzzer; (2) synchronized tapping of their dominant hand with RAS specifying a tempo Similar (700 ms) or Different (1300 ms) than their spontaneous tempo; (3) continued to produce the specified tempo after the withdrawal of the RAS. Two trials were required for all conditions. ANOVAs Group x Tempo x Continuation were performed on the mean tempo error and its variability.

Results: Spontaneous tempo of all Groups did not differ from 700 ms. The mean tempo error for the Different tempo was larger in Continuation than Synchronization for all Groups ($p =$

0.001) and larger for the Group of children with CP than for TD children ($p = 0.002$).

Discussion: Despite a preserved ability to intentionally synchronize and continue with a tempo similar to their spontaneous tempo, children with CP seem to present an impaired ability to synchronize and continue with a different tempo. These results suggest a specific sensorimotor adaptation mechanism impairment, that should be considered for future rehabilitation programs.

Bibliography: [1] Thaut, 2015, *Frontiers in Psychology*, 5. [2] Ghai, 2018, *Neuropsychiatric Disease and Treatment*, 14.

Keywords : sensorimotor synchronization, continuation, rhythm, tempo, cerebral palsy.

Main themes:

- IT = Innovation in treatment
- IDA = Innovation in diagnostics and assessments
- EP = Enhancing participation

Desired method of communication:

- Oral presentation sessions
- Poster sessions
- Instructional courses
- Mini symposium