

Fine motor timing ability

A study of syllable repetition and finger tapping in persons with developmental stuttering or Parkinson's disease compared with healthy adults

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Maria Sundqvist

Fakultetsopponent:
Professor Nick Miller
Newcastle University, UK

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- II. Sundqvist, M., Hartelius, L., & Laakso, K. (2015). Finger tapping in adults with developmental stuttering. Submitted manuscript.
- III. Sundqvist, M., Hartelius, L., & Laakso, K. (2015). Syllable repetition vs. finger tapping in persons with Parkinson's disease. Submitted manuscript.
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Maria Sundqvist

Speech and Language Pathology Unit, Institute of Neuroscience and Physiology
Sahlgrenska Academy at the University of Gothenburg, Sweden

ABSTRACT

Aim and methods: The overall aim of this thesis was to explore the fine motor timing ability as manifested by speech motor and fine hand motor activity in persons with developmental stuttering or Parkinson's disease, and in healthy adults. A test method for systematic comparison between speech motor timing and fine hand motor control was developed. The test comprises tasks involving finger tapping and syllable repetition of the syllable /pa/, with and without the support of a metronome in three different tempi and two different rhythms. Additionally, a task of self-initiated maximum rate is included. Three main measures were analyzed: *interval duration* (mean value of the duration between the participants' responses), *interval variability* (coefficient of variation of interval duration), and *asynchrony* (mean value of the difference between the exact time of each participant response and the time of the metronome click closest in time). One hundred healthy adults, 34 adults with developmental stuttering and 27 persons with Parkinson's disease were included in the studies.

Results: The main findings were that for both the adults who stutter (AWS) and the persons with Parkinson's disease (PD), motor timing deviances were found during the synchronization phase, i.e., with the metronome present. The largest deviances for the AWS were found in the fastest tempo, 330 beats per minute (bpm), and in the slowest tempo, 90 bpm, for the persons with Parkinson's disease. Additionally, a previously undocumented phenomenon of abrupt syllable-repetition irregularities was discovered in two of the AWS in tempi of 330–400 bpm.

Conclusions: This thesis adds knowledge about differences and similarities in fine motor timing ability between adults without speech impairment or neurological disorder, adults who stutter, and adults with Parkinson's disease. It is concluded that these differences and similarities between groups could be detected using the specifically developed motor timing test.

Keywords: motor timing, interval duration, interval variability, asynchrony, synchronization, finger tapping, syllable repetition