The application of timing in neurorehabilitation of children with specific language impairment (SLI)

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Specific Language Impairment refers to the developmental difficulties in normal patterns of language acquisition which cannot be accounted for neurological or speech mechanism abnormalities, sensory impairments, mental retardation or environmental factors.

One of the potential core cause of impaired language development is a deficit in temporal information processing (TIP). Recent studies suggested that there is a relationship between the effectiveness of TIP and the level of language functions. The aim of the present study was to compare beneficial effects of two cognitive trainings e.g. temporal (experimental) and non-temporal (control) training in amelioration of language and cognitive skills in children with SLI.

We tested 40 children aged from 5 to 8 years affected by SLI who were randomly assigned into two training groups. Experimental group underwent dr Neuronowski® training, recently developed in our Laboratory. Control group performed computer speech therapy exercises extended by playing computer games which trained attention, memory and executive functions. Before and after the training we conducted the assessment of language and cognitive abilities. To evaluate the stability of obtained improvements, after 6 weeks we performed a follow-up diagnosis. Moreover to verify the neural correlates of rapid auditory processing we measured event-related potentials (ERPs).

After the temporal training we observed a transfer of improvement from the temporal domain to the receptive-language domain. In both groups improvement in verbal working memory and executive functions was obtained. Furthermore, we observed higher amplitudes of the mismatch negativity (MMN) in an ERPs study but only in experimental group. This effect might reflect the improvement of rapid auditory processing following the temporal training.

We concluded that dr Neuronowski® induced more complex improvement than the control training.