

CLAPPING IN TIME PARALLELS LITERACY & CALLS UPON OVERLAPPING NEURAL MECHANISMS IN EARLY READERS

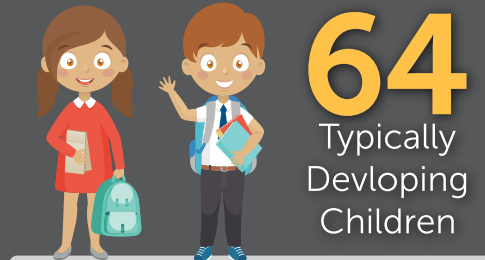
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ABSTRACT:

The auditory system is extremely precise in processing the temporal information of perceptual events and using these cues to coordinate action. Synchronizing movement to a steady beat relies on this bidirectional connection between sensory and motor systems, and activates many of the auditory and cognitive processes used when reading. Here we use Interactive Metronome, a clinical intervention technology requiring an individual to clap her hands in time with a steady beat, to investigate whether the links between literacy and synchronization skills, previously established in older children, are also evident in children who are learning to read. We tested sixty-four typically-developing children (ages 5-7 yrs) on their synchronization abilities, neurophysiological responses to speech in noise, and literacy skills. We found that children who have lower variability in synchronizing have higher phase consistency, higher stability, and more accurate envelope encoding - all neurophysiological response components linked to language skills. Moreover, performing the same task with visual feedback reveals links with literacy skills, notably processing speed, phonological processing, word reading, spelling, morphology, and syntax. These results suggest that rhythm skills and literacy call on overlapping neural mechanisms, supporting the idea that rhythm training may boost literacy in part by engaging sensory-motor systems.

TESTED:

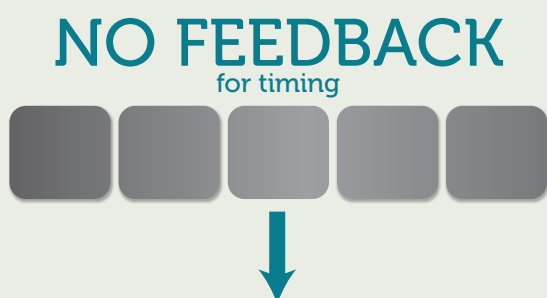


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Typically
Developing
Children

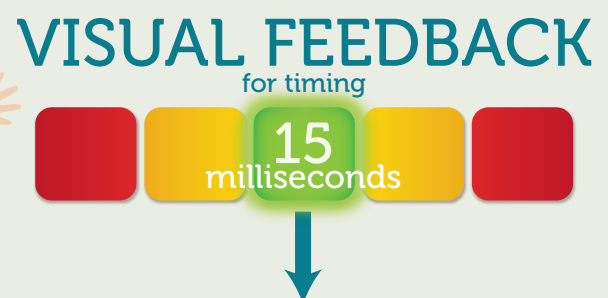


On their:
synchronization abilities,
neurophysiological
responses to
speech in noise,
& **literacy skills.**

Clapping in time tracks with literacy & calls upon overlapping neural mechanisms in early readers

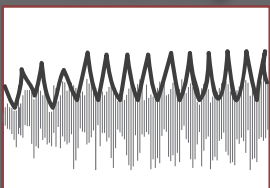


Auditory Processing

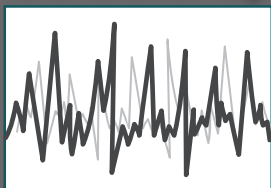


Literacy

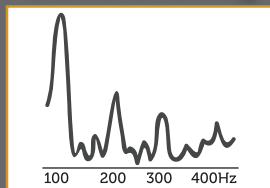
Envelope Accuracy



Response Consistency



Phase Locking Consistency



Phonological Awareness
Phonological Memory
Basic Reading
Processing Speed
Morphology & Syntax