

Linking rhythmic skills and speech motor development: the case of stuttering

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Stuttering is a neuro-developmental speech motor disorder that affects the fluency of speech and can severely impact communication in around 1% of the population. Untimely auditory-motor integration has been pointed out as one of the underlying mechanisms of stuttering, in relation with alterations in the basal-ganglia/cerebellar-cortical circuits. Compatible with the idea that general motor timing circuits are involved in stuttering, we previously found that children who stutter show alterations in rhythmic auditory-motor timing tasks beyond speech. Here, I will present fresh data from children, adolescents and adults who do and do not stutter collected in Germany and France to elucidate the intimate links between auditory-motor synchronization skills, speech motor development and individual differences therein. Results confirm that adults, children and adolescents who stutter show certain differences in timing and consistency from those who do not stutter when performing verbal and non-verbal synchronization tasks. Importantly, we found that auditory-motor synchronization skills are related to individual markers of speech motor development and deficits in children and adolescents. Generally, children without stuttering who were more consistent when tapping along with music or words also showed more mature speech motor development. Children who stutter with higher consistency when speaking to a metronome or higher precision when tapping to a metronome were also those displaying higher speech rates and less dysfluencies. These results suggest that enhancing auditory-motor synchronization skills in children could impact auditory-motor timing skills relevant for speech. This idea is currently tested in an ongoing proof-of-concept study in Montreal in which we test potential effects of a 3-week rhythmic training on auditory-motor and articulatory skills, speech convergence and fluency in (pre)adolescents who stutter.