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Musical aptitude relates to reading ability

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Auditory working memory and attention, for example the ability to hear and then remember instructions while completing a task, are a necessary part of musical ability. But musical ability is also related to verbal memory and literacy in childhood. New research published in BioMed Central's open access journal *Behavioral and Brain Functions* shows how auditory working memory and musical aptitude are intrinsically related to reading ability, and provides a biological basis for this link.

Researchers from the Auditory Neuroscience Laboratory at Northwestern University tested children on their ability to read and to recognize words. This was compared to the extent of their auditory working memory (remembering a sequence of numbers and then being able to quote them in reverse), and musical aptitude (both melody and rhythm). The electrical activity within the children's brains was also measured as auditory brainstem responses to rhythmic, or random, sounds based on speech.

The team lead by Dr Nina Kraus found that poor readers had reduced neural response (auditory brainstem activity) to rhythmic rather than random sounds compared to good readers. In fact the level of neural enhancement to acoustic regularities correlated with reading ability as well as musical aptitude. The musical ability test, specifically the rhythm aspect, was also related to reading ability. Similarly a good score on the auditory working memory related to better reading and to the rhythm aspect of musical ability.

Dr Kraus explained, "Both musical ability and literacy correlated with

enhanced electrical signals within the auditory brainstem. Structural equation modeling of the data revealed that music skill, together with how the nervous system responds to regularities in auditory input and auditory memory/attention accounts for about 40% of the difference in reading ability between children. These results add weight to the argument that music and reading are related via common neural and cognitive mechanisms and suggests a mechanism for the improvements in literacy seen with musical training."

More information: Subcortical processing of speech regularities predicts reading and music aptitude in children, Dana L Strait, Jane Hornickel and Nina Kraus, *Behavioral and Brain Functions* (in press)

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