

## Why music lessons are good for the memory

By MARK HENDERSON

Learning to play an instrument may affect the way in which a young brain develops

MUSIC lessons may improve memory and learning ability in young children by promoting different patterns of brain development, a study shows.

After a year of musical training, children aged between 4 and 6 performed better at a standard memory test than did children who were not taught music.

Because good scores on the test — which involved listening to a series of numbers and remembering them — were associated with general intelligence skills such as literacy and mathematical ability, the findings suggest that music could be useful for building the learning capacity of young minds.

Previous studies have shown that older children given music lessons become better at IQ tests than those who are musically untrained, but this is the first to show such a benefit in children so young.

Professor Laurel Trainor, of McMaster University in Hamilton, Ontario, also found clear differences in the ways in which children's brains responded to sound after a year of musical training.

"This is the first study to show that brain responses in young, musically trained and untrained children change differently over the course of a year," she said. "These changes are likely to be related to the cognitive benefit that is seen with musical training."

Professor Trainor's team looked at 12 children, 6 of whom had just started extra-curricular music lessons and 6 of whom were not being taught any music beyond that included as a standard part of their school curriculum.

The music lessons were taught at a Suzuki school, using a Japanese approach that encourages very young children to listen to and imitate music before they learn to read it.

During the year all 12 children had their brains examined four times using magnetoencephalography (MEG), which measures magnetic fields outside the head. These fields are associated with the electrical currents generated by nerve activity, and each child was played two types of sound — white noise and a violin tone.

The MEG measurements showed that all children responded more to violin sounds than to white noise, reflecting a preference for meaningful tones, and their response times fell over the course of the year as their brains matured.

Among the children receiving the music lessons, however, responses to the violin tones changed more over the year.

During the first and last scanning session, the children were also given a music test that examined their ability to discriminate between melodies and harmonies, and took the general memory test. The musically trained children improved more on both measures.

"That the children studying music for a year improved in musical listening skills more than children not studying music is perhaps not very surprising," Professor Trainor said. "On the other hand, it is very interesting that the children taking music lessons improved more over the year on general memory skills that are correlated with non-musical abilities such as literacy, verbal memory, visiospatial processing, mathematics and IQ.

"The finding of very rapid maturation [of responses to] to violin sounds in children taking music lessons fits with their large improvement on the memory test.

"It suggests that musical training is having an effect on how the brain gets wired for general cognitive functioning related to memory and attention."

Takako Fujioka, of the Rotman Research Institute, who was also involved in the study, said: "Previous work has shown assignment to musical training is associated with improvements in IQ in school-aged children.

"Our work explores how musical training affects the way in which the brain develops. It is clear that music is good for children's cognitive development and that music should be part of the pre-school and primary school curriculum."