

# Musicians show advantages in long-term memory

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Heekyeong Park is an assistant professor of psychology at the University of Texas at Arlington. Credit: UT Arlington

A peek inside the brains of professional musicians has given University of Texas at Arlington psychology researchers what may be the first links between music expertise and advantages in long-term memory.

Heekyeong Park, assistant professor of psychology, and graduate student James Schaeffer used electroencephalography (EEG) technology to measure electrical activity of neurons in the brains of 14 musicians and 15 non-musicians and noted processing differences in the frontal and parietal lobe responses. The team will present initial results of their new research Tuesday at Neuroscience 2014, the international meeting of the

Society for Neuroscience, in Washington, D.C.

"Musically trained people are known to process linguistic materials a split second faster than those without training, and previous research also has shown musicians have advantages in [working memory](#)," said Park.

"What we wanted to know is whether there are differences between pictorial and verbal tasks and whether any advantages extend to [long-term memory](#). If proven, those advantages could represent an intervention option to explore for people with cognitive challenges."

Park's laboratory in the UT Arlington College of Science uses high tech imaging tools - including EEG, functional magnetic resonance imaging (fMRI), and functional near-infrared spectroscopy (fNIRS) - to research human cognitive neuroscience. To test working memory, the study participants were asked to select pictorial or verbal items that they'd just been given among similar lures. For long-term memory, participants judged whether each test item was studied or new after the entire study session was complete.

The musicians, all of whom had been playing classical music for more than 15 years, outperformed non-musicians in EEG-measured neural responses on the working memory tasks. But, when long-term memory was tested, the enhanced sensitivity was only found in memory for pictures.

The study has not explored why the advantages might develop. Park said it's possible professional musicians become more adept at taking in and processing a host of pictorial cues as they navigate musical scores.

Park's abstract for the conference reports that musicians' neural responses in the mid-frontal part of the brain were 300 to 500 milliseconds faster than non musicians and responses in the parietal lobe were 400 to 800 milliseconds faster than non musicians. The [parietal](#)

[lobe](#) is directly behind the frontal lobe of the brain and is important for perceptual processing, attention and memory.

"Dr. Park's research uses the latest scientific instrumentation to reveal knowledge about human cognition that was previously unreachable," said James Grover, interim dean of the UT Arlington College of Science. "It provides usable information about far-reaching advantages arts training can bring."

Researchers hope to test more [musicians](#) soon to strengthen the findings.

Whatever the mechanism involved, Park said the new research is important because music is helpful for long-term [memory](#) for non-verbal events and "we are all surrounded by non verbal events."

"Our work is adding evidence that music training is a good way to improve cognitive abilities," she said.

Provided by University of Texas at Arlington

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