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Playing music can be good for your brain Stanford study finds it helps the understanding of language

- Carrie Sturrock, Chronicle Staff Writer
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Stanford University research has found for the first time that musical training improves how the brain processes the spoken word, a finding that researchers say could lead to improving the reading ability of children who have dyslexia and other reading problems.

The study, made public Wednesday, is the first to show that musical experience can help the brain improve its ability to distinguish between rapidly changing sounds that are key to understanding and using language.

The research also eventually could provide the "why" behind other studies that have found that playing a musical instrument has cognitive benefits.

"What this study shows, that's novel, is that there's a specific aspect of language ... that's changed in the minds and brains of people with musical training," said researcher John Gabrieli, a former Stanford psychology professor now at the Massachusetts Institute of Technology in Cambridge.

"Especially for children ... who aren't good at rapid auditory processing and are high-risk for becoming poor readers, they may especially benefit from musical training."

What's promising about the study, researchers believe, is the notion that the brain isn't an immutable organ fixed at birth but is adaptable -- that, with training, people can change their mental agility. The study focused on adults, but researchers want to expand the scope of their work to children as early as next summer.

One education observer cautioned against pinning too much on the research until it's proved that music actually helps children read better. No other studies have shown that music has any real impact on reading ability.

"We need to make sure we're not promising parents and kids there are these magic bullets they can rely on -- that they don't have to work at learning to read, that they can play music," said Michael Kamil, a Stanford education professor who has not yet read the study.

All the research was performed at Stanford in 2004 and was presented Wednesday at the Society for Neuroscience's annual meeting in Washington, D.C. It will be published in the Annals of the New York Academy of Sciences in December.

The researchers used adults -- from 28 to 40 individuals, depending on the part of the study -- divided into musicians and non-musicians matched by age, sex, general language ability and intelligence. To qualify, the musicians must have started playing an instrument before age 7 and never stopped, practicing several hours every week.

Researchers first had the two groups listen to three tone sequences of different pitches in rapid succession. As the various tone sequences were played faster and faster, the musicians outperformed the non-musicians

in their ability to distinguish among the tones. Functional magnetic resonance imaging scanners, or fMRIs, showed that the musicians had more focused, efficient brain activity as they did this.

The researchers then examined how musicians and non-musicians processed similar word syllables, like "da" and "ba." A person has only a 40,000th of a second to differentiate between the two sounds when the physical signal hits the ear, and the musicians made those rapid auditory distinctions more accurately and quickly than non-musicians did.

When the two sounds were clearly different, like "da" and "wa," the two groups performed similarly, the differences emerging only in the finer distinctions.

"The musicians are better able to detect small differences than the non-musicians, which is surprising," said Nadine Gaab, a postdoctoral associate who moved from Stanford to MIT with Gabrieli. "Non-musicians have the same experience with syllables as musicians."

Other research has shown that musical experience improves the ability of people to hear pitches and increases verbal memory. But until now, no one has explained why mastering a musical instrument plays a role in that, Gaab said.

Many children who become poor readers have a trouble making rapid auditory distinctions, Gabrieli said. That becomes a reading problem, because when the teacher explains that this letter is a "p" and this one a "b," a student with poor processing ability might not hear the difference.

"Once they don't hear the difference, the thought is that they're going to have a hard time" understanding the difference when the letters are written on a page, Gabreli said.

He and the other researchers would like to do a study as early as next summer involving children with auditory deficiencies who are struggling to read to see whether a summer of musical enrichment hones their language skills and helps them hear language better.

That is the kind of study that needs to be done, said Kamil, the Stanford professor who urged caution in looking at the latest study.

"Unless he's demonstrated that it makes a difference in the real world, and you have some kids there and they learn to read better, I would be reluctant to attach any real significance to it at this point," Kamil said. "I'm not saying it won't work, but we really don't know."

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