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Keep practicing.
Musical training may build connections between the left and right sides of the brain for children who practice regularly.

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Music Builds Bridges in the Brain

By Greg Miller
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SAN FRANCISCO, CALIFORNIA--Taking music lessons can strengthen connections between the two hemispheres of the brain in children, but only if they practice diligently, according to a study reported here 14 April at the annual meeting of the Cognitive Neuroscience Society. The findings add to a long-running debate about the effects of musical training on the brain.

In 1995, a study led by neurologist and neuroscientist Gottfried Schlaug found that professional musicians who started playing before the age of 7 have an unusually thick corpus callosum, the bundle of axons that serves as an information superhighway between the left and right sides of the brain. Schlaug and colleagues saw this as evidence that musical training can bolster neural connections, but skeptics pointed to the possibility that the musicians had bigger corpora callosa to begin with. Perhaps their neural wiring had enhanced their musical pursuits instead of the other way around.

To investigate further, Schlaug, now at Harvard Medical School in Boston, and colleagues including Marie Forgeard and Ellen Winner at Boston College, studied 31 children. The researchers collected detailed magnetic resonance images of the children's brains at age 6 and again at 9. Of the original group, six children faithfully practiced at least 2.5 hours a week in the time between the scans. In these budding musicians, a region of the corpus callosum that connects movement-planning regions on the two sides of the brain grew about 25% relative to the overall size of the brain. Children who averaged only an hour or two of weekly practice and those who dropped their instruments entirely showed no such growth. All of the children practiced instruments, such as a piano or a violin, that required two hands.

In every subject, the researchers found that the size of increase in the corpus

callosum predicted the improvement on a nonmusical test that required the children to tap out sequences on a computer keyboard. Schlaug says the findings should settle the earlier debate by showing that musical training can enhance neural connections related to planning and coordinating movements between the two hands. His team is now following up with the same children to investigate whether their training had other benefits, such as improved memory or reasoning skills.

"I'm very excited about this," says Steven Swinnen, a neuroscientist who studies movement control at Katholieke Universiteit Leuven in Belgium. "Everyone thinks musical training results in changes in brain structure and function," Swinnen says, but so far the hype has exceeded the evidence. Although he'd like to see the findings replicated in more subjects, Swinnen thinks the study is one of the first to provide a strong suggestion that training of any kind can cause substantial changes to the axon bundles that link together far flung regions of the brain. Whether training later in life can change the brain in a similar manner is a promising topic for future study, he says.

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- Background on music and the brain, including the debate about the "Mozart effect"