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Practice Makes Some Perfect, Others Maybe Not

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Some brains get a musical head start, research shows

BB King performed on May 22, 1979 in Los Angeles. Photo: Michael Ochs Archives/Getty Images

When the late, great B.B. King mused about the roots of his success, he recalled happening on his uncle's guitar as a small boy and picking out some tunes. Did that jump-start his later musical accomplishments? Or was it singing in the church choir? Maybe it was the death of his young mother—which left him with a real feeling for the blues along with a survivor's sense of self-reliance.

Then there's the persistence with which young B.B. pursued every performance opportunity, not to mention his tens of thousands of hours of practice.

It's probable that all these influences contributed to King's extraordinary musical achievements, along with one that he didn't mention: the unique responsiveness of certain areas of his brain. A study published in Cerebral Cortex in July shows that unusual activity in specific neural areas can predict how easily musicians learn their chops.

In their experiment, neuroscientists Robert Zatorre, Sibylle Herholz and Emily Coffey at the Montreal Neurological Institute, along with a colleague in Germany, used functional magnetic resonance imaging to assess how music instruction and practice affect the brain.

They studied 15 healthy young adults who had volunteered for keyboard lessons. None of them had musical training at the outset, nor had they ever played an instrument before. The goal of the experiment was to see what would happen to their brains once they had some instruction and could pick out some popular tunes on the piano.

First, the volunteers lay in the brain scanner and listened to recognizable songs, like "Hey Jude" and "Amazing Grace." The researchers thus had a measure of the subjects' baseline neural activity while they were listening to music.

Six weeks of music lessons followed. Though the participants primarily trained with an online program and practiced on their own, their electronic keyboards automatically uploaded every detail of their playing to the lab's computers. Then the subjects had another fMRI. While in the scanner they heard the same familiar songs from the first round, along with others they now knew how to play.

By comparing the volunteers' levels of brain activation before and after training, the researchers found that, as they had expected, the brain did change after learning to play music.

"The parietal cortex and the premotor cortex were more active in the trained subjects when hearing a song that they had learned," said Dr. Zatorre, the principal investigator. Both areas, which are recruited in the perception of sound and in planning and guiding movement, are clearly important when one has to imagine a note and play the right key.

The data also point to a distinct starting advantage in some people—and where that advantage might reside in the brain. A retroactive examination of the first fMRI images predicted who would be the best learners.

Those with a hyperactive Heschl's gyrus (part of the cerebral cortex that is associated with musical pitch) and with lots of reactivity in their right hippocampus (an area linked to auditory memory) turned out to be more likely to remember tunes they had heard before and, after some practice, play them well.

The "kicker," said Dr. Zatorre, was finding that neural head start. "That gives you an advantage when you're learning music, and it's a completely different system from the parts of the brain that show learning has taken place. It speaks to the idea of 10,000 hours." In his book "Outliers," Malcolm Gladwell called 10,000 hours of practice "the magic number of greatness." Dr. Zatorre disagrees, saying, "Is it really fair to say that everyone's brain is structured the same way, and that if you practice, you will accomplish the same thing?"

B.B. King was too modest to say so. But I think the answer is no.