



## MUSIC CHANGES THE BRAIN

by Laurie Riley

In the last twenty years or so it has come to our attention that there is researched proof that music positively affects how our neurology develops. Humans are musical beings and have always used music for entertainment, ritual, and mood enhancement. Now science is beginning to be able to tell us why it is so important to our well-being and our brain health.

It's a shame that music has largely been removed from our public schools because it is deemed unnecessary. Current science, however, says otherwise. Researcher and neuropsychologist Ani Patel, associate professor of psychology at Tufts University and author of [Music, Language, and the Brain](#), says "there's now a growing body of work that suggests that actually learning to play a musical instrument does have impacts on other abilities," including speech, understanding emotions in vocal inflection, and even multi-tasking. "This could have a real impact on the value we put on it as an activity in the schools, not to mention all the impact it has on emotional development, emotional maturity, social skills, stick-to-itiveness, things we typically don't measure in school but which are hugely important in a child's ultimate success."

At Boston Children's Hospital, research is being done on how music-learning affects language development. PET scans show that musically trained children and professional adult musicians have "...more activation in prefrontal areas of the brain compared to their peers".

There are several different neurosystems involved in learning and playing even a simple musical piece: the auditory system, motor system, executive function system (decision-making), and so on. Patel states, "There's overlap between the networks that process music and the networks that are involved in other day-to-day cognitive functions such as language, memory, attention and so forth... music sometimes places higher demands on the brain, on some of the same shared networks that we use for other abilities." Music learning and playing enhance those networks.

Yunxin Wang, a researcher at the [State Key Laboratory of Cognitive Neuroscience and Learning](#) at Beijing Normal University, examined the brains of 48 youths between 19 to 21 years of age who had studied music at least one year between the ages of 3 and 15. After controlling for gender and the amount of time they had been learning/playing music, she found that those who had been playing since before age 7 had significantly better developed language and executive functions.

It has also been found by researchers at the Karolinska Institute in Stockholm, Sweden that after a stroke or other negative neurologic impact, beginning music-learning enhances one's ability to recover lost functions.

Musical study also affects how our personalities develop. Through cooperative music study such as school orchestras, students learn to work well with others. Through inevitable failures, students learn how to achieve a goal through persistence. Through experiencing such successes, they gain self-esteem. They learn to interpret and express ideas in new ways. They learn that hard work and dedication are more productive than raw innate ability.

What a shame that music has largely been cut from public education. How many young people will grow up with less cognitive and functional ability because they were not given the opportunity to learn to play music? We have no way to measure what the difference could have been for any given individual.

But we can still learn music-playing as adults, and those who do can vouch for its beneficial effects. Fingers stay more limber, the brain more "plastic" (able to learn on a broad scale); we retain memory better, we track conversations better, and of course we derive a lot of enjoyment from our increasing ability to make beautiful music if we stick with it. Not to mention the wonderful camaraderie of playing music with friends.

Music, by the way, is a language. It is learned and processed in the same way as the spoken word, because it contains the same elements: tone and pitch, manipulation of a specific body part or parts to make the necessary sounds, vocabulary, memory, intention, and communication. What we communicate in music tells a story or elicits an emotion, just as any language does. With this in mind, I'll cite a study done years ago that is commonly referred to as The Nun Study:

The study was published by the journal *Neurology* and suggested that people with sophisticated linguistic skills can avoid developing dementia in old age, even if their brains show the physical signs of memory disorder such as Alzheimer's. This long-term study 600 nuns in Minnesota, done by Dr. David Snowdon, uncovered a correlation between the nuns' language skills and the likelihood that they would develop Alzheimer's later in life. The young nuns who had sophisticated language skill, defined as the density of ideas per every 10 written words, turned out over time to be significantly less likely to display symptoms of Alzheimer's or dementia fifty or more years later.

I believe there was an added component: not only the language skills they started with, but the fact that they were teachers who constantly used those skills through teaching far into old age, keeping those neurons firing. I tend to think that this constant usage was the more likely factor in retained brain plasticity. Like practicing a musical instrument every day.

What's the upshot of all of this? Don't let your music slide. Keep playing. Don't just play what you already know all the time. Keep learning. Keep challenging yourself. Your brain will be happier for it.

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