

From VOA Learning English, this is Science in the News. I'm Christopher Cruise. Today we tell about experiments at a major university in the United States. Northwestern University researchers are studying how music affects the human brain. Jim Tedder has the story.

It doesn't matter whether you play a guitar, a piano, a horn, or a drum. And what kind of music you play is not important. Maybe you like to play classical music like this.

Or maybe you like to play this kind of music.

Or this...

Or even this...

Just play it! It will do good things for your body because...

“We’ve known for some time that playing a musical instrument can change the anatomy as well as the function and the way the brain works.”

Nina Kraus is a professor at Northwestern University near Chicago, Illinois. She is also the head of the Auditory-Neuroscience Laboratory, where she investigates how music affects the human body.

Recently, she did tests in her lab using forty-five volunteers. Some of them had taken music classes and played an instrument, and others had not.

“People will play and study a musical instrument for some time in their lives and then that’s it! And we wanted to know did this early experience have a lasting effect on the way the nervous system responded to sound.”

Professor Kraus began by gently placing electrodes onto the heads of the volunteers. The wires from these electrical devices were then connected to a computer.

“Nerves in your brain that respond to sound give off electricity, and we can capture that electricity, and we can determine how does your nervous system respond to speech, to music, to elements of sound that we think are important for communication.”

One of the simplest sounds played for the volunteers was “da”. Listen carefully because the sound is very short and quick.

Here is the sound again.

After the human brain processed the sound, it sounded like this.

That sound came through the computer and was played on a speaker. Again...

The volunteers also heard other sounds, like this music from the British rock group Deep Purple. Here is a very small part of the song “Smoke on the Water.” Listen carefully.

Now, here is what it sounded like on a speaker after going through the brain of a volunteer.

The second sound is not as clear as the first, but it provided the information needed to be studied on a computer screen. Ms. Kraus says she could see an important difference in the way the processed sounds looked.

“These young adults who received formal music instruction as children had more robust neural responses to sound than peers who had never participated in music lessons.”

She says she could look at the computer screen and easily see who was a musician, and who was not. The computer screen’s graph, or picture of the sound, was larger for the volunteers who played music.

Every sound we hear has a main or “fundamental” frequency. This helps us determine the “pitch”. In music, that helps us decide if one sound, or musical note, is higher or lower than another. So, for a musician...

“The responses to this fundamental frequency that carries pitch information was simply larger in magnitude. The voltages, the electrical activity, was larger in response to these pitch elements.”

Professor Kraus says the people tested in the experiment could have been listening to any kind of sound, or any kind of music. They could even have been asleep. She could still see how their brains were understanding and identifying what they were hearing.

So now we know that the brains of musicians are different from those of other people. What is the big deal? Why is this important? According to Nina Kraus, that matters a lot as we get older. Many people notice that, as the years go by, their hearing gets worse. Just hearing an old friend’s voice in a noisy place can be difficult. But if you have ever played a musical instrument...

“Your nervous system automatically gets good at responding to sounds that the brain has learned are important.”

So

“If you’re talking to me in a noisy restaurant and my nervous system is very good at locking onto the sound of your voice, then I’m going to be better able to understand what it is that you say.”

The research at Northwestern University shows that playing a musical instrument is good for your brain. And although our ears may not work as well as we age, the brain remembers how to “lock onto” the important sounds. And that helps us to hear better.

“Musicians become quite good at being able to pull out the part of the sound that they are interested in listening to. For example, the sound of their own instrument.”

And there is something else good about playing music...if I could only remember...

Oh, yes! Our brains get better at remembering things. When we play a piano, for instance, we force our brains to remember the note we just played. If your brain could talk, it might ask itself, is that the right sound? Or is it this one? Should I play the notes like this? Or this? Does this sound better with a major chord...a happier sound? Or a minor chord, a sadder sound?

Ms. Kraus says when we play a musical instrument we are exercising and making important electrical connections, or pathways, in our brains. This might even help our brains when we are trying to learn another language, or a new subject in school. So, if learning to play a simple song is good, is it better to try to learn to play something much more complex, like Bach or Chopin, for example? Professor Kraus says she has yet to test that proposal, but ...

“We know that pushing ourselves, physically or intellectually, is very good for the development of the nervous system. Certainly the more challenging the task and the more engaging the task, the stronger the connections are likely to be.”

Over 20 years ago, a French scientist wrote about what he called the “Mozart Effect”. He said that just listening to the classical music of Wolfgang Amadeus Mozart could help the human brain. Some researchers said that Mozart’s music would make you smarter, or even help your brain cure some health disorders. Others said that there was nothing special about Mozart’s music. Any kind of high energy music would work. So if the cost of a musical instrument or music lessons is too costly, can we get the same brain experience just by listening? Ms. Kraus says...no.

“Usually people do have teachers, or they can teach themselves. But the point is they’re actively playing a musical instrument. They’re actively engaging in making music. We’re not talking about the effects of simply passively listening to music. I like to give the analogy that you are not going to get physically fit by watching spectator sports.”

Professor Kraus thinks it would be a very good thing if young people around the world could take music lessons in school. Even in difficult economic times, she urges school teachers and the administrators who control the money, not to cut back on musical training.

“Music, beyond being inherently a wonderful activity in and of itself, seems to confer benefits that extend outside the music domain, and extend into areas that are very, very important for human communication.”

There is much more about Nina Kraus’ work at her website: www.brainvolts.northwestern.edu. She is sure that playing a musical instrument is a really good and important thing to do. It is fun, and it helps your brain, now and in the future.

“I’m a biologist and I study learning. Whether it’s music or anything that we engage in, we are what we do. And our nervous system really changes according to how we spend our time.”

This program was written and presented by Jim Tedder. I’m Christopher Cruise. You can find transcripts, MP3s and podcasts of our programs at learningenglish.voanews.com. And you can find us on Twitter and YouTube at VOA Learning English. Join us again next week at this time for more news about science on the Voice of America.

