

Say What?! Musicians Hear Better

by [Jon Hamilton](#)

Listen Now 

[3 min 56 sec] on *All Things Considered*

add to playlist |

download 



[Enlarge](#)

[iStockphoto.com](#)

The study tested classically trained violinists and pianists, and found that their brains were much better adapted to discern subtle pitch and tonal differences in sound.

[For Pianist, Music Unleashes Rainbows Of Color](#)

October 19, 2009 - Musical training can improve your hearing, according to several studies presented in Chicago at Neuroscience 2009, the annual meeting of the Society for Neuroscience.

The studies found that serious musicians are better than other people at perceiving and remembering sounds. But it's not because they have better ears.

Sounds come in through the ears. But they travel through the nervous system and get interpreted by the brain.

That means your hearing can change even if your ears don't, says Nina Kraus, who directs the [Auditory Neuroscience Laboratory at Northwestern University](#).

"Your hearing system becomes tuned by the experiences that you have had with sound throughout your life," Kraus says.

The Musician's Brain

Kraus figured that the hearing systems of musicians ought to be more finely tuned than those of other people. So she tested their ability to do something challenging: understand what someone is saying in a noisy room.

Fifteen classically trained musicians and 16 nonmusicians listened to a voice reciting simple sentences against an increasingly loud backdrop of other conversations.

Standard hearing tests had shown that the musicians' ears weren't any more sensitive than those of the other listeners. But Kraus knew that their brains, shaped by years of training, had become very good at a similar task:

"A musician will be listening to the sound of his own instrument even though many other instruments are playing," she says, a skill not unlike separating one voice from a crowd of voices.

Kraus wanted to know whether this skill helps musicians pick out a particular voice the same way they pick out a particular instrument. "And resoundingly it does," she says.

A closer look at musical brains may explain why.

Tests show that certain sounds produce stronger electrical signals in a musician's brain stem, Kraus says. And, she says, these signals offer a more accurate representation of pitch, timing and tone quality — three things that help us pick out a single voice in a noisy room.

Music May Help Children Learn Language

Another study presented at Neuroscience 2009 suggests that musical training could help children who are struggling with language.

"These kids seem to be impaired in the very areas that musicians excel," says Dana Strait, a doctoral candidate in Kraus' lab who has studied the oboe and piano for many years.

Strait asked musicians and nonmusicians to take a simple test.

"They were asked to click a button every time they heard a specific sound," she says, "but not click a button to other sounds that they might hear."

Musicians not only responded faster and more accurately; they were able to stay focused longer, Strait says.

In contrast, many children with dyslexia and other language problems do poorly on tests like this. Musical training could offer a way to improve their performance, Strait says.

"Musical experience can change how our brain interacts with sounds," she says. "It's almost like the brain is better able to pay attention to sound and [to] better extract meaning from sound."

Training Lasts Despite Hearing Loss

A third study by scientists from Friedrich Schiller University in Jena, Germany, found that musicians could detect harmonies that were slightly off-key even when they had lost most of their hearing. Factory workers with similar hearing loss could not.

Results like these make sense if you think about the brain and the hearing system as if they were muscles, says Dr. Mark Jude Tramo, a professor of neurology at Harvard and director of the [Institute for Music & Brain Science](#).

Tennis players tend to be good arm wrestlers because they have strong forearms, Tramo says. In much the same way, he says, a musician who exercises certain parts of the brain "is going to be able to do better on any task that involves auditory concentration."

RELATED NPR STORIES

[Multitasking In The Car: Just Like Drunken Driving](#)

[Music Written For Monkeys Strikes A Chord](#)

[Exploring 'Your Brain On Music'](#)

COMMENTS

Discussions for this story are now closed. Please see the [Community FAQ](#) for more information.



J Thomas (rell) wrote:

I have always wondered about the frequency of hearing loss among conductors of orchestras/bands/large ensembles.

Several years ago, I heard an NPR series on the topic of 'power'. One of the interviewees

Recent First

was the conductor of an orchestra. The interviewer asked if the conductor felt a sense of power from standing in front of a group whose members were willing to do his bidding if he only looked at them or moved his arms. His response was that he did not feel that he had power over them so much as he sensed the power of the group for what they could accomplish in a performance. He felt he 'rode' on the undulating 'surf' of their music.

This concept triggered my curiosity about the volume of the music. Is that music loud enough/powerful enough to produce hearing loss in conductors and/or members of the orchestra.

A couple of years later, I went through a year or two of occasional real-life encounters with the conductor of my local symphony orchestra. I thought I perceived a hearing loss in this man. His reaction to certain elements in conversation was exactly like my mother's - a woman who has had a known hearing loss for years.

2009-10-23 10:38

[Recommend \(1\)](#)

[Report abuse](#)



Ana Rusel (amykate) wrote:

This makes me think of all those studies that say students who study music are better at learning foreign languages. The theory was that they both tap into a grammar or structure that makes students better able to understand the rules of the new language. Now I wonder if the ability to better "hear" the new language (as opposed to a string of gibberish) is what makes the difference.

2009-10-21 13:59

[Recommend \(0\)](#)

[Report abuse](#)



Full Midwestern (Traditional) wrote:

Though insightful, it's too bad this report only addresses the issue from the age old "how do I get smarter" viewpoint. The ability to play, and more importantly, enjoy music for the aesthetics it provides is much more important.

Not everything important can be measured scientifically. Beethoven, Mozart and Bach would be rolling in consort.

2009-10-20 21:41

[Recommend \(0\)](#)

[Report abuse](#)



E Frederick (lizochka) wrote:

A musician myself, I enjoyed this and am a believer! The article brings to mind Alfred Tomatis, a famous French ENT physician. He developed a system of listening therapy involving Mozart and Gregorian chant that can have broad impact-- from the emotional to the physical. It has been found to help adults and children function at their highest potential, overcoming learning obstacles or just fine-tuning abilities in areas such as confidence, athleticism, musicality, sense of well-being, foreign language learning, etc. Positive results have been observed in people of all sorts, including those with learning disabilities or other challenges, all from the skilled delivery of music with filtered frequencies through special headphones.

My young son has been involved in a listening therapy program based on Tomatis' work at a wonderful OT and sound therapy clinic north of Boston (www.projectchild.com), and I have been astounded at the changes-- improved focus, eye contact, coordination. He stands taller, is less anxious. He seems more tuned in to the whole world around him and to himself. It is hard to believe, but I see it and am amazed. Exposure to music clearly has the power to shape one's mind and development.

2009-10-20 21:15

[Recommend \(0\)](#)

[Report abuse](#)

Matthew Scallon (MatthewCScallon) wrote:



I knew it, I knew it, I knew it. This is why I was the only one in my family who would get bothered by a nasal voice from the other side of the room.

2009-10-20 19:37

[Recommend \(2\)](#)

[Report abuse](#)



K Whit (KWhit) wrote:

I find it funny how those who lack ability (Colin) are the ones who doubt it can be taught, and can only see ability as the result of talent. As an art teacher, I often encounter students who claim that they just can't draw. And more often, I encounter adults who say this claiming they don't have talent. Eventually, my students are convinced otherwise after many weeks of drawing exercises in class and practice at drawing. The brain CAN be trained in new ways! It is probably the same for music, yes some are born with a natural bent toward this type of thinking, but happily, it can be taught and learned! This belief is the whole reason I go to work every day, thank you NPR for sharing this study.

2009-10-20 18:47

[Recommend \(0\)](#)

[Report abuse](#)



Lilly Gavina (lfg33) wrote:

This completely makes sense to me!! As a classical musician you are taught to listen in a different way that isolates each sound by pitch, rhythm, and harmonics of everything being combined. The result is that you hear everything way too loud at the movie theater, the radio is way too loud, it's really hard to go to a rock concert because you feel sick to your stomach and you are always having the "tv" is WAY too loud conversation with your family. It's a gift, really, but it can be a curse too!!

2009-10-20 18:28

[Recommend \(4\)](#)

[Report abuse](#)



Jim Hawkins (swahawk) wrote:

OK, all you trained musicians, Listen Up? Say What?

2009-10-20 13:41

[Recommend \(1\)](#)

[Report abuse](#)



Steven Ford (Yumans) wrote:

While some of what you say might be true Colin, it is a source of some controversy where our abilities, such as intelligence and capabilities in specific areas, come from. While I believe that some people are gifted from the start, I also believe that much of our abilities come from our early life! For example, a kid who is taught from the start to think logical might be a genius in mathematics or programming. Our brains are amazing in being able to adapt, and if experience rewards the development of certain parts of the brain, well then the owner of such a brain might be described as being "naturally able" to perform some task.

2009-10-20 12:43

[Recommend \(1\)](#)

[Report abuse](#)



Katherine Laucamp (loip) wrote:

da

2009-10-20 07:45

[Recommend \(2\)](#)

[Report abuse](#)

[View all comments \(13\)»](#)