


treatments

The Beatles' Surprising Contribution To Brain Science

by JON HAMILTON

November 08, 2012 4:00 AM

Listen  Morning Edition

- Playlist
- Download



The Beatles rehearse for that night's Royal Variety Performance at the Prince of Wales Theatre in 1963.

Central/Hitton Archive/Getty Images

The same brain system that controls our muscles also helps us remember music, scientists say.

When we listen to a new musical phrase, it is the brain's motor system — not areas involved in hearing — that helps us remember what we've heard, [researchers reported](#) at the Society for Neuroscience meeting in New Orleans last month.

The finding suggests that the brain has a highly specialized system for storing sequences of information, whether those sequences contain musical notes, words or even events.

But the discovery might never have happened without The Beatles, says [Josef Rauschecker](#) of Georgetown University. As a teenager in Europe, Rauschecker says, he was obsessed with the group.

"They were kind of the hot band at the time and I would listen to music while I was studying," he says. "My mother would say, 'Don't do that, you can't concentrate.'"

But Rauschecker ignored her. He says *The White Album*, *Revolver* and *Rubber Soul* seemed to become a part of his teenage brain, and the memory of which songs came in which order never faded.

"Years later I would put on one of these old LPs and then you know at the end of one track you immediately start singing the next one," he says, "as if it was all stored in your brain as a continuous sort of story."

That intrigued Rauschecker, who by this time was a brain scientist at Georgetown. He kept wondering which part of his brain knew the order of all those sequences of Beatles songs.

"The funny thing is that if you ask me now what comes after 'Michelle' or whatever I wouldn't know," he says. "It's not explicit knowledge. But if you hear it, then you can immediately continue singing it."

So a couple of years ago Rauschecker's lab did an experiment. It had volunteers bring in a favorite CD and lie in a brain scanner. Then the scientists watched what happened as the volunteers listened.

Sure enough, there was distinctive brain activity after each track ended. But Rauschecker says the brain activity wasn't where he thought it would be.

"You would think the brain part that is relevant for hearing would be the one that is mostly activated," he says. "But no, it was the motor areas. So that was quite surprising and puzzling."

So why had the part of the brain that works muscles been hijacked to remember music?

To find out, Rauschecker and a graduate student named Brannon Green did another experiment to see precisely what was happening as the brain learned a new musical sequence. This time, they put volunteers in a scanner and had them listen to atonal music generated by a computer.

At first the volunteers heard a single musical phrase made up of several notes, Green says. Then they heard that phrase again, followed by a new phrase.

"So what happens is by the time the entire sequence is played, the parts at the beginning have been repeated something like 30 times whereas the parts at the end have repeated once or twice," he says.

Brain scans showed that motor areas became active when people were hearing something new. But these motor areas were relatively quiet when people heard familiar notes.

"As you progressed to a familiar sequence, those areas became less and less important," Green says.

During familiar sequences, meanwhile, activity increased in areas involved in hearing.

All this suggests that areas involved in hearing can remember small chunks of notes, but it takes the motor system to put these chunks in the right order, Rauschecker says. And he says it makes sense that the motor system would be responsible for this sequencing function.

"Because that's what the motor system has to do when you do a dance sequence or you ski down the slope," he says. "You have to program your muscles to work in particular sequence, especially when you learn something."

Rauschecker has also found evidence that the motor system can step in to help retrieve a chunk of forgotten musical notes.


"When as a musician you get stuck in playing a piece on the piano you don't just continue," he says. "Usually you go back to a certain point and start over again because the sequence has to be somehow played out."

And that's possible with a little help from the brain system that moves our muscles.

memory neuroscience the beatles research

More From Shots - Health News

health care **Hospitals Gamble On Urgent Care Clinics To Keep Patients Healthy** 

health **Obamacare Is Here To Stay, But In What Form?** 

health **West Nile Cases Still Climbing As Temperatures Drop** 

You must be logged in to leave a comment. [Login](#) / [Register](#)



Please keep your community civil. All comments must follow the [NPR.org Community rules and terms of use](#), and will be moderated prior to posting. NPR reserves the right to use the comments we receive, in whole or in part, and to use the commenter's name and location, in any medium. See also the [Terms of Use](#), [Privacy Policy](#) and [Community FAQ](#).




5 comments ★ 2 Stars




Discussion | Community 

Show One New Comment

 **chris schweder** · 3 hours ago
I like listening to jazz at work (it gets the synapses snapping), rock when I am driving (or working around the house), funky soul when my wife and I are... (well, you know), and classical when I am getting ready for bed (zzzzzzzzzz).
I like listening to country... well, I don't like listening to country... country sucks.
4   · [Share](#)

 **Joe Gandalf** · 2 hours ago
A fascinating story; it also seems to be a reasonable explanation.
Thanks, NPR.
3   · [Share](#)

 **Dean Earlix** · an hour ago
There are some exciting implications for learning that may arise from this research. The current theory is that there are three channels we use to get information into our sensory register (the first step to learning): visual, auditory, and kinesthetic. We each have only so much "bandwidth" in each of these channels, so any time our brains can use multiple channels in parallel, we greatly increase our rate of information intake. Learning our sequence through our kinesthetic channel and the notes through our auditory channel would greatly increase how much we can "learn" from listening.
Now, can anyone tell us teachers how to use this to make learning easier and last as long as the ability to remember the next song to an album we heard half a lifetime ago?
1   · [Share](#)


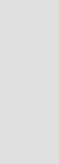
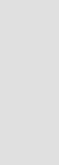
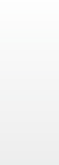
 **Susan Lewis** · an hour ago
Certain music helps me concentrate.
Which music does that for me has changed over the years.
Same effect though.
Today, the sound of Bono's melodious, haunting voice does it for me. What an amazing sound.
I play "I Still Haven't Found What I'm Looking For" in a continuous loop, when I need to relax and focus.
Somehow, this brilliant telling of a crisis of faith really soothes me.
0   · [Share](#)

Powered by **DISQUS**

About

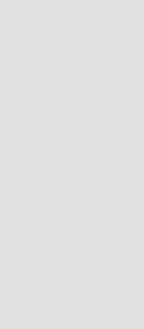
Shots is the online channel for health stories from the NPR Science Desk. We report on news that can make a difference for your health and show how policy shapes our choices about health. Look to *Shots* for the latest news on research and medical treatments, as well as dispatches about health from around the globe. [Scott Hensley](#) is your host. You can reach Scott and the rest of the *Shots* team via our [contact form](#).

Subscribe

-  **Podcast**
-  **RSS**
-  **@NPRHealth**
-  **@scotthensley**

On Health Podcast

In-depth reports on medicine, staying healthy and the major issues surrounding health care.



Subscribe



NPR Shop
Support The Programs You Love



Novo Nordisk, committed to changing diabetes in communities worldwide. [novonordisk-us.com](#)

NPR thanks our sponsors [Become an NPR sponsor](#)