

Researchers find where musical memories are stored in the brain

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A group of Dartmouth researchers has learned that the brain's auditory cortex, the part that handles information from your ears, holds on to musical memories.

In a study titled "Sound of silence activates auditory cortex" published in the March 10 issue of *Nature*, the Dartmouth team found that if people are listening to music that is familiar, they mentally call upon auditory imagery, or memories, to fill in the gaps if the music cuts out. Using functional magnetic resonance imaging (fMRI) to measure brain activity, the researchers found that study participants could mentally fill in the blanks if a familiar song was missing short snippets.

"We played music in the scanner [fMRI], and then we hit a virtual 'mute' button," says first author David Kraemer, a graduate student in Dartmouth's Psychological and Brain Sciences Department. "We found that people couldn't help continuing the song in their heads, and when they did this, the auditory cortex remained active even though the music had stopped."

The researchers say that this finding extends previous work on auditory imagery and parallels work on visual imagery, which both show that sensory-specific memories are stored in the brain regions that created those events. Their study, however, is the first to investigate a kind of auditory imagery typical of everyday experience.

"It's fascinating that although the ear isn't actually hearing the song, the brain is perceptually hearing it," says coauthor William Kelley, Assistant

Professor of Psychological and Brain Sciences at Dartmouth.

The researchers also found that lyrics impact the different auditory brain regions that are recruited when musical memories are reconstructed. If the music went quiet during an instrumental song, like during the theme from the Pink Panther, individuals activated many different parts of the auditory cortex, going farther back in the processing stream, to fill in the blanks. When remembering songs with words, however, people simply relied on the more advanced parts of the auditory processing stream.

"It makes us think that lyrics might be the focus of the memory," says Kraemer.

The other researchers on this study are Professor C. Neil Macrae and graduate student Adam Green, both with the Psychological and Brain Sciences Department at Dartmouth.

Source: Dartmouth College

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