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Humans have a poor memory for sound

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Remember that sound bite you heard on the radio this morning? The grocery items your spouse asked you to pick up? Chances are, you won't.

Researchers at the University of Iowa have found that when it comes to memory, we don't remember things we hear nearly as well as things we see or touch.

"As it turns out, there is merit to the Chinese proverb 'I hear, and I forget; I see, and I remember," says lead author of the study and UI graduate student, James Bigelow.

"We tend to think that the parts of our brain wired for memory are integrated. But our findings indicate our brain may use separate pathways to process information. Even more, our study suggests the brain may process auditory information differently than visual and tactile information, and alternative strategies – such as increased mental repetition – may be needed when trying to improve memory," says Amy Poremba, associate professor in the UI Department of Psychology and corresponding author on the paper, published this week in the journal *PLOS ONE*.

Bigelow and Poremba discovered that when more than 100 UI undergraduate students were exposed to a variety of sounds, visuals and things that could be felt, the students were least apt to remember the sounds they had heard.

In an experiment testing short term-memory, participants were asked to

listen to pure tones they heard through headphones, look at various shades of red squares, and feel low-intensity vibrations by gripping an aluminum bar. Each set of tones, squares and vibrations was separated by time delays ranging from one to 32 seconds.

Although students' memory declined across the board when time delays grew longer, the decline was much greater for sounds, and began as early as four to eight seconds after being exposed to them.

While this seems like a short time span, it's akin to forgetting a phone number that wasn't written down, notes Poremba. "If someone gives you a number, and you dial it right away, you are usually fine. But do anything in between, and the odds are you will have forgotten it," she says.

In a second experiment, Bigelow and Poremba tested participants' memory using things they might encounter on an everyday basis. Students listened to audio recordings of dogs barking, watched silent videos of a basketball game, and, touched and held common objects blocked from view, such as a coffee mug. The researchers found that between an hour and a week later, students were worse at remembering the sounds they had heard, but their memory for visual scenes and tactile objects was about the same.

Both experiments suggest that the way your mind processes and stores sound may be different from the way it process and stores other types of memories. And that could have big implications for educators, design engineers and advertisers alike.

"As teachers, we want to assume students will remember everything we say. But if you really want something to be memorable you may need to include a visual or hands-on experience, in addition to auditory information," says Poremba.

Previous research has suggested that humans may have superior visual memory, and that hearing words associated with sounds – rather than hearing the sounds alone – may aid memory. Bigelow and Poremba's study builds upon those findings by confirming that, indeed, we remember less of what we hear, regardless of whether sounds are linked to words.

The study also is the first to show that our ability to remember what we touch is roughly equal to our ability to remember what we see. The finding is important, because experiments with non-human primates such as monkeys and chimpanzees have shown that they similarly excel at visual and tactile memory tasks, but struggle with auditory tasks. Based on these observations, the authors believe humans' weakness for remembering sounds likely has its roots in the evolution of the primate brain.

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