Brain training using sounds can help aging brain ignore distractions

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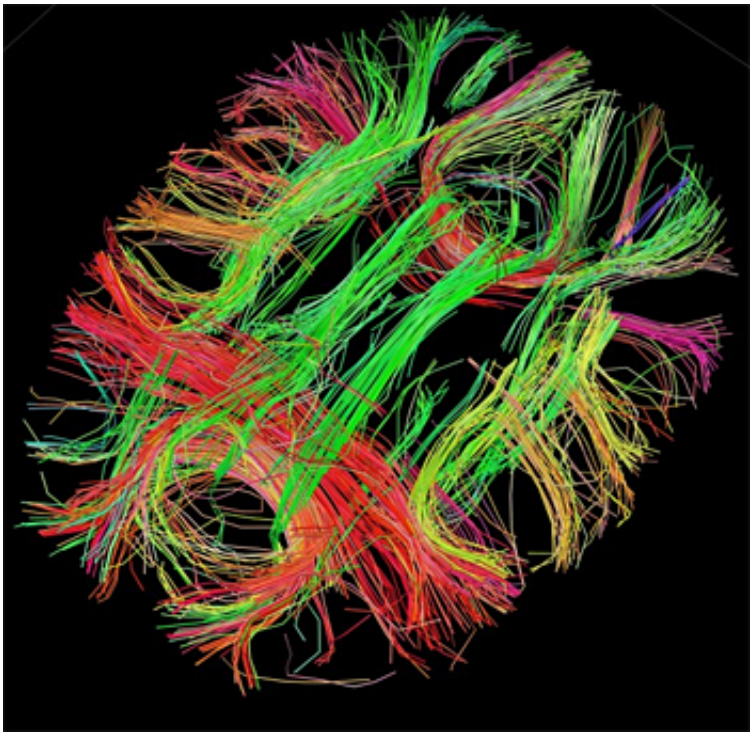

White matter fiber architecture of the brain. Credit: Human Connectome Project.

As we age, we have an increasingly harder time ignoring distractions. But new research online November 20 in the Cell Press journal *Neuron* reveals that by learning to make discriminations of a sound amidst progressively more disruptive distractions, we can diminish our distractibility. A similar strategy might also help children with attention

deficits or individuals with other mental challenges.

Distractibility, or the inability to sustain focus on a goal due to attention to irrelevant stimuli, can have a negative effect on basic daily activities, and it is a hallmark of the aging mind.

To address the problem, a team led by researchers at the University of California, San Francisco developed a training approach designed to help strengthen individuals' ability to suppress their attention to distracting stimuli.

The investigators used sounds at various frequencies as targets and distractors, with the goal of having trainees focus on the target frequencies while ignoring the distractor frequencies. In both aged rats and older humans, trainees implicitly learned to identify the target tone in each training session through reinforcement feedback, and then they had to continue to correctly identify that target tone amidst progressively more challenging distractor frequencies. Distractor frequencies were progressively made more similar to the target after trainees made correct discriminations, or they were made more dissimilar after incorrect discriminations. All the while, the target frequency was kept constant.

In both rats and humans, training led to diminished distraction-related errors, and trainees' memory and attention spans improved. Also, electrophysiological brain recordings in both rats and humans revealed that neural responses to distractors were reduced.

"We show that by learning to discriminate amidst progressively more challenging distractions, we can diminish distractibility in rat and human brains," says lead author Dr. Jyoti Mishra.

The approach could also be modified to help individuals struggling with a variety of distractions. "This same training could be generalized to

more complex stimuli and across sensory modalities—such as auditory, visual, and tactile—to broadly benefit distractor processing in diverse impaired populations needing such training," says senior author Dr. Adam Gazzaley.

In addition to highlighting the therapeutic potential of this type of brain training to improve our ability to focus with age, it also shows that even in the aged adult, the brain is responsive to learning-based approaches that can improve cognition.

More information: Neuron, Mishra et al.: "Adaptive Training Diminishes Distractibility in Aging across Species" www.cell.com/neuron/abstract/S0896-6273(14)00954-4

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