

Hack your brain to remember almost anything

- Anyone can use the same techniques as top "memory athletes" to boost memory and rewire their brain
- In 30 minutes a day, memory novices dramatically improved their performance, a new study says

(CNN) The reigning World Memory Champion, [Alex Mullen](#), can memorize the order of a deck of cards in 17 seconds. But in some ways, he's just as forgetful as the rest of us.

"I still forget plenty of basic things, like where I left my keys," said Mullen, a medical student at the University of Mississippi.



Memory champion Alex Mullen memorized the order of a deck of cards in 21.5 seconds at the 2015 World Memory Championships. He later set the current world record under 17 seconds.

Memory athletes such as Mullen can remember hundreds or even thousands of random words, numbers and images -- a feat that may seem unbelievable to onlookers. But according to [a study published today](#), anyone can train their brain using the same tricks as the world's top competitors, reshaping their brain's networks in the process.

For the study, researchers recruited 23 of the world's top-ranked memory athletes and compared their brains with those of people who had never practiced memory techniques at all. Then, they put some of the newcomers through a memory training program and observed how their brains changed.

The more the rookies practiced the techniques, the more their brain scans started to resemble the memory athletes' -- and it took only six weeks.

"These really incredible memory feats ... are not some form of inborn talent. It's really just training," said Martin Dresler, a neuroscientist at Radboud University in the Netherlands and the lead author of the study.

Mullen, a relative newcomer to the scene who was not involved in the study, was none too surprised. The top-ranked memory athlete said that, before he started training, "I felt like my memory wasn't that great.

"You can do things that you probably don't think you're capable of," he said.

You will have **1 minute** to memorize up to **20 cards**. Then, you will recall them in the same order.

[Boris Nikolai Konrad](#), a researcher in Dresler's lab and a memory athlete himself, had expected to find an enlarged hippocampus -- the brain's memory center -- in memory athletes. But instead, their brains, and even his own, looked no different from the beginners'.

"It surprised me that we did not find structural differences in the brain," said Konrad, who is [ranked 24th worldwide](#) by the World Memory Sports Council.

His hypothesis was based on studies of London taxi drivers, who must memorize thousands of streets and landmarks for a notoriously difficult test called "The Knowledge." Their brains were previously found to have [larger hippocampi](#).



To improve your memory, exercise and sleep at the right time

Although the brain structures of memory athletes were no different from the beginners', Konrad said, there was something different about the way their brains worked: Their memory centers were communicating strongly with the visual and spatial centers.

Konrad said this is because of how memory athletes train: by picturing familiar places and filling them with imaginary objects, like a cow eating moss to represent the city of Moscow.

By imagining that cow in the doorway of your home, the research suggests, you can make memories stick by capitalizing on something that humans are naturally good at: visual learning and navigation. Many athletes know this method as the "memory palace."

In using this method, Konrad said, memory athletes use a larger number of brain regions -- a practice that changes only brain connectivity, not structure.

"It might be a motivating message for some: You don't have to have a special brain in any way," he said.

Brain games

Mullen first became interested in memory techniques while reading ["Moonwalking With Einstein,"](#) a book about one journalist's yearlong journey to win the 2006 USA Memory Championship using the memory palace method.

The title of the book refers to a mnemonic the author used to memorize a deck of cards: a mental image of Albert Einstein dancing the Moonwalk.

"Before that, I'd never heard about memory techniques," said Mullen, who converts his own decks of cards into characters like [Captain Kirk from "Star Trek" and Gandalf from "Lord of the Rings."](#)



Alex Mullen memorized the order of over 28 decks of cards at the 2015 World Memory Championships in Chengdu, China.

Then a junior at Johns Hopkins University, Mullen picked up a few memory tricks to help with school. Before long, however, he was experimenting with the same tasks that were used at memory competitions: reciting long strings of ones and zeroes, memorizing decks of cards and matching lists of names and faces.

"It became addictive in the same way that [Candy Crush](#) is addictive," he said. "You keep on wanting to improve your time and your scores."

Mullen uses the same method to memorize anatomy and biochemistry in medical school. The method may even help some people memorize something as mundane as a grocery list.

When he's not preparing for a big competition, Mullen spends about 30 minutes a day practicing the techniques. This is exactly how much time the people trained in Dresler's study.

Interestingly, Dresler said, the results of his study are specific to this one memory technique. His study not only compared those who learned the tricks of the trade with those who didn't; a third group received a different type of memory training that was based on repetition, not visualization.

This memory group, which never learned the memory palace method, had only modest gains in the number of random words they could recall, and their brains didn't show the

same changes on fMRI. Four months later, their memories were back to normal; they were statistically no different from the group that had no training at all.

Meanwhile, the group that trained like the pros kept much of their newfound abilities four months later.

"You can really drive the brain in the direction of the world's best memorizers," Dresler said, adding that it doesn't take six weeks of daily training to boost your memory capacity.

"You can see considerable increases in memory in one afternoon."

Being Joe Schmoe

"Our brains are very plastic, very flexible, and can still be resculpted," said [Dr. Michael Greicius](#), medical director of the [Stanford Center for Memory Disorders](#). Greicius assisted in the analysis of the fMRI data in the study.

The study reinforces an idea that has gained traction among neuroscientists, Greicius said: that memory is distributed over many regions of the brain, instead of being confined to just one. The brain in general is made up of connected "networks" and not just specialized areas, he said.

"The whole field is witnessing this shift ... away from studying areas of the brain in isolation," said [Chantal Stern](#), a cognitive neuroscientist with [Boston University's Center for Memory and Brain](#) who was not involved in the study. "And it's in the patient work, as well."



Do brain-training exercises really work?

According to Stern and Greicius, this approach to the brain could reveal how diseases like Alzheimer's -- which may begin as a memory problem -- jump tracks and spread along these networks to other regions of the brain, disrupting areas dealing with personality and sleep.

Stern is also interested in what brain networks may reveal about why ["superagers"](#) stay sharp well into their golden years.

But Greicius cautions that memory training has not been proved to prevent or slow the effects of old age or dementia, despite the claims of the brain game industry.

In a 2014 [open letter](#) signed by study authors Greicius and Dresler, 75 scientists slammed the brain game industry's "exaggerated and misleading claims (that) exploit the anxiety of older adults."

"There's no real-world clinical connection at this stage whatsoever," Greicius said.

There is no indication a memory palace has any impact on everyday memory either, said Stern -- which may be why top memory athletes still lose their keys. The memory gains seem to appear only when using the memory palace.

When memory athletes are fooled -- by being told they won't be tested on a list of words and then getting quizzed by researchers anyway -- they don't perform much better than average, said Konrad, who is continuing to study his fellow memory athletes.

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Konrad, who also trained the newcomers to build their first memory palace, said that one finding in particular stood out to him as motivating: Everyone improved, regardless of where they started.

Even for the reigning world champion, Mullen has managed to surprise himself when he thought he had hit a wall or reached a personal limit. He has come a long way since his college years, when he was frustrated with forgetting things from one class to the next, he said.

"Before I learned about the techniques, I was an average Joe Schmoe," Mullen said.

"Not to say that I'm not an average Joe Schmoe anymore," he added.