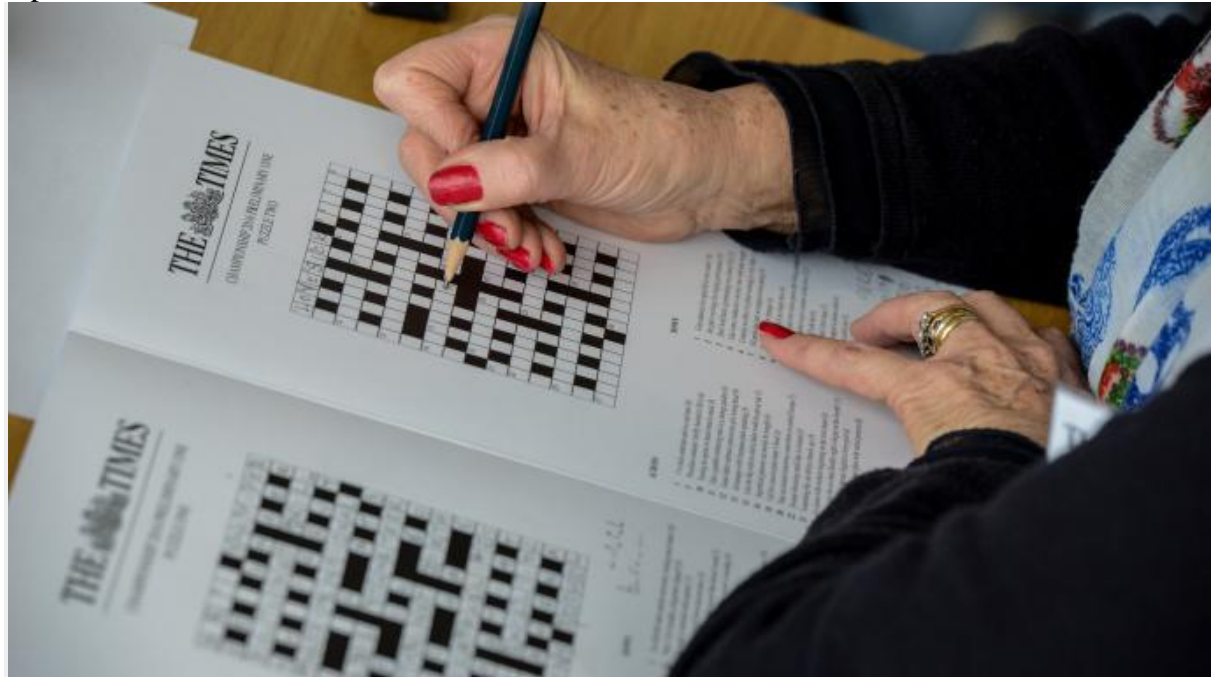


# Electric shock: zapping brain can improve your memory

**Tom Whipple**, Science Editor

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**Applying an electric current to the brain reinforces rhythms already present in brain circuits and could slow age decline** CHRIS J RATCLIFFE FOR

Next time you settle down to do the crossword make sure to remember your reading glasses, your dictionary — and of course your brain zapper.

Scientists have shown that applying a weak electric current to the brain can improve working memory in older adults, giving them cognitive skills equivalent to people half their age.

Other researchers said that the technique, which reinforces rhythms already present in brain circuits, represented a “real advance” that could lead to better treatments for age-related brain decline.

“Working memory is a really fundamental building block of human cognition,” Robert Reinhart, from Boston University, who conducted the research, said. “It’s been called the workbench of the mind. It allows us to hold information in our minds over a period of seconds. This is where we think, where we problem solve, reason, plan, and make decisions. It’s essentially where consciousness lives.

“What we’ve known for a long time is that working memory, although critical in cognition, is also a fragile and precious cognitive resource that declines with age.”

For his experiment, published in the journal *Nature Neuroscience*, he wanted to see if this was inevitable. He took 42 adults over 60 and 42 in their 20s, and gave them a battery of tests to assess their working memory. At first, as expected, the older participants did significantly worse. Then, though, they applied electrodes to their skulls. These electrodes sent pulses of current designed to mimic and strengthen brainwaves associated with working memory. Professor Reinhart said this was, in a sense, “speaking the language of the brain”.

“Most people are familiar with the snappy phrase, ‘Cells that fire together wire together’,” he said. “At the higher scale, populations of cells that rhythmically synchronise activity are communicating — transferring information.” By producing waves of firing neurons in this way, disconnected parts of the brain can, he believes, co-ordinate.

With these headsets on these already present brainwaves, which had become more fuzzily aligned in the older brains, were given the crisp synchronicity of youth again. With this change, performance improved dramatically, to such an extent that there was no difference between the old and the young.

“This is important,” Professor Reinhart said. “Not only does it give us new insights into the brain basis of age-related working memory decline, it also shows that these negative changes are not unchangeable.”

Other scientists welcomed the work. Sven Braeutigam, from the University of Oxford, said it could point the way to treating something that most just consider an inevitability of age. “The effects of age-related decrease in our ability to think and remember are highly significant both at the individual and societal level. However, neither the biological mechanisms underlying such decrease are fully understood nor are consistent therapeutic approaches available.”

Robert Howard, professor of old age psychiatry at University College London, said that we should be cautious about thinking it will easily translate into a useful tool, not least because improving one part of the brain might have knock-on effects on other functions.

“The ‘real world’ benefits of any apparent improvements in experimental working memory function associated with the technique will also need to be evaluated together with the impact of any potential adverse effects of brain

stimulation. For example, induced improvements in working memory might come at the price of worsening of other areas of cognitive function.”