

# A brain training exercise that really does work

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(Medical Xpress) -- Forget about working crossword puzzles and listening to Mozart. If you want to improve your ability to reason and solve new problems, just take a few minutes every day to do a maddening little exercise called n-back training.

In an award address on May 28 at the annual meeting of the Association for [Psychological Science](#) in Washington, D.C., University of Michigan psychologist John Jonides presented new findings showing that practicing this kind of task for about 20 minutes each day for 20 days significantly improves performance on a standard test of fluid intelligence—the ability to reason and solve new problems, which is a crucial element of general intelligence. And this improvement lasted for up to three months.

Jonides, who is the Daniel J. Weintraub Collegiate Professor of Psychology and Neuroscience, collaborated with colleagues at U-M, the University of Bern and the University of Taipei on a series of studies with more than 200 young adults and children, demonstrating the effects of various kinds of n-back mental [training](#) exercises. The research was supported by the National Science Foundation and by the Office of Naval Research.

According to Jonides, the n-back task taps into a crucial brain function known as working memory—the ability to maintain information in an active, easily retrieved state, especially under conditions of distraction or interference. Working memory goes beyond mere storage to include processing information.

The n-back task involves presenting a series of visual and/or auditory cues to a subject and asking the subject to respond if that cue has occurred, to start with, one time back. If the subject scores well, the number of times back is increased each round. The task can be done with dual auditory and visual cues, or with just one or the other.

A few years ago, Jonides and his colleagues Martin Buschkuhl, Susanne Jaeggi, and Walter Perrig demonstrated that [dual n-back training](#) increased performance on tests of fluid intelligence. But the current work extends that finding in several ways.

"These new studies demonstrate that the more training people have on the dual n-back task, the greater the improvement in fluid intelligence," Jonides said. "It's actually a dose-response effect. And we also demonstrate that the much simpler single n-back training using spatial cues has the same positive effect."

The new studies also include tests with children, showing the same sort of training effect using a video-game version of n-back training. Again, Jonides and colleagues found that mental training on the n-back task resulted in improvements on tests of fluid intelligence. They also found that training made children less likely to be fooled by tempting, but incorrect, information.

"Psychologically, training made them more conservative," Jonides said.

Jonides and colleagues also conducted neural imaging studies on adults to show how training affected brain activity.

"We found two effects of our training regimen," he said. "After training, people had reduced amounts of [blood flow](#) in active brain regions when they were doing training tasks. And they had increased amounts of blood flow in those regions when they were not doing training tasks.

"In some ways, this is much like training a muscle in the body, and in some ways, it is different. When new muscle fibers have been grown as a result of training, they require greater blood flow when they are not being used. However, by contrast, when the new muscles are in use, they require more blood, unlike the trained regions of the [brain](#)."

**More information:** Brain Workshop:  
[brainworkshop.sourceforge.net/](http://brainworkshop.sourceforge.net/)

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