

# The Memory Practice

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Newsletter

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In this issue, Dr. Michelon tells you about

## Using training to boost intelligence

Do you know adults who would enjoy or benefit from brain exercises? Let them know about The Memory Practice.

Contact us to learn more about our [Home Program](#):

- [Brain exercises sent directly at home](#)

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## Can we use training to become smarter?

### What is intelligence?

Intelligence is a concept difficult to define as it covers many types of abilities. One definition dissociates between crystallized and fluid intelligence.

Crystallized intelligence refers to the knowledge acquired throughout life, such as vocabulary. **Fluid intelligence is the ability that allows us to adapt to new situations.**

Age does not affect crystallized and fluid intelligence the same way. In 2004, Shaie et al. as well as Lovden et al. published results showing that fluid intelligence declines steadily with age whereas crystallized intelligence does not.

### Can we train intelligence?

Several studies have shown that practicing specific tasks can increase performance in these tasks. Problematically, transfer of the training benefits to a different task (not practiced) has been rarely shown.

However, in a recent 2008 study published in the Proceedings of the National Academy of Sciences, Jaeggi and her colleagues showed that **fluid**

**intelligence can be improved by training on working memory.** In other words they showed that training young adults using a working memory task induced performance benefits that transferred to fluid intelligence tasks.

Jaeggi et al. trained four groups of young adults using a complex working memory task (Working memory is the ability to hold information for a short while in memory and use that information to solve a problem). In the task participants had to hold in memory both the locations of squares shown on a computer screen and consonants heard through headphones. A response was required whenever one of the presented stimuli matched the one presented  $n$  positions back in the sequence. Quite complex as you can see!

Participants (approximately 16 per group) were trained for 25 mn per day for 8 days, 12 days, 17 days or 19 days. Fluid intelligence was assessed before the training and after the training using standardized tests. Control groups, who did not receive any training, were also tested for fluid intelligence at the same intervals as the trained groups.

Results showed that **the trained groups did better in the fluid intelligence tasks after the training than before the training.** Importantly, this gain was greater than the gain seen in the control groups. Why would the control groups also improve when they did not get any training? They merely had some practice taking the intelligence test given that the test was administered twice (this is why it is crucial to show that the trained groups shows more benefit than the control groups).

This result shows that the benefits from being trained on a working memory task transferred to a test of fluid intelligence. This is probably possible because working memory and fluid intelligence are related in several ways: they both rely on similar neural networks and require to use attentional and control processes.

Showing that training benefits transfer to untrained tasks is an important result. Think about brain fitness training using computerized **brain games**. Playing the same game over and over will increase your performance in that game. But what you really want to see is a transfer of the benefits induced by playing that game to other, everyday, tasks.