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Strategic video game improves critical cognitive skills in older adults

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A desire to rule the world may be a good thing if you're over 60 and worried about losing your mental faculties. A new study found that adults in their 60s and 70s can improve a number of cognitive functions by playing a strategic video game that rewards nation-building and territorial expansion.

This is the first such study of older adults, and it is the first to find such pronounced effects on cognitive skills not directly related to the skills learned in the video game, said University of Illinois psychology professor Arthur Kramer, an author on the study.

The research appears this month in the journal *Psychology & Aging*.

Decades of laboratory studies designed to improve specific cognitive skills, such as short-term memory, have found again and again that trainees improve almost exclusively on the tasks they perform in the lab – and only under laboratory conditions, Kramer said.

"When you train somebody on a task they tend to improve in that task, whatever it is, but it usually doesn't transfer much beyond that skill or beyond the particular situation in which they learned it," he said. "And there are virtually no studies that examine whether there's any transfer outside the lab to things people care about."

Kramer and his colleagues wanted to know whether a more integrated training approach could go beyond the training environment to enhance

the cognitive skills used in every day life. Specifically, the researchers wondered whether interactive video games might benefit those cognitive functions that decline most with age.

"Older people tend to fare less well on things that are called executive control processes," Kramer said. "These include things like scheduling, planning, working memory, multitasking and dealing with ambiguity."

After testing several video games, the researchers selected "Rise of Nations," which gives gamers points for building cities and "wonders," feeding and employing their people, maintaining an adequate military and expanding their territory.

"You need merchants. You need an army to protect yourself and you have to make sure you're spending some of your resources on education and food," said postdoctoral researcher Chandramallika Basak, lead author on the study. "This game stresses resource management and planning, which I think for older adults is important because many of them independently plan and manage their resources."

The study included 40 older adults, half of whom received 23.5 hours of training in Rise of Nations. The others, a comparison group, received no training in the game.

Both groups were assessed before, during and after the video game training on a variety of tests designed to measure executive control functions. The tests included measures of their ability to switch between tasks, their short-term visual memory, their reasoning skills and their working memory, which is the ability to hold two or more pieces of information in memory and use the information as needed.

There were also tests of the subjects' verbal recall, their ability to inhibit certain responses and their ability to identify an object that had been

rotated to a greater or lesser degree from its original position.

The researchers found that training on the video game did improve the participants' performance on a number of these tests. As a group, the gamers became significantly better – and faster – at switching between tasks as compared to the comparison group. Their working memory, as reflected in the tests, was also significantly improved. Their reasoning ability was enhanced. To a lesser extent, their short-term memory of visual cues was better than that of their peers, as was their ability to identify rotated objects.

The video game training had no effect on their ability to recall a list of words in order, their enumeration ability or their ability to inhibit certain responses, however.

There was a correlation between their performance on the game and their improvement on certain cognitive tests, Kramer said.

Those who did well in the game also improved the most on switching between tasks. They also tended to do better on tests of working memory.

"In medical terminology, these would be dose-response effects," Kramer said. "The more drug – or in this case the more training on the video game – the more benefit."

The findings are meaningful, Basak said, because they show that multi-dimensional training can affect many individual components of cognitive function.

"The fact that you're training people in a molecule and finding transfer to atoms I think is very impressive," she said.

"This is one mode in which older people can stay mentally fit, cognitively fit," Kramer said. "I'm not suggesting, however, that it's the only thing they should do."

Other activities, in particular socializing, exercising and eating well, are also important to maintaining healthy cognitive function in later years, he said.

Source: University of Illinois at Urbana-Champaign