

Going for a run could improve cramming for exams

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Ever worried that all the information you've crammed in during a study session might not stay in your memory? The answer might be going for a run, according to a new study published in *Cognitive Systems Research*.

A student's choice of activity after a period of learning - such as cramming for an exam - has a direct effect on their ability to remember information. The researchers behind the new study, from the University

of Applied Sciences Upper Austria, say students should do moderate exercise, like running, rather than taking part in a passive activity such as playing computer games if they want to make sure they remember what they learned.

"I had kids in an age where computer games started to be of high interest," said Harald Kindermann, lead author and professor at the University of Applied Sciences Upper Austria. "I wanted to find out how this - and hence the increasing lack of exercise in fresh air - impacts their ability to memorize facts for school."

In the study, Dr. Kindermann and his colleagues asked 60 men aged 16-29 to memorize a range of information, from learning a route on a city map to memorizing German-Turkish word pairs. They were then split into three groups: one group played a violent computer game - Counter Strike - one went for a run and one (the control group) spent time outside. The researchers compared how well the people in each group remembered the information they were given.

The results showed that the runners performed best, remembering more after the run than before. Those in the [control group](#) fared slightly worse, and the memories of people who played the game were significantly impaired.

"Our data demonstrates that playing a video game is not helpful for improving learning effects," Dr. Kindermann added. "Instead it is advisable for youngsters, and most probably for adults too, to do moderate exercise after a learning cycle."

What's causing this effect is complex. The [stress hormone cortisol](#) is known to have an impact on our [memory retention](#): in some circumstances it helps us remember things, and in others it impairs our memory. There are two types of stress in this sense - psychological and

physical - and it could be that substances released by a [physical stress](#) like running improve memory retention.

The researchers had two main hypotheses. First, it could be that violent computer games trick the brain into believing it is under real physical threat. This, combined with the psychological stress of gameplay, means that the brain focuses on these perceived threats, and rejects any information it has just learned.

Alternatively, their second hypothesis was that the physical stress of running switches the brain into "memory storage mode" where it retains the information the student wants to remember. During [moderate exercise](#) like running, the body produces more cortisol to keep the body's systems in balance while it's under physical stress. It's this cortisol that could help improve memory. However, the link between cortisol levels and memory retention is uncertain, so further research is needed.

Dr. Kindermann and the team now plan to extend this study and investigate the effects of violent computer games and other post-study activities on long-term memory.

More information: Harald Kindermann et al. Playing counter-strike versus running: The impact of leisure time activities and cortisol on intermediate-term memory in male students, *Cognitive Systems Research* (2016). [DOI: 10.1016/j.cogsys.2016.01.002](https://doi.org/10.1016/j.cogsys.2016.01.002)

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