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Video game playing found beneficial for the brain

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Playing the Super Mario 64 video game causes increased size in brain regions responsible for spatial orientation, memory formation and strategic planning as well as fine motor skills, a new study conducted at the Max Planck Institute for Human Development and Charité University Medicine St. Hedwig-Krankenhaus has found.

The positive effects of video gaming may also be useful in therapeutic interventions targeting psychiatric disorders.

To investigate how video games affect the brain, scientists in Berlin asked 23 adults (mean age: 24) to play the video game “Super Mario 64” on a portable Nintendo XXL console over a period of two months for 30 minutes a day. A control group did not play video games.

In comparison to the control group, the video gaming group showed increases of gray matter in the right hippocampus, right prefrontal cortex and the cerebellum, measured using MRI.

These brain regions are involved in functions such as spatial navigation, memory formation, strategic planning, and fine motor skills of the hands. These changes were more pronounced the more the participants wanted to play the video game.

“While previous studies have
shown differences in brain structure of video gamers, the present study can demonstrate the direct causal link between video gaming and a volumetric brain increase.

“This proves that specific brain regions can be trained by means of video games”, says study leader Simone Kühn, senior scientist at the Center for Lifespan Psychology at the Max Planck Institute for Human Development.

**Mental health treatments possible**

The researchers suggest that video games could be therapeutically useful for patients with mental disorders in which brain regions are altered or reduced in size, as in schizophrenia, post-traumatic stress disorder, or neurodegenerative diseases such as Alzheimer’s dementia.

“Many patients will accept video games more readily than other medical interventions,” said Jürgen Gallinat, psychiatrist and co-author of the study at Charité University Medicine St. Hedwig-Krankenhaus.

A study on the effects of video gaming in the treatment of post-traumatic stress disorder is currently ongoing, and further studies to investigate the effects of video gaming in patients with mental health issues are planned.

*Is it valid to generalize from this specific video game and specific genre? — Editor*

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**Abstract of Molecular Psychiatry paper**

Video gaming is a highly pervasive activity, providing a multitude of complex cognitive and motor demands. Gaming can be seen as an intense training of several skills. Associated cerebral structural plasticity induced has not been investigated so far. Comparing a control with a video gaming training group that was trained for 2 months for at least 30 min per day with a platformer game, we found significant gray matter (GM) increase in right hippocampal formation (HC), right dorsolateral prefrontal cortex (DLPFC) and bilateral cerebellum in the training group. The HC increase correlated with changes from egocentric to allocentric navigation strategy. GM increases in HC and DLPFC correlated with participants’ desire for video gaming, evidence suggesting a predictive role of desire in volume change. Video game training augments GM in brain areas crucial for spatial navigation, strategic planning, working memory and motor performance going along with evidence for behavioral changes of navigation strategy. The presented video game training could therefore be used to counteract known risk factors for mental disease such as smaller hippocampus and prefrontal cortex volume in, for example, post-traumatic stress disorder, schizophrenia and neurodegenerative disease.

**References:**

www.kurzweilai.net/video-game-playing-found-beneficial-for-the-brain
S Kühn, T Gleich, R C Lorenz, U Lindenberger, J Gallinat, Playing Super Mario induces structural brain plasticity: gray matter changes resulting from training with a commercial video game, *Molecular Psychiatry*, 2013, DOI: 10.1038/mp.2013.120