

HOW CAN GAMES AFFECT THE HUMAN BRAIN?

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The paper deals with the influence of computer (video) games on gamer's brain activities, notably neuroplasticity as the ability of the human brain to build connections. Video games are examined as a tool of improving cognitive abilities and skills based on them.

Cognitive abilities are the highest functions of our brain that make us Human. The brain «engages» different cognitive abilities (types of attention and memory, ways of processing input signals, reasoning, abstract thinking, complex idea comprehension, planning, etc.) and interrelated skills to interpret and use information. The idea of neuroplasticity is closely connected to the development of cognitive abilities. The fact is that when you get new information and skills, new synaptic connections appear in the brain. And it is their quantity and quality that are the determining factors for a number of cognitive abilities.

The impact of computer games on the human brain is intensively being investigated. How does the gamer's brain work? Are there any violations in relation to memory, attention, types of thinking for computer gamers? There are many studies, some of them are contradictory. A lot of people have the idea that computer games «spoil» the brain. But this is not really the case. The first experiments were made by scientists in the 80-90s of the last century. Researches were conducted on how computer games affect spatial thinking. The results were surprising: the ability to spatial thinking in gamers developed. However, the experiment was criticized. This was due to the fact that scientists studied avid fans of games on the console, and compared them to people who did not play games at all. In other studies, people whose skills in playing were at about the same level, or they did not know how to play at all, were taken as a group for research. However, even in this case, the obtained data were contradictory. Recent research by scientists in the field of neuropsychology showed that during an organized game session the gamers had some changes in the hippocampus. MRI scans revealed that the players had changes in grey matter, in areas of the brain associated with orientation in space. It is worth noting that such studies can also not be considered unambiguous. The fact is that changes were observed only in players who used a particular strategy. We can probably conclude that computer games improve existing cognitive functions. However, some scientists believe that the acquired skills will not necessarily be reflected in real life.

Another study of the effects of computer games on the brain made by neuropsychologists showed that scientists could not find any differences in the brain activity of ordinary people and those who devoted enough time to computer games. And the test results showed differences. So fans of playing online games

showed the best results regarding the quality and the speed of tasks aimed at recognizing and finding letters or numbers. But there is no evidence that they developed this ability at the level of neural response. Again, the tests were conducted only in relation to games of the action genre, so scientists can't get a complete picture.

As for the most objective conclusion that can be drawn from all these studies, it is the following: "Computer games have a weak influence on the processes that occur in the brain." There is a certain effect, but it is not so pronounced that you can openly say that games are useful, or, on the contrary, harmful to the brain. Some researchers believe that it may be motivation. The tasks that scientists offered to test gamers on spatial thinking and reaction speed may have seemed like a computer game to them. Because of this, they seemed more interesting and familiar to them than to other people.

As for memory, there are experiments that have shown that the amount of working memory for gamers is much larger. Perhaps this is due to the fact that the game is a dynamic and complex activity, which not only requires high concentration, but also the ability to hold in your head a number of different indicators and a lot of information. Most computer games make the brain work in a multitasking mode. The player needs to constantly switch between tasks, and this requires a lot of effort for an untrained person. Despite the fact that a lot of articles have been written about the challenges and even harm of multitasking, this is one of the aspects of our modern life. Fans of playing computer games cope with this mode better.

The ability to remember and find information quickly, the ability to concentrate on objects and not be distracted, to be able to look at the problem from a different angle: all depends on the number of synapses. The achieved data on how our brain reacts on computer games will help us to find the ways of improving cognitive abilities and skills.

References:

1. Купатенко Я.Г., Когнитивные способности мозга человека. / Я.Г. Купатенко // Образование и наука в России и за рубежом. – Московский двор, Москва – 2019, № 8, С.65-74
2. Horizon: How video games can change your brain [Электронный ресурс] - 2015. - Режим доступа: <https://www.bbc.com/news/technology-34255492>
3. How video games affect the brain? [Электронный ресурс] - 2017. - Режим доступа: <https://www.medicalnewstoday.com/articles/318345>