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## Violent games emotionally desensitizing

**After excessively violent events, shoot 'em up games regularly come under scrutiny. In Norway, several first-person shooter games actually disappeared from the market for a while after the killings. Does intense fighting on a flat screen display also result in aggressive behavior in real life? Researchers from the University of Bonn found brain activity patterns in heavy gamers that differed from those of non-gamers. The study's results have just been published in the scientific journal "Biological Psychology."**

"First-person shooter" games have been discussed in connection with violence over and over. Participants take on the role of a shooter fighting opponents in a war-like situation using different weapons. The Norwegian killer is said to have participated in such worlds intensely before he killed dozens of people in Oslo's government district and on the vacation island of Utoya. And after the shooting sprees in Erfurt, Emsdetten and Winnenden, the debate whether violent games lower the inhibition threshold and result in violent behavior was revived again. Psychologists, epileptologists and neurologists from the University of Bonn studied the effect of shoot 'em up game images and other emotionally charged photos on the brain activity of heavy gamers. "Compared to people who abstain from first-person shooters, they show clear differences in how emotions are controlled," reported lead author Dr. Christian Montag from the Institute of Psychology at the University of Bonn.

Excessive first-person shooting of about 15 hours a week

The 21 subjects ranging in age from 20 to 30 years played first-person shooters for about 15 hours per week on average. During this study, they were shown a standardized catalog of photos that reliably trigger emotions in human brains, using video glasses. At the same time, the researchers recorded the responses in their brains using one of the brain scanners at the Life & Brain Center of the University of Bonn. The images included photos as they are used in the violent games, but also shots of accident and disaster victims. "This mix of images allowed us to transport the subjects both to the fictitious first-person shooter world they are familiar with and to also trigger emotions via real images," explained Dr. Montag. This catalog of photos was also shown to a control group of 19 persons who had no experience with violent video games.

When the subjects regarded the real, negative pictures, there was greatly increased activity in their amygdalas. This region of the brain is strongly involved in processing negative emotions. "Surprisingly, the amygdalas in the subjects as well as in the control group were similarly stimulated," reported Montag. "This shows that both groups responded to the photos with similarly strong emotions." But the left medial frontal lobes were clearly less activated in the users of violent games than in the control subjects. This is the brain structure humans use to control their fear or aggression. "First-person shooters do not respond as strongly to the real, negative image material because they are used to it from their daily computer activities," Montag concluded. "One might also say that they are more desensitized than the control group." On the other hand, while processing the computer game images, the first-person shooters showed higher activity in brain regions associated with memory recall and working memory than the control group members. "This indicates that the gamers put themselves into the video game due to the computer game images and were looking for a potential strategy to find a solution for the game status shown," said Dr. Montag.

## Violent games as a cause for changes in brain activity?

One question raised while interpreting the results is whether the users showed altered brain activity due to the games, or whether they were more tolerant of violence from the start and as a consequence, preferred first-person shooter games. The researchers from the University of Bonn were able to suggest an answer to this question based on the fact that they took into account various personality traits such as fearfulness, aggressiveness, callousness or emotional stability. "There were no differences between the subjects and the control group in this area," reported Dr. Montag. "This is an indication that the violent games are the cause of the difference in information processing in the brain."

From the results, Dr. Montag has concluded that emotional desensitization does not only occur while playing computer games. "We were ultimately able to find the decreased control of emotions in first-person shooters for the real images, too," he said. That is why he thinks these responses are not just limited to these virtual worlds. While there are many studies on video games and aggressive behavior, surprisingly few exist that look at their effect on the brain. "Our results provide indications that the extensive use of first-person shooters is not without its problems," said Dr. Montag. "But we will need additional studies to shed some more light on the connections between violent games, brain activity, and actual behavior."

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