

Action video games improve vision

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This is a photo illustrating 58 percent better contrast perception versus "regular" contrast perception. Credit: University of Rochester

Video games that involve high levels of action, such as first-person-shooter games, increase a player's real-world vision, according to research in today's *Nature Neuroscience*.

The ability to discern slight differences in shades of gray has long been thought to be an attribute of the human visual system that cannot be improved. But Daphne Bavelier, professor of brain and cognitive sciences at the University of Rochester, has discovered that very practiced action gamers become 58 percent better at perceiving fine differences in contrast.

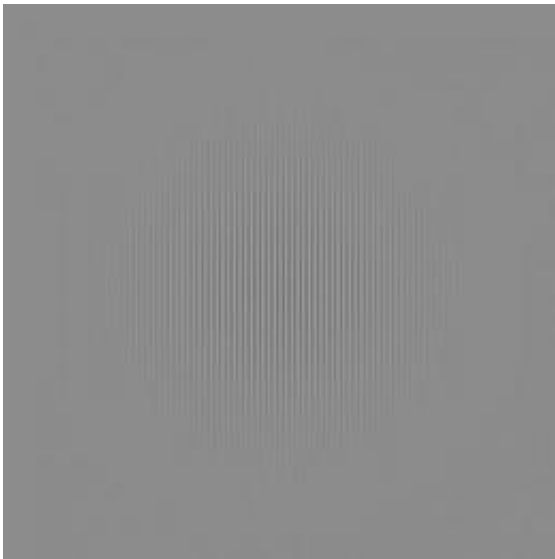


This is a Pelli-Robson chart showing decreasing contrast from upper left to lower right. True contrast varies between monitors. Credit: University of Rochester

"Normally, improving contrast sensitivity means getting glasses or eye surgery—somehow changing the optics of the eye," says Bavelier. "But we've found that action video games train the brain to process the existing visual information more efficiently, and the improvements last for months after game play stopped."

The finding builds on Bavelier's past work that has shown that action video games decrease visual crowding and increases visual attention. Contrast sensitivity, she says, is the primary limiting factor in how well a person can see. Bavelier says that the findings show that action [video game](#) training may be a useful complement to eye-correction techniques, since game training may teach the [visual cortex](#) to make better use of the information it receives.

To learn whether high-action games could affect contrast sensitivity, Bavelier, in collaboration with graduate student Renjie Li and colleagues Walt Makous, professor of brain and cognitive sciences at the University of Rochester, and Uri Polat, professor at the Eye Institute at Tel Aviv University, tested the contrast sensitivity function of 22 students, then divided them into two groups: One group played the action video games "Unreal Tournament 2004" and "Call of Duty 2." The second group played "The Sims 2," which is a richly visual game, but does not include the level of visual-motor coordination of the other group's games. The volunteers played 50 hours of their assigned games over the course of 9 weeks. At the end of the training, the students who played the action games showed an average 43% improvement in their ability to discern close shades of gray—close to the difference she had previously observed between game players and non-game players—whereas the Sims players showed none.



This is an animation illustrating the difference between 38 percent contrast and 60 percent contrast -- the approximate difference perceived by non-action gamers and action gamers. Credit: University of Rochester

"To the best of our knowledge, this is the first demonstration that contrast sensitivity can be improved by simple training," says Bavelier. "When people play action games, they're changing the brain's pathway responsible for visual processing. These games push the human visual system to the limits and the brain adapts to it, and we've seen the positive effect remains even two years after the training was over."

Bavelier says that the findings suggest that despite the many concerns about the effects of action video games and the time spent in front of a computer screen, that time may not necessarily be harmful, at least for vision.

Bavelier is now taking what she has learned with her video game research and collaborating with a consortium of researchers to look into treatments for amblyopia, a problem caused by poor transmission of the visual image to the brain.

Source: University of Rochester ([news](#) : [web](#))

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