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HEALTH

The Boston Globe  
MONDAY, OCTOBER 12, 2009

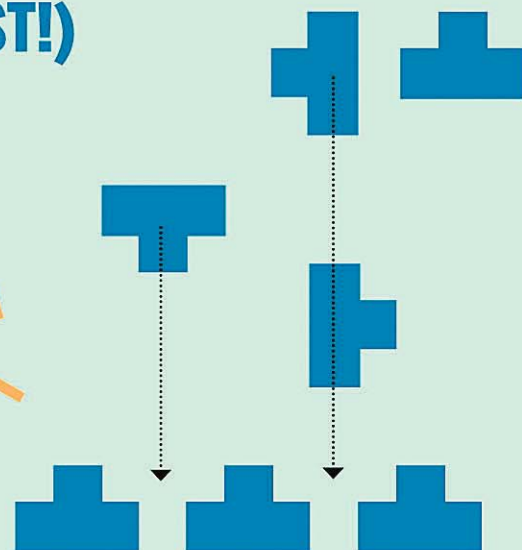


## HOW VIDEO GAMES ARE GOOD FOR THE BRAIN

(HONEST!)



Researchers are finding that playing can boost cognitive function and foster positive behavior



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# HOW VIDEO GAMES ARE GOOD

Concerns about violent programs persist, but researchers are discovering that playing can boost cognitive function and foster positive behavior

By Emily Anthes  
GLOBE CORRESPONDENT

In his speech to America's schoolchildren last month, President Obama had a clear directive about video games: Put them away. It wasn't the first time he had sounded this particular alarm, warning of the dangers of days spent at gaming consoles. But the latest science shows that there's a lot more to video games than their dark reputations suggest.

"There's still a tendency to think of video games as a big wad of time-wasting content," said Cheryl Olson, co-director of the Center for Mental Health and Media at Massachusetts General Hospital. "You would never hear a parent say we don't allow books in our home, but you'll still hear parents say we don't allow video games in our home."

"Games are a medium. They're not inherently good or bad."

After years of focusing on the bad — and there are still legitimate concerns, for instance, about the psychological effects of certain violent games — scientists are increasingly examining the potential benefits of video games. Their studies are revealing that a wide variety of games can boost mental function, improving everything from vision to memory. Still unclear is whether these gains are long-lasting and can be applied to non-game tasks. But video games, it seems, might actually be good for the brain.

The very structure of video games makes them ideal tools for brain training.

"Video games are hard," said Eric Klopfer, the director of MIT's Education Arcade, which studies and develops educational video games. "People don't like to play easy games, and games have figured out a way to encourage players to persist at solving challenging problems."

The games aren't just hard — they're adaptively hard. They tend to challenge people right at the edge of their abilities; as players get better and score more points, they move up to more demanding levels of play. This adaptive challenge is "stunningly powerful" for learning, said John Gabrieli, a neuroscientist at MIT.

Most games involve a huge number of mental tasks, and playing can boost any one of them. Fast-paced, action-packed video games have been shown, in separate studies, to boost visual acuity, spatial perception, and the ability to pick out objects in a scene. Complex, strategy-based games



JONATHAN ALCORN/BLOOMBERG NEWS

Attendees of the E3 Expo, a video-game industry trade show, test games at the Nintendo booth last June in Los Angeles.

can improve other cognitive skills, including working memory and reasoning.

These findings fit with scientists' increasing understanding of how malleable the human brain truly is. Researchers now know that learning and practicing a challenging task can actually change the brain.

Richard Haier, a pediatric neurologist and professor emeritus at the School of Medicine at the University of California at Irvine, has shown in a pair of studies that the classic game Tetris, in which players have to rotate and direct rapidly falling blocks, alters the brain. In a paper published last month, Haier and his colleagues showed that after three months of Tetris practice, teenage girls not only played the game better, their brains became more efficient.

A type of scan that illuminates brain ac-

tivity showed that at the end of the three months, the girls' brains were working less hard to complete the game's challenges. What's more, parts of the cortex, the outer layer of their brains responsible for high-level functions, actually got thicker. Several of these regions are associated with visual spatial abilities, planning, and integration of sensory data.

"Does this mean that Tetris is good for your brain?" Haier said. "That is the big question. We don't know that just because you become better at playing Tetris after practice and your brain changes . . . whether those changes generalize to anything else."

Generalizability to non-game situations is the big question surrounding other emerging games, particularly software that is being marketed explicitly as a way

to keep neurons spry as we age. The jury is still out on whether practicing with these games helps people outside of the context of the game. In one promising 2008 study, however, senior citizens who started playing Rise of Nations, a strategic video game devoted to acquiring territory and nation building, improved on a wide range of cognitive abilities, performing better on subsequent tests of memory, reasoning, and multitasking. The tests were administered after eight weeks of training on the game. No follow-up testing was done to assess whether the gains would last.

Now that researchers know these off-the-shelf games can have wide-ranging benefits, they're trying to home in on the games' most important aspects, potentially allowing designers to create new games that specifically boost brain power.

# FOR THE BRAIN



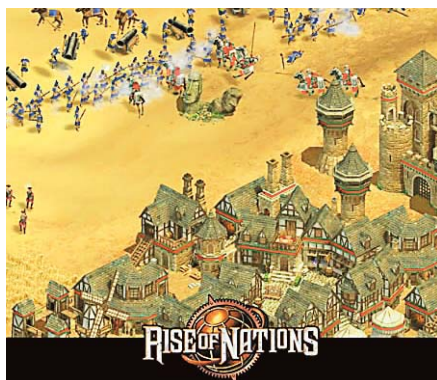
## It doesn't matter if you win or lose . . .

There's a wide variety of video games, and they have an equally large range of effects. Some of the benefits of playing video games, and the kinds of games that can lead to them, are listed below. Video games can:

### ENHANCE EXECUTIVE SKILLS

Strategy-based games that involve long-term planning and toggling between various goals, as well as managing and deploying resources, can boost higher-level brain function, including multitasking, planning, and working memory.

**EXAMPLE: Rise of Nations**



### BOOST MOOD AND REDUCE STRESS AND PAIN

Scientists have found that playing video games can boost mood, reduce stress, and even alleviate pain. Researchers believe that these effects are due to distraction from daily life — in which case, anything engrossing, engaging, and enjoyable should do the trick.

**EXAMPLE: Bejeweled**

### TEACH COLLABORATION

Complex, multiplayer games that require coordination and teamwork can build collaborative skills.

**EXAMPLE: World of Warcraft**



"Until now, people have been asking can you learn anything from games?" MIT's Klopfer said. "That's a less interesting question than what aspects of games are important for fostering learning."

Klopfer is currently conducting research to determine how important narrative is in an educational physics game: Do students learn more with a more narrative game? And Anne McLaughlin, a psychologist who co-directs the Gains Through Gaming lab at North Carolina State University, is assessing whether games that are novel, include social interaction, and require intense focus are better at boosting cognitive skills. McLaughlin and her colleagues will use the findings to design games geared toward improving mental function among the elderly.

Other researchers are hoping to use video games to encourage prosocial behaviors — ac-

tions designed to help others. ("Prosocial" behaviors are, in some ways, the opposite of "antisocial" ones.) In June, an international team of researchers, including several from Iowa State University, reported that middle school students in Japan who played games in which characters helped or showed affection for others, later engaged in more of these behaviors themselves. Researchers also found that US college students randomly assigned to play a prosocial game were subsequently kinder to a fellow research subject than students who played violent or neutral games.

Unlike, say, movies or books, video games don't just have content, they also have rules. A game is set up to reward certain actions and to punish others. This means they have immense potential to teach children ethics and values, said Scott Seider, an assistant professor of education at Boston University. (Of

### IMPROVE VISION

Fast-paced action games can boost visual acuity, spatial perception, and ability to pick out objects in a scene.

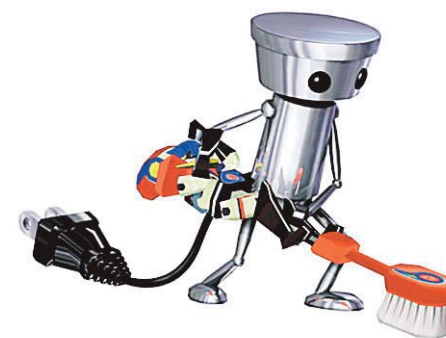
**EXAMPLE: Call of Duty**



### ENCOURAGE KINDNESS

Games with prosocial characteristics, in which characters help or show affection for one another, can prompt players to treat others more kindly.

**EXAMPLE: Chibi-Robo**



course, this is a double-edged sword. Games could reward negative, antisocial behavior just as easily as positive, prosocial behavior.)

Some off-the-shelf games already contain strong prosocial themes; consider The Sims, for instance, or the classic Oregon Trail, which make players responsible for the well-being of other characters and feature characters who take care of one another. But Seider also hopes game developers consider the prosocial possibilities in developing new games. The challenge for the architects of future games will be figuring out how to wrap virtuous characteristics into an engaging package.

"Ultimately, the video game needs to be an entertaining experience," Seider said. "The game has to be fun."

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**Q.** Does it help to take non-steroidal anti-inflammatory drugs like ibuprofen for colds?

**A.** Yes, they can reduce some cold symptoms. But don't expect miracles. And do take these medications — dubbed NSAIDs — judiciously, because they carry significant side effects such as gastrointestinal bleeding.

In a recent review of nine randomized, controlled studies of NSAIDs published by the Cochrane Collaboration, an international nonprofit that analyzes health care information, researchers from the Kangdong Sacred Heart Hospital in South Korea concluded that NSAIDs can help with the aches and pains of the common cold, though not the pain of sore throats. The review, which involved 1,064 patients, showed that NSAIDs don't help with coughs and runny noses, but they may reduce sneezing.

This somewhat-baffling picture makes sense to Dr. J. Owen Hendley, a rhinovirus specialist and professor of pediatrics at the University of Virginia School of Medicine. NSAIDs probably don't help with sore throats, he said, because sore throats are caused by irritating substances that drip down directly from the nose and thus may not be affected by systemic medications like NSAIDs, which circulate to the whole body through the blood.

Even so, he said it's reasonable to take them if you have a cold because they do help with other aches and pains. "The evidence is pretty good that NSAIDs are good for these analgesic effects, the 'feel bads,'" he said.

Dr. Kimon Zachary, an infectious disease specialist at Massachusetts General Hospital, agreed that NSAIDs can help with some symptoms of colds. The Cochrane finding that NSAIDs did seem to help reduce sneezing is somewhat surprising, he added, but may be related to the reduction of inflammation in the nasal passages. The main effect of NSAID medications is to reduce inflammation.

"However, NSAIDs are not completely safe," he said, "and I would argue that certain individuals should not take them, including those with cardiovascular disease, kidney disease, gastrointestinal disease with risk of bleeding, those on anticoagulation [blood thinning] therapy."

E-mail health questions to [foreman@globe.com](mailto:foreman@globe.com).