

What types of video games improve brain function?

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Figure 1. "Video games" encompass a wide variety of experiences.

Note. Video games differ widely in their content, dynamics, and mechanics. As a result, games vary in their effects on cognitive skills. Action games, including many "first-person shooters" (top-left: Wolfenstein: The New Order) and "third-person shooters" (top-middle: Grand Theft Auto V) have been shown to enhance many cognitive functions. Others, including simple building/exploration games (top-right: Minecraft), social games (middle-left: The Sims 2), phone games (middle-middle: Angry Birds; middle-right: Candy Crush), and card games (bottom-left: Hearthstone) lack features believed to be important to the cognitive impact of action games. Even "brain games" have a wide variety—with some being gamified scholastic or lab tasks (bottom-middle: Balloons; Owen et al., 2010), while others layer effective content into interesting game environments (bottom-right: NeuroRacer; Anguera et al., 2013).

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shooters" (top-left: Wolfenstein: The New Order) and "third-person shooters" (top-middle: Grand Theft Auto V) have been shown to enhance many cognitive functions. Others, including simple building/exploration games (top-right: Minecraft), social games (middle-left: The Sims 2), phone games (middle-middle: Angry Birds; middle-right: Candy Crush), and card games (bottom-left: Hearthstone) lack features believed to be important to the cognitive impact of action games. Even "brain games" have a wide variety--with some being gamified scholastic or lab tasks (bottom-middle: Balloons; Owen et al., 2010), while others layer effective content into interesting game environments (bottom-right: NeuroRacer; Anguera et al., 2013). Credit: C. Shawn Green and Aaron R. Seitz

From "brain games" designed to enhance mental fitness, to games used to improve real-world problems, to games created purely to entertain, today's video games can have a variety of potential impacts on the brain. A new article argues that it is the specific content, dynamics, and mechanics of individual games that determine their effects on the brain and that action video games might have particularly positive benefits. This article is published today in the new issue of *Policy Insights from the Behavioral and Brain Sciences*.

"The term video games refers to thousands of quite disparate types of experiences, anything from simple computerized card games to richly detailed and realistic fantasy worlds, from a purely solitary activity to an activity including hundreds of others, etc. A useful analogy is to the term food - one would never ask, 'What is the effect of eating food on the body?' Instead, it is understood that the effects of a given type of food depend on the composition of the food such as the number of calories; the percentage of protein, fat, and carbohydrates; the vitamin and mineral content; and so on," the researchers wrote.

Analyzing science on the cognitive effects of video games, Drs. C.

Shawn Green and Aaron R. Seitz wrote that action video games- games that feature quickly moving targets that come in and out of view, include large amounts of clutter, and that require the user to make rapid, accurate decisions - have particularly positive cognitive impacts, even when compared to "[brain games](#)," which are created specifically to improve cognitive function.

"Action video games have been linked to improving attention skills, brain processing, and cognitive functions including low-level vision through high-level cognitive abilities. Many other types of games do not produce an equivalent impact on perception and cognition," the researchers commented. "Brain games typically embody few of the qualities of the commercial video games linked with cognitive improvement."

Green and Seitz noted that while action games in particular have not been linked to problems with sustaining attention, research has shown that total amount of [video game](#) play predicts poorer attention in the classroom. Furthermore, video games are known to impact not only cognitive function, but many other aspects of behavior - including social functions - and this impact can be either positive or negative depending on the content of the games.

"Modern video games have evolved into sophisticated experiences that instantiate many principles known by psychologists, neuroscientists, and educators to be fundamental to altering behavior, producing learning, and promoting [brain](#) plasticity. Video games, by their very nature, involve predominately active forms of learning (i.e., making responses and receiving immediate informative feedback), which is typically more effective than passive learning."

More information: "The Impacts of Video Games on Cognition (and How the Government Can Guide the Industry)" *Policy Insights from the*

Behavioral and Brain Sciences, 2015.

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