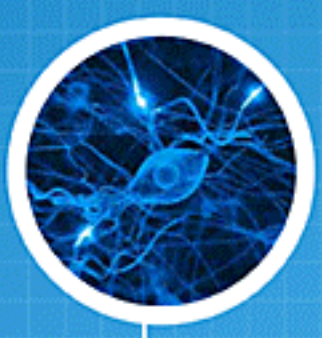
The Neurology of Gaming

Video games have both positive and negative effects on the human brain. They can be used to educate through repetition and feedback, but they also have some less-positive side effects:

The parts of the brain impacted by games

Different gaming scenarios and situations affect different areas of the brain by provoking certain reactions:



Game play involves repeated actions that strengthen the brain cell connections underlying memory and learning.

PREMOTOR & PARIETAL CORTEX
Games that require real-time action, like 'Space Invader,' activate these areas, which control sensory movement.

FRONTAL LOBE
One study claimed frequent players can get 'video game brain.' This means key parts of their frontal lobe become underused, which can alter moods.

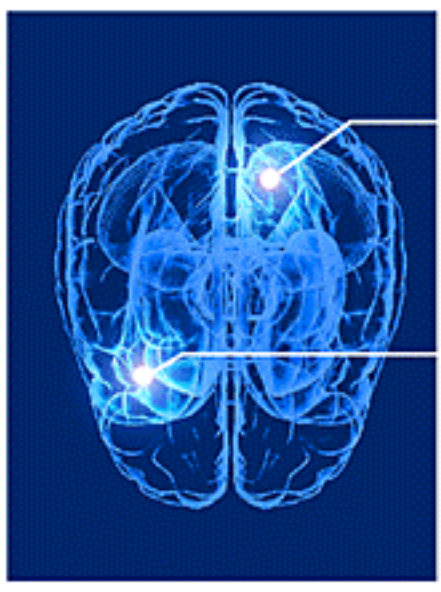
PREFRONTAL CORTEX
Games that require logical thinking, like 'Othello' and 'Tetris', activate this area, which controls decision making.

DOPAMINE
Dopamine, which is involved in learning and feelings of reward, is released in the brain's striatum during video game play.

DORSAL ANTERIOR CINGULATE CORTEX
Immediately after firing a weapon in a video game, players show greater activity in this area, which controls cognition and planning.

ROSTRAL ANTERIOR CINGULATE CORTEX & AMYGDALA
Areas that resolve emotional conflict showed less activity while players fired a weapon and soon afterward. Studies say players may suppress their emotional response to cope with their violent actions.

The effects of violent video games

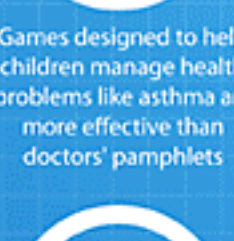


- When gamers play frequently, there's a decrease in prefrontal lobe activity. This can lead to altered moods and aggressive behavior, which can last even after the game is turned off.
- One week of violent game play can lead to lower activation of the left inferior frontal lobe during emotional tasks and also in the anterior cingulate cortex during numerical tasks.
- Those who play high-aggression games are significantly more anxious than those who don't.
- Playing violent games increases aggressive thoughts, feelings and behaviors in the short and long-term.

The positive and negative effects of video game

Depending on what area of the brain is being tested, studies can produce very different results.

Games that require teamwork help develop collaboration skills



Games designed to help children manage health problems like asthma are more effective than doctors' pamphlets

Violent content in games increases aggressive responses

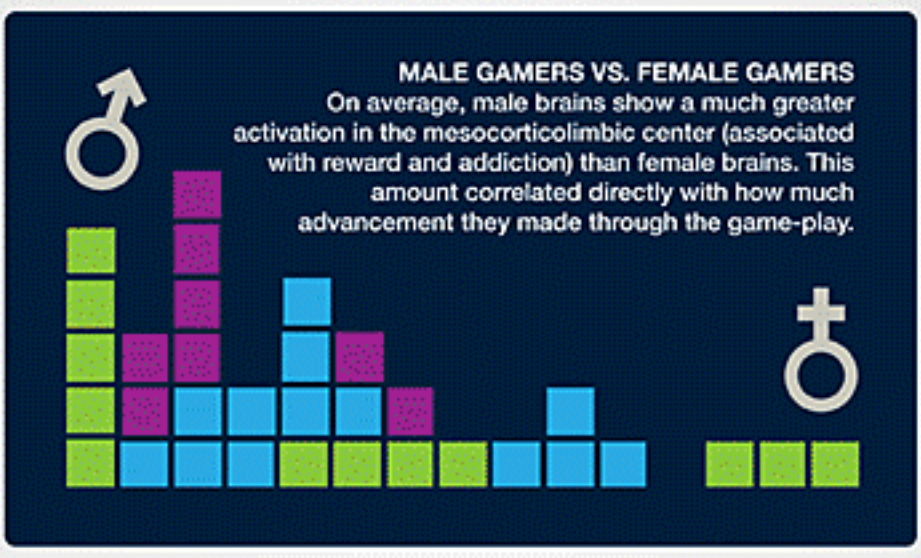
Violent game play increases active suppression of emotional responses

Improves ability to reason and solve new problems independently of previously acquired knowledge

Can improve peripheral vision, way-finding skills, hand-eye coordination and mental rotation

Long-term playing can lead to obesity, attention problems, and poor school performance

Increased risk of seizures in people with epilepsy or photosensitivity disorder



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