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The Effects of Video Games on Human Intelligence

Lifeng Yuan & Wenxiang Hu

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Some say the best education method is one that educates through entertainment. As a long-standing form of entertainment especially appealing to children, games not only let children have fun but also enable them to pick up new knowledge quickly through interaction with the game mechanism. The same applies to adults. Humans are all curious creatures and playing games is an effective way to arouse curiosity and unlock potential treasure chests of wisdom .

According to Clark Abt, the author of the book *Serious Games*, the definition of game is as follow: “Reduced to its formal essence, a game is an activity among two or more independent decision-makers seeking to achieve their objectives in some limiting context. A more conventional definition would say that a game is a context with rules among adversaries trying to win the objective.”

Video game, also known as electronic game, is a type of game played on electronic devices, which depends on the interaction between an independent human being and a device to generate visual outcome on an electronic screen such as computer monitor, cell phone screen or television screen. Video games are divided into five types: home console game, computer game, arcade game, mobile game and handheld game.

The first known video game is Cathode-Ray Tube Amusement Device constructed by Thomas Goldsmith and Estle Ray Mann, which can be traced back to the early 1950s. More video games appeared during the 1970s, the most famous ones of which include Pong and Spacewar!. After the 1980s, video game has become a mainstream option of entertainment. The concept of game has also been redefined since then because people

are playing games through a brand new medium: electronic device. Therefore, it could be said that video game is really a kind of entertainment that comes into being thanks to the advances in the consumer electronics industry.

With the help of rapidly growing electronics industry offering more affordable electronic gaming devices, an increasing number of people have stepped into the realm of video games and as a result, playing video games has become part of life for many to some extent. While the majority of people are embracing the fun and the thrill that video games have brought about, a handful of people are still holding relatively negative opinions on video games, thinking that playing video game is just a waste of time and money. In fact, the truth is quite the opposite. It has proved that video game is actually playing a multifaceted positive role in improving people's intelligence, or making people smarter on the physiological aspect, the psychological aspect as well as the sociological aspect.

First of all, the most significant effect video game has on players is physiological. At first glance, some might think this statement makes little to no sense because in their opinion, video game only produces visual stimuli, which are physical outside signals not taken in by human body, and therefore no chemical reaction, the key process that brings about physiological change, is involved. However, according to Science Daily, a reputable source that periodically publishes new scientific findings, the physiological change on humans that video games bring about is dramatic. The article titled *Video Games Can Change Your Brain* illustrates this physiological change in two correlated aspects: how video games change humans' brain regions and how those changed brain regions affect humans' behaviors (Frontiers). To support its claim, the article refers to a systematic review done by neuroscientist Marc Palaus and his colleagues, who collected

data from 116 studies, 22 of which focuses on changes in brain structures and 100 of which on changes in behaviors. To many people's surprise, their study shows that there is a noteworthy change in brain structure and this change is pretty significant that brain functionalities are changed as a result. Their review further reveals that this change is positive because it improves players' attention span and visuospatial skills (Palau).

Results shown by the above study might appear mind-boggling to most people, but simply by associating these results with popular games on the market, one would find these results pretty easy to interpret. For example, in first person shooter games such as Crossfire and Counter-Strike, good timing and accurate targeting are key skills to survival or success. However, the real requirements behind these skills are a player's ability to pay attention to moving objects and the surrounding environment. This means that in order to win the game, a player has to keep undivided attention during the entire game session, often lasting thirty minutes to an hour and up to two hours in the worst case. Subconsciously, the game has been constantly training a player to be capable of keeping full attention at all times. In addition to that, a player of such type of games also develops an ability to scan moving objects, distinguishing between allies and enemies, while keeping an eye on his or her surroundings. In consequence, it is not too difficult to understand that a player would show improvements in sustained attention and selective attention as described by Science Daily (Frontier) after hours of play.

Educators, especially special education teachers, have seen firsthand the benefits of these meaningful findings in the classroom. A study has been done on children who suffer from a neurodevelopmental disorder called dyslexia, which causes those children to have extreme difficulty in interpreting letters and symbols. Currently, the treatment for dyslexia is mainly individualized reading intervention, which demands a high cost of

education resources, and dyslexia is far from being fully treated meaning that there is still no effective way to treat dyslexia. The study aims to verify if playing video games is beneficial for improving their reading abilities and the results are pretty satisfying. Researchers find out that only 12 hours of action games playing without any intervention on spelling or phonetics, significantly improves dyslexic children's reading speed, at a level equal to one year of reading development (Franceschini). The study has also further verified the assumption made above regarding the relationship between action games and improvements in attention span. Furthermore, another research done by researchers at University of Toronto Psychology Department shows that players who are constantly engaged in demanding visual task, (for example playing three-dimensional block building game like Minecraft), are more capable of visual processing efficiently and performing better on geometry tests. This once again provides valid evidence for the claims made by Science Daily that video game enhances visuospatial skills of gamers.

In addition to the physiological effects video game has on players, video game influences players psychologically on a large scale as well. Generally speaking, the criterion to determine whether a person is psychologically intelligent or not are based on the ability to make quick decision in the face of an overwhelming number of obstacles and the ability to maintain a relative stable mood. Video games such as adventure games have proved to train players to have better mental flexibility thus more mentally stable for countering dramatic life changes. According to *Psychology Today*, multiples studies done by psychologists including Anderson, Green as well Colzato in the past decade shows that players who have experience with action games has better ability to switch between multiple conflicting actions successfully (Peter). Although these studies were

done on a small group with simulated tasks, the abilities demonstrated by participants in this study would certainly translate to better ability to cope with stuff in real life. For example, imagine a college student has a breakup with his or her significant other at the end of a school term, faced with essays, presentations as well as final exams. This situation could be emotionally overwhelming, which makes his or her next step a tough choice. If not well advised, many would experience an emotional crisis, drowning in the sadness and losing the motivation to move on with his or her academics. However, if the person has experience with video game that requires multitasking, making such a decision could be relatively easy compared to those without this experience because players of these video games are constantly being challenged with similar tasks, to which wasting time crying over a lost combat and letting go of the final victory is obviously not a wise choice.

Besides the physiological and psychological benefits for players discussed above, there are also mentions on the improvements on social abilities of players of certain types of games. The best examples of these games include The Sims, MapleStory and World of Warcraft, where players are establishing online identities and creating large online communities and social networks in addition to playing the game. For example, in virtual worlds created by The Sims, players get to know every stage of life and almost every aspect that the real world has, ranging from making friends, doing part-time jobs, dating and even giving birth to child. Given those close-to-real-life experiences that a person would otherwise unlikely to gain before reaching certain life stages, players of these games appear to be more mature and social adept than their peers. This phenomenon has been investigated by many researchers, one of which has even found

out that “higher usage of video games is associated with decreases in peer relationship problems and in prosocial deficits” (Kovess-Masfety).

Just like every coin has two sides, some game researchers contend that playing video game will not make players smarter at all but does harm to their physical and mental health. First of all, they assert that playing video games is harmful to physical health. The more features a game has, the more exquisite it becomes, the fewer people are resistant to it. People addicted to a game often stay up late playing the game, which would potentially disrupt their biological clock, weaken their immune system and make them vulnerable to diseases. According to America’s Health Report, over 45% of Americans aged 12 to 17 spend over two hours every day playing video games with eyes glued to screens (National Obesity Forum). The majority of children surveyed in the study admit that they spend more time on video games than initially expected. In addition, a large number of people are suffering from myopia after frequently staring at a screen for a prolonged time period. A survey states that at least a large percentage of computer users have vision problems and the reason is that staring at a screen for long periods of time causes eyes to become dry and even irritated due to the reduced blink rate (Rosenfield).

Additionally, they further contend that some video games are causing mental health problems as well. The video game market nowadays is indeed quite the mixed bag. On the one hand, some games are doing excellent job helping people learn new knowledge, improving people’s logical thinking skills and problem-solving skills. On the other hand, some are selling sex scenes, promoting crude language and spreading violence. According to *Computer Violence: Are Your Kids at Risk*, the author Stephen Barr describes a video game situation: “The 12-year-old boy cornered an unarmed

opponent and held the gun to his head at point-blank range. 'You can't get away!' the boy said with a maniacal sneer, taunting the character on the screen. 'You're mine!' The boy pushed the button and shot the character in the face. Blood splattered the lab coat of the character as he whirled and fell. 'You're down!' the boy said, laughing." Such bloody video game trains children in a precise way as the military trains soldiers to suppress their natural resistance to killing. In the military, soldiers are trained to overcome their natural resistance to killing through a purposeful practice: shooting man-shaped targets. In video games such as Call of Duty, player controls a "real human" character to kill "real human" enemies. It makes them feel like participants and lets them familiar with the act of killing. As a result, the players are likely to mistakenly identify themselves with the killers in real life and commit homicide.

The rise of electronics industry along video with advancements in information technology in the past few decades made video game a reality. The definition of games in daily context has changed as a result. Video game not only provides people with an alternative to entertainment but also has a proven effect on improving human intelligence on various aspects. Physiologically, playing video games subtly changes brain regions and functionalities, resulting in better attention span and visuospatial skills, which benefits children receiving special education. Physiologically, playing video games trains decision-making skills, provides players with experience of handling unforeseen obstacles and thus makes players more immune to emotional crisis. Sociologically, playing video games makes players more adept in real life given communication skills and close-to-real-life experiences gained through game narratives. Although there are opposing voices against video games for causing health problems and violent behaviors, the benefits of video games clearly outweigh the cons.

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