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Psychological Effects of Video Games

Through the birth of the computer, our world has seen a rapid advancement in the multi-faceted use of this technology. The advancements in computers brought about the invention of video game consoles. Basically a different type of computer. Game consoles today are all basically computers, they contain a hard drive and operating system just like a computer (Daniel, 2012). Without even looking into the harmful effects of what a regular computer has on the brain and eyes of a person, one can assume that it is not beneficial to spend hours on one every day or even every other day. Not only does the radiation from the screen come into play, but the harmful effects on the eyes are another large concern as well (Nichols, 2017). With these high-powered game consoles being so new in terms of creation, the studies can not be seen at the depth they need to be yet. Generation X and Z will be the true guinea pigs of these game consoles' effects on the development of the brain. Now the effects of these consoles do not have to be so bleak because some studies show great benefits from play. In an article done by MedicalNewsToday, they share a multitude of studies on the benefits of attention and cognitive ability. Much research has shown many different improvements in cognitive ability not just in the developing brains of children, but also in adults. The psychological effects of video games

are an important area of study because of the vast amount of positive and negative benefits that not just affect the people of today but the people of the future as well.

People that play video games are subjected to not just negative effects but also positive effects.

While it is great to see the brighter side of gaming, one can not help but see the negative. For this is a very avoidable hobby if one wishes to escape these effects. More than three hours of video games daily can lead to computer eye syndrome, eye pain, issues with focusing after play, and headaches (Kim P, 2020, CreditDonkey). A study done by Tohoku University, states that children who play video games for multiple hours a day can suggest problems with the development of the frontal lobe in the brain (Kim P, 2020, CreditDonkey). These studies show that the human brain can only handle so much screen time while intensely engaged in a video game. Some video games such as shooters take on an even more intense and emotional impact on the person playing. An article titled, "Video Games Affect the Brain— for Better Or Worse by a doctor named Douglas Gentile, states that a doctor at Michigan State named Rene Weber along with other colleagues conducted a study on how the aggression impact of video games affects the brain (Gentile, 2009). In this study, they asked thirteen experienced gamers to play a violent game purposely coded and constructed with killing, fighting, imminent danger, safe, and dead for certain responses while undergoing functional magnetic resonance imaging, which essentially is a brain scan (Gentile, 2009). What the study garnered is that before firing a weapon greater activity was shown in the dorsal anterior cingulate cortex of the brain (Gentile, 2009). When firing the weapon and shortly after, less activity was shown in the rostral anterior cingulate cortex and amygdala (Gentile, 2009). This interaction between these two parts of the brain is significant because these areas are associated with resolving emotional conflict and, "...their decreased functioning could indicate a suppression of the emotional response to witnessing the

results of taking violent action” (Gentile, 2009). This study shows that there needs to be a deeper understanding and studies into if the brain can read if this is a real situation or not. The brain is undergoing deep emotional responses in moments of games such as these which pair with the suggested screen time of a person stated above. While many see video games as just a hobby, how does the brain see these moments? A decade ago eight men underwent a study using “positron emission tomography”, which is another type of brain imaging system (Gentile, 2009). These men played again constructed around destroying tanks in battle (Gentile, 2009). This study showed that the neurotransmitter dopamine which is involved with learning and feelings of reward was released as the men progressed through the game, showing that stress hormones and the release of dopamine were not only during moments of violence and harm but in motivation and winning (Gentile, 2009). These studies show can suggest that the brain releases these hormones and neurotransmitters in real-life situations as well as augmented ones. This begs the question of can the brain tell the difference once again, and if such a thing is dangerous for children and adults. From evidence shown, video games can be a tricky pastime to navigate for those concerned with after effects but not all effects are negative.

While video games have long been judged for their negative effects on the brain, the positive effects are quite encouraging to the betterment of the human brain. Studies have shown a wide range of areas in the brain that take an improvement from video game use. An article titled, “Neural Basis of Video Gaming: A Systematic Review”, by Marc Palaus, Elena Marron, Raquel Sobreja, and Diego Rippol, shows a vast amount of evidence from studies done in this decade and the last. An interesting site of evidence from this article states, “By studying lifelong experts or professional gamers, some studies have detected structural GM changes that correlated with improved executive performance, involving posterior parietal ([Tanaka et al., 2013](#)), and

prefrontal ([Hyun et al., 2013](#)) regions” (Palau 2017). This study shows a greater improved performance from parts of the brain that control decision making, cognitive flexibility, prospective memory, and more. From this study, one can see that video games can be a sort of mental workout for the psyche. This article also talks about how different video games work on different cognitive skills. Palau shares from a study and says, “Training older adults in a strategy VG seemed to improve verbal memory span ([McGarry et al., 2013](#)), but not problem-solving or working memory, while using a 2D action VG improved everyday problem solving and reasoning” (Palau 2017). The brain takes different lessons from the challenges presented by the game. To most, it would seem that a strategy game would help with problem-solving, but in this study that is not the case. Nonetheless, the improved cognitive ability can be found in any genre of video games which is good for people who stray from the effects of action games stated above. A study done by Palau and their team shows that video games have shown improvements in several types of attention such as sustained attention and selective attention (Frontier 2017). As well as an increase in the size and efficiency of brain regions correlated to visuospatial skills, which is shown in a study where the right hippocampus became enlarged in long-term gamers and volunteers after a training program (Frontier 2017). Data from finding positive effects on the brain can be relative to the person, showing that people are affected differently (Palau 2017). Video games when relating to children are important for the fact that younger generations are the future. An article titled, “Video Games and Child Development: What Does the Research Say?”, by Northwestern shares a study saying, “... educational games can help preschoolers learn coding, literacy, and math skills. Another study focused on characters in educational games showed that creating a strong bond with an in-game character can improve the child’s learning. A study that looked at games that involved movement and

exercise, called “exergames,” found that the games can help improve children’s decision-making and overall main functions of the brain” (Northwestern.edu, 2019). From this study, we can see that children gain benefits from video games in various different regions of the brain. What this study does not talk about are the children that play more advanced games on PlayStations and Xbox. One of the most popular discussions about video game players is the entering of the flow state during the game. Palaus states, “VGs provide the appropriate context in which flow states are encouraged to occur, since feedback is offered continuously and the level of difficulty is programmed to raise progressively, in order to match the improving skills of the player (Hunicke, 2005; Byrne, 2006). Therefore, VGs are perfect candidates to operationalize the components involved in the flow theory. Furthermore, motor regions were implicated in the difficulty, sustained attention, and control components. Together, the authors identify this sensorimotor activity as a reflection of the simulated physical activity present in the VG, which can contribute to the state of flow” (Palaus 2017). This quote shows a direct correlation to all different genres of video games that present a gradual level of difficulty as the game continues on. This flow state of sustained attention and cognitive flexibility can be obtained through constant progression and action during a video game. This is significant because there are not many things one can do to bring on the sense of a flow state in general life outside of sports. Video games have long been subjected to harsh critique from parents and health professionals alike. What cannot be ignored by people against the use of video games is the scientific evidence showing a beneficial aspect. Now, these positive effects are relative to the person but they are still true nonetheless. As video games take on larger and more expansive studies through the coming years, only more positive and beneficial aspects will be discovered to combat the negative.

Video games are a pass time enjoyed by a billion people across the world. A study shared by WePlayHolding states, that at the end of 2016 there were 2.5 billion gamers across the world in a population of 7.6, which roughly equates to 36% of the world population (WePlayingHolding 2021). This number only continues to grow. Technology took over the human mind and lifestyle over a decade ago. Everyday life is consumed with the presence of some sort of screen time. Many choose the hobby of video games in their free time, with hours of play ranging on all sorts of scales. For the reasons and evidence stated above, the importance of conducting a vast amount more studies on how video games affect the human brain is paramount. This use of technology is not leaving any time soon. Due to this fact, the need for this civilization to study long-term effects with becoming significant to how later generations will develop. The psychological effects of video games are an important area of study because of the vast amount of positive and negative benefits that not just affect the people of today but the people of the future as well.

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