

Exploring the Adverse Effects and Prevention Methods of Electronic Games on the Physical and Mental Development of Adolescents in Contemporary Society

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Abstract: The electronic game industry has developed rapidly in the past decade. From Contra and Super Mario to League of Legends and Glory of Kings, players' enthusiasm for games has been enduring. Among them, game consoles have brought arcade halls to people's homes. With the development of the times, iPhones make games' within reach with the level of realism in image technology has significantly improved. With the popularity of games, a problem has emerged which is game addiction. With the expansion of the base of game players, the problem of game addiction has become a social problem that cannot be ignored. Many studies have examined the risk effects of game addiction, including academic performance, physiological development, social development, and the formation of negative emotions such as package personality, anxiety, depression, and suicidal tendencies. This study has integrated these variables to explore the role of multiple influencing factors in developing game addiction and their potential prevention methods.

Keywords: adolescents, game addiction, prevention methods

1. Introduction

Electronic Games, also known as video games or gaming games, refer to all interactive games that run on electronic device platforms. In the past decade, the electronic game industry has developed rapidly. Among them, game consoles have brought arcade halls to people's homes, and with the introduction of each new generation of consoles, the level of realism in image technology has significantly improved. Wii consoles make games approachable, while iPhones make game within reach. Both of these have brought millions of people into the game and created new opportunities for game developers.

The widespread global high-speed internet connection has made games interconnected and social and has also promoted the concept of games as a service. In other places such as China and India, healthy economic development and the emerging middle class are leading to a huge increase in the number of people using leisure time to play. The four major types include FPS (First Person Shooting), RPG (Role Playing Games), MOBA (Multiplayer Online Battle Arena), and RTS (Real-time Strategy). For example, RPG characters can be explored in the virtual world and can be subdivided into turn-based RPGs, ARPGs(Action role-playing game), and MMORPGs (Massively multiplayer online role-playing game). Its representative works include Genshin Impact, Dream

Journey to the West, Perfect World, etc. FPS, as the name suggests, is a shooting game played from the player's subjective perspective, with teenagers playing FPS the most. Representative works such as "PUBG" and "CSGO". MOBA, also known as Action Real Time Strategy (ARTS), is an action real-time strategy game, similar to DOTA, and an enduring gaming genre. Games are played in real-time, rather than the turn-based approach commonly seen in strategy games.

The variety of games has led to teenagers becoming increasingly addicted, causing losses in the cultivation of physical, psychological, and social personalities. According to statistics, as of November 2022, the global number of game players has reached 3.03 billion. Research has shown that the global incidence of gaming addiction is about 3.05%, and with such a large base of gaming players, gaming addiction has become a global public health problem.

This study conducted advanced searches using keywords such as electronic games, teenagers, and video games. Through literature review, attempted to summarize the impact of electronic games on the physiological and psychological development of adolescents and proposed reducing the phenomenon of internet addiction among adolescents by establishing a grading system and parental supervision, Providing a reference for research on the adverse effects of electronic games on the physical and mental development of adolescents in modern society.

2. Literature Review

The negative impact of electronic games on adolescents is growing. Some studies suggest that electronic games can have a negative impact on teenagers' attention and academic performance. Karunya University adopted a random sampling survey method. Randomly select students from various disciplines as research subjects. The research results show that students' choice of electronic game types is significantly correlated with their overall performance in CGPA. Similarly, the average time spent on such participation per week is significantly correlated with academic performance, with a value of (0.842). The research results also show that there is a significant positive correlation between the history of elementary school children playing games from an early age and their overall academic performance, with a correlation value of 0.982. The research results also show that the correlation between students' exposure to electronic games in their first year of university and academic performance is relatively higher than in the following years. Therefore, the choice and time spent on electronic games have a significant negative impact on the academic performance of students in Karunya [1].

A 13-month follow-up evaluation was conducted on 1323 adolescents aged 6-8 and 210 adult samples. The evaluation included parental-reported exposure to television and video games, as well as self-reported attention issues by teachers or adolescents. The results showed that both television and video games had a significant negative impact on the attention of samples of different age groups [2]. In addition, functional magnetic resonance imaging (fMRI) was used to measure the activation of various brain regions during counting tasks in 71 adolescents aged 13-17 who were exposed to and not exposed to violent electronic game content (whether they were exposed to violent electronic games or television media content within a week or a year) through a controlled trial. The results showed that there were different situations between the two. Participants who were not exposed to violent game content had higher levels of activation in the prefrontal region, while those who were exposed to violent game content had lower levels of activation, decreased cognitive control ability, and were more susceptible to the influence of violent content [3]. And this is not related to whether it belongs to the personal characteristics of disruptive behavior disorder (DBD). Taking ARGs(Alternate reality game) as an example, it may increase the risk of injury, even exceeding that of motion-tracking games. At the same time, considering that online identities are easily forged, they may pose significant risks to the well-being and security of adolescents [4]. The

above results also indicate that violent game content may have an impact on brain function and motor function, and may be the main factor affecting attention and physical health.

The negative social impact of electronic games on the development of adolescents encompasses multiple aspects such as prosocial behavior, aggressive behavior, and gender role behavior. The relationship between the content, context, and game volume of electronic games and adolescent aggressive behavior has received the most attention. Gentile also found this relationship in a study of 67 adolescents in grades 8-9 from four different schools. Adolescents who were exposed to more violent video games were more hostile, more likely to have physical conflicts, and performed worse in school. Other studies have also found a close correlation between violent games and high aggression rates, which can also lead to reduced cooperative behavior among peers and affect interpersonal relationships [5].

In addition, gaming situations also have a certain impact on human sociality. A Japanese study found that situational factors in violent games have a greater impact than game volume. Funk believes that excessive game volume, violent video game content types, and game situations may have an impact on social empathy among adolescents [6]. Long-term exposure to violent video games may lead to a decrease in empathy and desensitization, which is a common understanding and behavior of violence, leading to an increase in aggressive behavior. Other neuroscience studies have also confirmed this.

In addition, a study suggests that internet addicts have poorer mental health and cognitive function, including poorer symptoms of impulse control and ADHD. In addition, addicts exhibit more emotional difficulties, including depression and anxiety, feel more isolated, and are more likely to exhibit pathological symptoms of online pornography [7]. This indicates that excessive game volume and violent electronic game content can increase the aggressiveness of teenagers, and teenagers who replace real interactions with virtual interactions in games for a long time will lack preparation in real interactions, which can easily lead to poor social adaptation and affect their social development. Finally, regarding the relationship between excessive use of electronic games and adolescent suicide. The data comes from the 2007 and 2009 Youth Risk Behavior Survey (YBS), a nationally representative school-based survey. Playing video games/online for hours or more per day significantly increased the risk of sadness (adjusted and weighted odds ratio, 95% confidence interval=2.1, 1.7-2.5), suicidal ideation (1.7, 1.3-2.1), and suicide planning (1.5, 1.1-1.9). The same pattern was also found in the 2007 survey. These findings support the association between excessive use of electronic games and the internet, as well as the risk of depression and suicide in adolescents [8].

Due to the long-term submission of electronic games to patriarchal culture, their reverence for heterosexual scripts and potential gender discrimination has made them a frequent target of feminist criticism [9]. At the same time, electronic game players adopt strategies such as satire, irony, compromise, crossover, or comparison, these strategies are influenced and influenced by their racial and ethnic socialization in daily life.

3. Methodology

As is well known, excessive playing of electronic games can have adverse effects on students' physical and mental development. On the other hand, some other studies have shown that addiction caused by electronic games has a complex negative impact on the mental health of adolescents. On this basis, it is accompanied by a higher incidence of teenage suicide, an increase in violent and aggressive behavior, and an increase in mild anxiety and depression rates. The impact of gender perspectives on character views and ethnic stereotypes on the psychological shaping of adolescents is influenced by social deformities. These studies also indicate that as an additional traumatic result of electronic games, students' cognitive abilities and the degree of damage to their brains also

become at risk during their addiction to electronic games. Therefore, there are still some unclear assumptions that lead to investigating the relationship between their gaming habits and their academic performance and personal growth. Research on the impact of electronic games on individuals mostly focuses on adults, mainly exploring the aggressive effects of electronic games on humans. Although there are many controversies about the negative/positive effects of electronic games, overall, the negative effects of electronic games are more prevalent. In order to better conduct this study, focus on teenagers who are addicted to electronic games. After excluding irrelevant literature, the aforementioned references were obtained. Based on the organization of this literature, an attempt is made to summarize the impact of electronic games on the physiological and psychological development of adolescents and propose corresponding solutions, providing a reference for future research.

4. Result

According to a large number of literature surveys, firstly, electronic games have a negative impact on the physiological development of adolescents. Among them, the amount of play and the play posture have various effects on the physical health of adolescents, which will lead to health risks, such as diabetes, obesity, limb pain, muscle strain, epilepsy, and many other eye problems. Secondly, research on the negative effects of electronic games on teenagers' attention and academic performance has shown that long-term addiction to electronic games puts more pressure on their brain and motor functions, making them unwilling to learn. Finally, the types of violent electronic game content and game scenarios may have an impact on empathy among adolescents. Long-term exposure to violent electronic games may lead to a decrease in empathy and desensitization, which is a habitual understanding and behavior of violence, leading to an increase in aggressive behavior. This indicates that excessive game volume and violent electronic game content can increase the aggressiveness of teenagers, and teenagers who replace real interactions with virtual interactions in games for a long time will lack preparation in real interactions, which can easily lead to poor social adaptation and affect their social development.

5. Discussions

The most eye-catching discovery is that there are many signs that playing electronic games can to some extent affect the personal growth, and academic and social development of teenagers. There is clear evidence that the habit of playing electronic games can affect academic performance and personal growth. Karunya University's random sampling survey method provides some valuable insights. Randomly select students from various disciplines as research subjects. The research results show that students' choice of electronic game types is significantly correlated with their overall performance in CGPA (924). Similarly, the average time spent on such participation per week is significantly correlated with academic performance, with a value of (0.842). The research results also show that there is a significant positive correlation between the history of elementary school children playing games from an early age and their overall academic performance, with a correlation value of 0.982. As expected, as a series of published literature has shown, addiction to electronic games can also cause social developmental abnormalities in adolescents. As Dill and Gentile et al. discovered the relationship between violent content in electronic games and aggression. And with longer video game practice, the risk of sadness among adolescents is significantly higher (adjusted and weighted odds ratio, 95% confidence interval=2.1, 1.7-2.5), suicidal ideation (1.7, 1.3-2.1), and suicide planning (1.5, 1.1-1.9). After conducting in-depth literature research found that the impact of game volume, game content, and situational factors on adolescent participation in electronic games is relatively clear. Excessive game volume, violent content, and situational factors can have negative effects on adolescent sociality, attention, and

brain reward systems. However, appropriate game volume, pro-social game content, action, and learning games can have a positive impact on teenagers' sociality, attention, visual-spatial ability, and cognitive function. These factors are not acting alone, and the role of many other non-gaming factors, such as different regions, cultures, economies, and families, needs to be further explored. In addition, some brain science studies have confirmed that electronic game training can increase the volume of the prefrontal region, but some teenagers have reduced control ability due to decreased prefrontal activity, which provides an explanation for the negative correlation between electronic game content and inhibitory control. In addition, it may also be influenced by other factors such as age, gaming performance, level of interest in electronic games, and attention. Although it was observed that exposure to electronic games had an impact on the structure and function of the prefrontal region, electronic game training showed a poor transfer effect on the promotion of executive function. After replacing the measurement task of executive function, no significant improvement was observed. A meta-analysis of three models, including the impact of electronic game skills on cognitive abilities, the differences in cognitive abilities between electronic game players and non-players, and the impact of video game training on participants' cognitive abilities, found that the results showed only weak or even no correlation. It can be seen that the relationship between electronic games and adolescent executive function needs further verification.

6. Measures to Reduce the Risk of Electronic Games

6.1. Optimize Network Environment

Some assert that existing rating systems such as ESRB and PEGI can be extended or special rating systems can be created to assess the addictive potential of games and assess their violent and mature content [10]. Similar to the tags used in the ESRB system. Such a proposal will definitely help raise awareness among game players and their families about the dangers that excessive gaming can bring. Develop a rating system for online games that is suitable for the national conditions of each country, establish a rating committee for online games composed of experts in education, psychology, and other fields, and standardize the content development of online games for different age groups. Set the admission conditions for online game licenses, strengthen special supervision of online game business premises, and strictly conduct self-inspection and self-correction before product launch and operation. But stricter enforcement of laws such as purchasing graded games may be detrimental to free markets and racial stereotypes. Therefore, it is recommended to establish a dispute resolution mechanism for content review involving government departments, content producers, industry experts, and guardians, in order to objectively and fairly balance the interests of minors, cultural product producers, distributors, or disseminators, and reduce cases of overcorrection or arbitrary killing, and further create a favorable environment for the development of cultural products for minors.

6.2. Strengthen Supervision

Parents who can only invest very little resources in their children's education, such as those who have been working outside for a long time, not only cannot effectively manage adolescent gaming behavior but may also worsen parent-child relationships under limited governance. For parents who have the ability to control their children's gaming behavior but are unable to master gaming techniques, regulation has become the optimal means under specific conditions; Parents who have time to educate their children and are familiar with gaming technology can explore how to combine gaming entertainment with learning and growth, thereby achieving the reproduction of cultural capital. Therefore, in order to prevent the harm caused by addiction to violent electronic games, people of every age group should be allowed to only play positive games reinforced by their parents

[11]. Parents should change their inappropriate parenting styles, enhance communication with their children, and pay attention to their inner needs. At the same time, parents should guide their children to realize that the internet is a double-edged sword, and that fully utilizing its positive role can promote learning. On the contrary, if online games occupy the center of one's life and learning, it will have a significant negative impact on one's life. Setting the time and content for playing games can strengthen the supervision of adolescent gaming addiction.

7. Conclusions

The level of exposure of teenagers to electronic games and products is deepening, and the negative impact on individual physical and mental development is constantly increasing. Accompanied by a higher suicide rate among adolescents, an increase in violent and aggressive behavior, as well as an increase in mild anxiety and depression rates. The impact of gender perspectives on character views and ethnic stereotypes on the psychological shaping of adolescents is influenced by social deformities. The research on this issue warns to pay high attention to the physical health of adolescents and the negative effects of internet addiction. However, overall, there are not many studies targeting adolescents, indicating that more in-depth research is still needed in this field. In the future, the following issues can be addressed: firstly, improving research design. By combining the usage functions of some electronic products or software, more accurate electronic game usage data can be obtained, further refining the characteristics of the participants, and exploring which factors in electronic games have the greatest impact on which traits of teenagers; Secondly, focus on more practical research issues. The impact of different game content on the physical and mental development of young people is also different. Explore the differences between electronic games and physical games, and discover the effects of different content and types of games. Reasonably apply electronic games to the field of education to promote the development of young people.

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