|Research Article|

The Psychological Effects of Videogames on the Cognitive Development in Children.

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ABSTRACT

This cross-sectional study investigated the impact of video games on children's cognitive development and the risk of addiction. Data from 100 respondents in Rawalpindi were analyzed using SPSS software. The study found a significant negative association between video game use and cognitive development in children, indicating detrimental effects on attention, memory, problem-solving, and executive functions. It also revealed a positive association between video game use and addiction, highlighting the increased likelihood of developing addictive behaviors related to gaming. These findings emphasize the need for limits on children's video game exposure and a balanced approach to gaming and other activities supporting cognitive development. Parents, educators, and policymakers should be aware of the risks associated with excessive video game use and implement measures to monitor and regulate children's gaming habits. The study acknowledges limitations, including the cross-sectional design's inability to establish causality and the potential impact of the sample size and selection method on generalizability. Future research should employ longitudinal designs and diverse samples to enhance the findings' applicability. Overall, this study contributes valuable insights into the negative impact of video games on children's cognitive development and the importance of interventions to mitigate these effects and promote healthy cognitive development

Keywords: Video games, Cognitive development, Addiction, Children, Psychological effects, Depression

Introduction

Video games have become a popular form of entertainment among children, but concerns have been raised about their potential negative effects on the children's. It is important to examine these consequences to better understand the impact of video games on children's well-being. This article aims to explore the adverse effects of video gaming on children, including increased anger, compulsive behavior, and emotional distress. Additionally, it will delve into the potential implications for cognitive abilities, physical health, and social interactions.

Negative Effects on Emotional Well-being:

One notable concern associated with video games is the potential for increased anger and aggression among children. Exposure to violent content in certain games can lead children to

perceive aggression as acceptable behavior. This normalization of violence may subsequently affect their real-life interactions, leading to behaviors such as bullying or physical altercations. Compulsive gaming is another detrimental consequence that can negatively impact children's emotional well-being. Some children develop a strong urge to play video games continuously, feeling unable to control their gaming habits. This compulsion can result in neglect of other important activities, such as schoolwork, chores, or spending time with friends and family. The inability to meet these obligations can cause feelings of sadness, frustration, and isolation.

Negative Effects on Physical Health:

Extended periods of gaming can have adverse effects on children's physical health. Excessive use of controllers or keyboards can lead to repetitive strain injuries, causing discomfort and pain in muscles and joints. Conditions like sore muscles, carpal tunnel syndrome, and trigger finger are common in children who engage in prolonged gaming sessions. Moreover, the sedentary nature of gaming contributes to a lack of physical activity, increasing the risk of weight gain, obesity, and related health issues such as heart disease and diabetes.

Impact on Cognitive Abilities:

Video games can also have detrimental effects on children's cognitive abilities. The constant stimulation provided by games can affect their ability to concentrate and focus on real-life tasks, leading to difficulties in school and decreased academic performance. Moreover, spending excessive time in virtual environments can overtax the brain, impairing memory capacity and retention of information. These cognitive challenges can hinder problem-solving skills and creativity, limiting children's overall cognitive development.

Effects on Social Interactions:

Excessive gaming can impact children's social interactions and relationships. Engaging in extensive gaming sessions may lead to social isolation as children prioritize virtual interactions over face-to-face communication. This isolation can hinder the development of essential social skills, making it challenging for children to form meaningful connections with peers. Moreover, neglecting family and friends due to excessive. gaming can strain relationships and lead to feelings of loneliness and sadness.

It is crucial to acknowledge the negative effects that video games can have on children's emotional well-being, physical health, cognitive abilities, and social interactions. Increased anger, compulsive behavior, and emotional distress are among the adverse consequences observed in children who engage in excessive gaming. The sedentary nature of gaming and the potential for repetitive strain injuries pose risks to their physical health. Furthermore, video games can hinder cognitive development, impede academic performance, and limit problem-solving skills. Lastly, excessive gaming can isolate children socially, inhibiting the development of essential social skills and impacting their relationships with peers and family members. It is important for parents and caregivers to establish limits on gaming time and encourage a balanced lifestyle for children, promoting their overall well-being and healthy development.

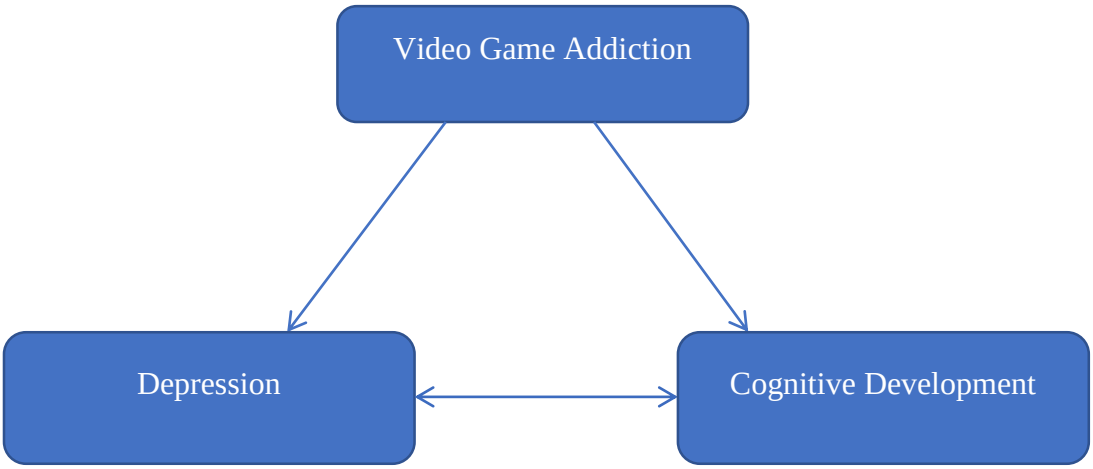

Figure 1. Conceptual framework of study

Hypotheses

1. Excessive use of video games is negatively associated with children's cognitive development.
2. Excessive gaming is positively associated with symptoms of depression.
3. Excessive video game use is positively associated with addiction in children.
4. Older children are more likely to exhibit addictive behaviors related to video games than younger children.
5. Males are more likely to exhibit symptoms of depression related to excessive video game use than females.

Sample

Convenience sampling techniques will be employed for the present study, focusing on a sample of 100 children aged 6 to 12 years old. These children will be selected from various schools in Rawalpindi. Convenience sampling allows for a convenient and accessible selection of participants based on their availability and proximity to the researchers. This approach will provide valuable insights into the impact of video games on children's cognitive development and addiction potential within the specific context of Rawalpindi.

Instruments

The present study incorporates two instruments: the Children's Depression Rating Scale (CDRS) and the Brain Ware Cognitive Rating Scales. The CDRS, developed in 1979, assesses depression symptoms in children aged 6 to 12 using a semi-structured interview. It consists of 17 domains and provides insights based on DSM-IV guidelines. The Brain Ware scales evaluate cognitive abilities across different age groups, recognizing uneven development. Additionally, the VGA

questionnaire measures video game addiction, including withdrawal symptoms, preoccupation, loss of control, and negative consequences. These instruments contribute to understanding the impact of video game usage on children's cognitive development and psychological well-being. The CDRS identifies depression symptoms, the Brain Ware scales assess cognitive domains, and the VGA questionnaire explores addiction levels. By utilizing these instruments, researchers can gain comprehensive insights into the effects of excessive video game use on children's well-being.

Procedure

The present study investigates the relationship between video game addiction and its impact on depression and cognitive development. The Video Game Addiction (VGA) questionnaire, designed to assess the level of addiction to video games, is utilized as the scale for measuring video game addiction. The Children's Depression Rating Scale-Revised (CDRS-R) is employed to assess depression symptoms, while the Brain Ware Cognitive Rating Scales are used to evaluate cognitive development. Convenience sampling techniques are employed to select a sample of 100 children aged 6 to 12 years old from various schools in Rawalpindi. Participants are provided with questionnaires containing the selected scales, and they are instructed to carefully read each item and select the response that best reflects their situation. Privacy and confidentiality of the participants' responses are assured. The gathered data is prepared and checked for missing values. Subsequently, statistical software SPSS is used to analyze the collected data, allowing for a comprehensive exploration of the relationship between video game addiction, depression, and cognitive development. The findings from this study will contribute to a deeper understanding of the impact of video game addiction on children's psychological well-being and cognitive abilities.

Result

The table 1 presents the frequency and percentage distribution of the sample based on demographics. The sample consists of 100 participants, with an equal distribution of males and females (50 each). Similarly, 50% of participants fall within the 6 to 8 age group, and the remaining 50% fall within the 9 to 12 age group.

		Freq	*Per%*
Gender	*Male*	50	50.0
	Female	50	50.0
	Total	100	100.0
Age	*6 to 8*	50	50.0
	9 to 12	50	50.0
	Total	100	100.0

Note. Freq=Frequency, Perc=Percentage

Table 2 shows that CDRS-R is non-significantly moderate negative correlated with age and CDRS- is very high negative non-significant correlated with gender and CDRS-R is very high positive significantly correlated with VGA. VGA is significantly positive with Age, gender and CDRS-R.

Table 2. Pearson Correlation with Age and Gender with Children's Depression Rating Scale-Revised (CDRS-R) and Video Game Addiction Scales

Pearson Correlation with Age and Gender with Children's Depression Rating Scale-Revised (CDRS-R) and Video Game Addiction Scales

	CDRS-R	*VGA*	*Age*	*Gender*
CDRS-R	1	.207	-053	-132
VGA	.207	1	.284	.171
Age	-053	.284	1	.000
Gender	-132	.171	.000	1

Note. Cdrs-r = Children's Depression Rating Scale; VGA = Video game addiction

Table 3 shows that Video game addiction and Brain ware cognitive (6 to 8) has positively non-significance correlation with each other.

Table 3. Pearson Correlation with Video game addiction brain ware cognitive scale (6 to 8).

	VGA	*BRCS (6 to 8)*
VGA	1	.253
BRCS (6 to 8)	.253	1

Note. VGA= Video game addiction; BRCS (6 to 8) =Brain Ware Cognitive Rating Scale (Ages 6-8)

Table 4 shows that Both Video game addiction and Brain ware cognitive (9 to 12) has a negatively significant correlation relation between each other.

Table 4. Pearson Correlation with Video game addiction with brain ware cognitive scale (9 to 12).

	VGA	*BRCS (9 to 12)*
VGA	1	-.492
BRCS (9 to 12)	-.492	1

Note. VGA= Video game addiction; BRCS (9 to 12) =Brain Ware Cognitive Rating Scale (Ages 6-8)

Table 5 shows that Average venting among Cdrs-r 6 to 8 (M=69.400, SD= 27.48) is slightly higher than that of Cdrs-r 9 to 12 (M= 66.40, SD= 29.218) but has lower SD t (98) =.529 value. Meanwhile VGA 9 to8 also has higher Mean than 6 to 8 but is lower in Standard deviation t (98) =.04 value

Table 5. Mean, Standard deviation, and t-values on Cdrs-r with age (N=100)

	6 to 8		9 to 12				
	M	*SD*	*M*	*SD*	*T*	*P*	*DF*

Cdrs-r	69.400	27.4835	66.40	29.218	.529	.598	98
VGA	18.660	6.40347	21.38	1.3834	-2.93	.04	98

Note. 6 to 8= 50 n; 9 to 12 = 50 n; Cdrs-r= Children's Depression Rating Scale-Revised; VGA= Video game addiction.

Table 6 shows that Average venting among Male (M=71.600, SD= 28.8705) is higher than that of Female (M= 66.40, SD= 27.426) t (98) =.192 value which means that males have more depression than females. Meanwhile VGA 6 to8 has littler higher Mean than 9 to 12 but is lower in Standard deviation by a huge number and t (98) =.088 value

Table 6. Mean, Standard deviation, and t-values on cdrs-r with gender (N=100)

	Male		Female				
	M	*SD*	*M*	*SD*	*T*	*P*	*DF*
Cdrs-r	71.600	28.8705	64.20	27.426	.1.314	.192	98
VGA	19.200	6.62093	20.84	1.2182	-1.722	.088	98

Note. Male = 50 n; Female = 50 n; Cdrs-r= Children's Depression Rating Scale-Revised; VGA= Video game addiction.

Table 7 shows that Average venting among BRCS (6 to8) (M=92.440, SD= 19.50) is lower than that of Female (M= 95.480, SD= 14.32) but standard deviation is much lower and t (male= 48, female= 44.05) =.533. Meanwhile BRCS (9 to 12) males has littler higher Mean than females and also higher standard deviation which males has more problem with cognitive development than females and t (male= 48, female=45.28) =.891 value.

Table 7. *Mean, Standard deviation, and t-values on Both Brain ware cognitive scales age group with gender (N=100)*

	Gender	*M*	*SD*	*T*	*P*	*DF*
BRCS(6to8)	*Male*	92.440	19.50	-628	.533	48
	Female	95.480	14.32	-628	.533	44.059
BRCS(9to12)	*Male*	95.920	19.41632	.138	.891	48
	Female	95.240	15.11	.138	.891	45.28

Note. Male = 50 n; Female = 50 n; BRCS = Brain Ware Cognitive Rating Scale

Discussion

The study aimed to investigate the effects of video games on the cognitive development of children through a correlational research design. The sample consisted of 100 participants, both male and female, aged 6 to 12 years, selected using convenient sampling from various schools in Rawalpindi. The researchers used scales such as the cognitive development rating scale (CDRS-R) and brain

ware rating scale (BCRS) to measure cognitive skills and depression in the children. Additionally, a questionnaire was employed to assess addiction to video games.

The study utilized several statistical analyses, including descriptive statistics, correlation analysis, independent sample t-test, and regression analysis, to analyze the collected data using the SPSS software.

According to hypothesis 1 Excessive use of video games is negatively associated with children's cognitive development. Table 3 indicated a non- significant positive correlation between video game addiction and cognitive development subscale scores (6 to 8 years old children). This suggests that younger children, who play fewer video games and have less addiction, have better cognitive development. On the other hand, Table 4 showed a significant negative correlation between video game addiction and cognitive development subscale scores (9 to 12 years old children), suggesting that older children who have more addiction have poorer cognitive development than younger children. Teenagers have been found to be more susceptible to internet-related addiction, leading to worse mental health, cognitive functioning, depression, anxiety, and social isolation (Kandell, 1998; Stockdale & Coyne, 2018). Concerns have been raised about the negative impact of video games on children's cognition (Du et al., 2017).

According to hypothesis 2 Excessive gaming is positively associated with symptoms of depression. Table 2 demonstrates a significant correlation between video game addiction (VGA) and children's depression rating scale (CDRS-R), indicating that increased VGA is associated with higher CDRS-R scores. Lee and Kim (2017) note that versatile video games pose unique risks due to their portability, punctuality, and accessibility. Previous studies (Bozoglan et al., 2013; Taylor, 2017) suggest that anxiety, depressed mood, and unhappiness are risk factors for video game addiction, which can contribute to depression and despondency (Lawrence & Peng, 2010).

According to hypothesis 3 Excessive video game use is positively associated with addiction in children. Table 2 supports the hypothesis by revealing a positive correlation between video game addiction (VGA) and children's development rating scale (CDRS-R). Table 53 shows a non-significant correlation between VGA and brainware cognition in younger children, while Table 4 shows a significant negative correlation in older children. This suggests that children aged 9 to 12 are more susceptible to addiction. Dangerous flexible online gaming involves handheld gameplay and difficulty resisting prolonged play (Sun et al., 2014). Studies indicate modest connections between different types of addictive behavior (Sha et al., 2018). According to hypothesis 4 older children are more likely to exhibit addictive behaviors related to video games than younger children. Pearson correlation analysis demonstrated a significant positive correlation between video game addiction (VGA) and age, indicating that addiction tends to increase with age. The independent samples T-Test revealed that 6- to 8-year-olds had slightly higher average cognitive development scores ($M = 69.40$, $SD = 27.48$) compared to 9- to 12-year-olds ($M = 66.40$, $SD = 29.218$), but with a lower standard deviation, $t(98) = 0.529$. VGA scores were higher for 9- to 12-year-olds in mean but lower in standard deviation, $t(98) = 0.04$. These findings support the hypothesis that children aged 9 to 12 are more prone to video game addiction. Previous research

suggests that older children, particularly those who are solitary or have low self-esteem, are more susceptible to video game addiction (Wang et al., 2014; Chew, 2019).

According to hypothesis 5 Males are more likely to exhibit symptoms of depression related to excessive video game use than females. CDRS-r demonstrated a highly significant negative correlation with gender, indicating lower depression scores in females. Table 6 supported this, showing higher average CDRS-r scores for males (M = 71.600, SD = 28.8705) compared to females (M = 66.40, SD = 27.426), t(98) = 0.192. Table 7 displayed the BRCS findings, with 6-8-year-old females (M = 95.480, SD = 14.32) exhibiting better behavioral regulation and cognition than males (M = 92.440, SD = 19.50), t(male = 48, female = 44.05) = 0.533. However, 9-12-year-old males showed slightly higher mean BRCS scores than females, indicating more cognitive development problems, t(male = 48, female = 45.28) = 0.891. These findings support hypothesis 5, suggesting gender differences in depression and cognitive abilities. Previous research emphasizes men's attraction to movement and conflict, while women prefer friendlier activities (Duven et al., 2013). Female adolescents' parental supervision reduces their risk of internet addiction (Yen et al., 2019).

Conclusion

Overall, the findings suggest a link amongst children video game addiction and worse memory, attention, cognition, and academic abilities in children. Those findings highlight the necessity for additional study and include critical leading steps necessary in subsequent articles, such as separating predicted elements that might enable early detection of video gaming addiction in children. It is vividly depicted that children between 6 to 8 years, play fewer video games and are less addicted to video games so they have less cognitive disturbance whereas the children age between 9 to 12 have more disturbed cognitive development than other children's i.e. (6 to 8) due to excessive playing video games.

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