| Research Article |

Cognitive Failure as a Consequence of Video Games, Developing Risk of Disruptive Behaviors among Students

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Abstract: *The recent study aims to explain the excessive level of aggression and cognitive failure among video game player students. Participants were 200 gamers, and 198 were non-gamers in which (149 males and 49 females, only gamers) from Islamia University of Bahawalpur. Two questionnaires were used to measure variables: the Buss-Perry Aggression Questionnaire and the Cognitive Failures Questionnaire. A descriptive research design is used for the study. Data was collected from the co-relation sampling method, and it is analyzed by using the new SPSS version 21. Statistical techniques such as correlation, t-test, mean, and standard deviation were used. The results are very confirmed from the collected data; the greater value of aggression among the gamers is more aggressive than the non-gamers. Gamers have more cognitive failure problems than non-gamers. The study provides the probable negative impacts and consequences of violent video games on students. The present study found that students who play video games excessively have more aggression and cognitive problems than students who avoid playing video games. The results of studies indicated that the students who do not play video games have less physical aggression, verbal aggression, anger, hostility, and cognitive failure problems.*

The present study found that students who play video games excessively have more aggression and cognitive problems than students who avoid playing video games. The results of studies indicated that the students who do not play video games have less physical aggression, verbal aggression, anger, hostility, and cognitive failure problems.

Keywords: *physical aggression, verbal aggression, anger, hostility, and cognitive failure*

Introduction

In the past few decades, electronic media has grown from virtual non-existence to a primary means of student entertainment (Anderson et al., 2017). Nowadays, video games influence both young and elderly lives. Previous studies proposed the numerous advantages of videogames, including social and educational perspectives, financial returns for companies, and recreational purposes. In academic learning, video games can play a role in helping student stress levels related to their studies, connecting game terms with what's taught in class as well as can be considered as self eward system. Besides all the learning and educational activities and advantages, video games can negatively impact students(Adzic et al., 2021).

All over the world, the usage of video games has increased significantly among teenagers and students. The excessive use led to a real problem known as video game addiction(Adair, 2022). World Health Organization (2021)defined gaming disorder as a pattern of uncontrollable and recurrent gaming behavior manifested by impaired control over gaming, whether it is online or offline. Gaming takes precedence over other life interests and daily routines by increasing priority given to gaming despite its negative consequences. People often get hooked on video games because of the thrill of winning, making video game addiction similar to compulsive gambling (Starcevic et al., 2020). Recent estimates show that one out of three children under 18 uses the Internet globally, and 75% of adolescents in developed countries play electronic games daily. Spending more time playing video games and using screens is linked to more psychological and behavioral problems in children and often leads to externalizing and internalizing problems (Eirich et al., 2022).

The behavioral theory explains that violent video games can produce behavioral problems in children and adolescents and serve as an influencing virtual external environment. Studies have investigated that violent video games havea significant effect on students. Numerous meta-analyses showed that video games containing violent content adversely affected behavior and significantly increased aggressive behavior, which affects violent desensitization and mental health issues(De Pasquale et al., 2020).

With the development and growing use of video games, concern increased regarding potential problems related to cognitive and behavioral issues such as cognitive failure. The inability to perform everyday tasks appropriately is a cognitive failure (Özçetin et al., 2019).Incredibly late night and intense game sessions can disturb the sleep cycle and cause difficulty concentrating, leading to physical and mental fatigue and decreased cognitive performance. Excessive use of video games also concerns social interactions and communication skills and contributes to social isolation (Benoit et al., 2020)

Research evidence suggests that aggression-related issues are associated with exposure to violent video games. (Anderson and Bushman, 2001; Andersonet al., 2004).Particularly, engaging in violent video games can impact aggressive thoughts and emotions, leading to increased feelings of hostility, as indicated by research(Anderson and Dill, 2000; Anderson et al., 2004). While some studies explore how video games affect children's thinking skills and school performance, other studies (Kwak et al., 2020; Lee et al., 2018) propose a connection between playing violent video games and a rise in aggressive thoughts, feelings, and actions. The specific type of video game played could play a role in the likelihood of developing such behaviors.

Video games became increasingly subtle and pronto accessible, causing expressions of alarm amongst some students. Video games nowadays have become one of the favorite activities of youngsters. So, the central

concerns regarding the content of violent games and their influence on students.During the last decade, video games have become increasingly attractive and appealing as entertainment and a hobby, ignoring that they also have some adverse effects worldwide.Individuals who play violent video games are much more likely to be identified by a forceful character and personality.The present study aims to investigate the psychological characteristics of video gamers, such as perception, visual attention, memory, processing disorders, and development and temperament, especially in aggressive behavior such as physical, verbal aggression, anger, and aggression, and to find out the relationship of video games with cognitive failure, verbal aggression, physical aggression, anger, and hostility in students.We hypothesized that cognitive failure, verbal aggression, anger, physical aggression, and hostility wouldcorrelate positively.Cognitive failure leads impact to physical aggression, verbal aggression, anger, and hostility among gamers, and the levels of cognitive failure, verbal aggression, physical aggression, anger, and hostility will differ in, i.e., gamers and non-gamers, gender, and type of games (Action, Puzzle, and Board Games).

Method

Participants

Participants were 200 gamers (149 males, 49 females), and 198 were non-gamers from Islamia University of Bahawalpur. The age range was 18-27 years. A simple random sampling technique was used to collect data.

Instruments

Cognitive Failure Questionnaire (CFQ)

Cognitive Failure Questionnaire developed by (Broadbent et al., 1982), CFQ was a 25-project self-report that was used to measure failures in attention, perception, memory, and movement. The frequency of each failure is rated on a 5-point scale, from 0 (never) to 4 (very). It also has high retest reliability. (Broadbent et al., 1982) reported values of r = .82 and r = .80 over an extended period of up to 2 years. Broadbent claims that CFQ should only be used to assess the single structure of cognitive impairment. He supports his claim by explaining the scale's high internal consistency.

Buss-Perry Aggression Questionnaire (BPAQ)

The Bass Perry Aggression Questionnaire is a 29-item scale used to assess verbal aggression, physical aggression, anger, and hostility in male and female adults. It is based on the original list of hostility (Buss and Durkee, 1957), retaining many of the unique former items but including more things to improve clarity and develop more ideas. Preliminary research indicates that BPAQ consists of four factors (or secondary scales): physical aggression, verbal aggression, anger, and hostility. BPAQ shows good test-retest reliability between 0.59 and 0.846. The internal consistency of the questionnaire, the degree of physical aggression was 0.902, the degree of verbal aggression was 0.917, the degree of anger was 0.894, and the degree of hostility was 0.894. Use the Likert-type scoring table to score items ranging from 1 (extreme individual characteristics) to 5 (extreme individual characteristics).

Procedure

The purpose of the study was to explain to them, and instructions were given to every student regarding questionnaires. The first tool was the Cognitive Failure Questionnaire (CFQ) to measure cognitive errors; the second was the Buss Perry Aggression Questionnaire (BPAQ) to measure the different aggression levels like verbal aggression, physical aggression, anger, and hostility. In addition, after collecting the data, it was analyzed by SPSS version 21.0. Analyze data using descriptive and inferential statistics, where the mean, standard deviation, and t-test are used to compare the mean of gamers and non-game players and male and female respondents from the score of physical aggression, verbal aggression, hostility, anger, cognitive failure as well as the use of correlation analysis to predict the level of the significance among all variables.We also analyzed the simple linear regression.

Results

Table 1: Sociodemographic Characteristics of the Participants

Demographics	Frequency(percentage)	Demographics	Frequency(percentage)
Gamers	200	Age	
Male	149(74.5%)	18-20	74(37%)
Female	51(25.5%)	21-23	78(39%)
Non-gamers	198	24-25	40(20%)
Qualification		26-27	8(4%)
Master of Science	22(11%)	Gaming Devices	
Master of Arts	8(4%)	Computer	120(60%)
Business Administration	56(28%)	Mobile	56(28%)
Information Technology	38(19%)	Gaming Console	20(10%)
BSc	12(6%)	Television	4(2%)
Others	64(32%)	Time spend	
Types of Games		Minimum time	30 min
Action Games	152(76%)	Maximum Time	6 hours/ 390 min
Puzzle Games	36(18%)		
Board Games	12(9%)		

Table 2:Correlations between Cognitive Failure, Physical Aggression, Verbal Aggression, Anger and Hostility

Variables	1	2	3	4	5
Cognitive Failure	1				
Physical Aggression	.873**	1			
Verbal Aggression	.824**	.917**	1		
Anger	.833**	.944**	.749**	1	

Hostility	.874**	.960**	.983**	.942**	1

The values of the correlation coefficient among cognitive failure, physical aggression, verbal aggression, anger, and hostility are presented in Table 2. The results indicate that cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically positively correlated.

Table 3: Analysis of differences among cognitive failure, physical aggression, verbal aggression, anger, and hostility differences between gamer and non-gamer

	Gamer		**Non-Gamer**			
	(*n*=200)		(*n*=198)			
	Mean	Standard Deviation	Mean	Standard Deviation	*t*	*P*
Cognitive Failures	64.07	6.57	61.88	7.78	3.030	.003**
Physical Aggression	12.11	2.17	11.42	2.39	3.004	.003**
Verbal Aggression	17.25	3.07	16.08	2.34	3.634	.000***
Anger	18.97	3.25	17.87	3.72	3.131	.002**
Hostility	22.49	3.56	21.05	4.14	3.720	.000***

df = 396, ***$p < 0.001$

Table 3 shows the analysis of differences among cognitive failure, physical aggression, verbal aggression, anger, and hostility between gamers and non-gamers. From the results, we can conclude that cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically higher in gamers thanin non-gamers.

Table 4:Analysis of differences among cognitive failure, physical aggression, verbal aggression, anger, and hostility between male and female gamer

	Male		Female			
	(*n*=151)		(*n*=49)			
	Mean	Standard Deviation	Mean	Standard Deviation	*t*	*P*
Cognitive Failures	64.82	6.47	61.73	6.34	2.913	.004**
Physical Aggression	23.03	3.53	20.84	3.14	3.875	.000***
Verbal Aggression	12.41	2.10	11.16	2.10	3.613	.000***
Anger	17.63	3.03	16.06	2.93	3.175	.002***
Hostility	19.41	3.21	17.61	3.03	3.457	.001**

df = 396, ***$p < 0.001$

Table 4 shows the analysis of differences among cognitive failure, physical aggression, verbal aggression,

anger, and hostility between male and female gamers. From the results, we can conclude that the levels of cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically significantly higher in males than that of female gamers.

Table 5:Analysis of differences in the levels of physical aggression, verbal aggression, anger hostility, and cognitive failure among gamers playing different types of games

ANOVA

Variables	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Physical Anger	Between Groups	260.796	2	130.398	11.391	.000
	Within Groups	2255.184	197	11.448		
	Total	2515.980	199			
Verbal Aggression	Between Groups	61.124	2	30.562	6.923	.001
	Within Groups	869.671	197	4.415		
	Total	930.795	199			
Anger	Between Groups	283.724	2	141.862	17.540	.000
	Within Groups	1593.271	197	8.088		
	Total	1876.995	199			
Hostility	Between Groups	189.019	2	94.509	9.734	.000
	Within Groups	1912.801	197	9.710		
	Total	2101.820	199			
Cognitive Failures	Between Groups	459.097	2	229.548	5.570	.004
	Within Groups	8119.058	197	41.213		
	Total	8578.155	199			

Table 5 represents the results of the levels of physical aggression, verbal aggression, anger hostility, and cognitive failure in gamers playing different types of games. From the results, we concluded that cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically different among gamers playing other games.

Table 6 Regression analysis, using cognitive failure as an independent variable and physical aggression as an outcome

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R^2	F
	B	Std. Error	Beta				
(Constant)	-8.150	1.163		-7.008	.000	.780	283.418

Cognitive Failures	.478	.018	.883	26.485	.000	

Table 6 shows the regression analysis results with cognitive failure as an independent variable and physical aggression as the outcome variable. The result indicates that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will result in 0.478 positive changes in physical aggression.

Table 7 Regression analysis, using cognitive failure as an independent variable and verbal aggression as an outcome

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R^2	F
	B	Std. Error	Beta				
(Constant)	-4.487	.932		-4.817	.000	.618	320.535
Cognitive Failures	.259	.014	.786	17.903	.000		

Table 7 indicates the regression analysis results with cognitive failure as an independent variable and verbal aggression as the outcome variable. The result shows that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will have 0.259 positive changes in verbal aggression.

Table 8: Regression analysis, using cognitive failure as an independent variable and anger as an outcome

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2	F
	B	Std. Error	Beta				
(Constant)	-7.325	1.226		-5.976	.000	.672	405.991
Cognitive Failures	.384	.019	.820	20.149	.000		

Table 8 shows the regression analysis results with cognitive failure as an independent variable and anger as the outcome variable. The result indicates that cognitive failure leads to physical aggression. Furthermore, we

conclude that one unit change in cognitive failure will result in 0.384 positive changes in anger.

Table 9: Regression analysis, using cognitive failure as an independent variable and hostility as an outcome

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2	F
		B	Std. Error	Beta				
	(Constant)	-8.307	1.155		-7.190	.000	.740	563.205
	Cognitive Failures	.426	.018	.860	23.732	.000		

Table 9 shows the regression analysis results with cognitive failure as an independent variable and hostility as the outcome variable. The result indicates that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will result in 0.426 positive changes in hostility.

Discussion

Since the beginning of the 21st century, with the rapid development of the Internet, video games have been an important leisure and entertainment tool for children and adolescents. The current study was conducted to find out the level of aggression and cognitive failure among video game players and non-video game players students. The entire sample comprised 398 students belonging to Islamia University. For example, 200 participants (50.2%) are gamers who play video games daily, and 198 participants (49.7%) are non-gamers. The ages and qualifications of participants are the minimum age is 18 and a maximum of 27 for all participants. In the range of 18 to 20, there are participants (37%) are exist. Most participants (39%) age range is 21 to 23. Some participant's 20% age range is 24 to 25. Only 4 %of participants' age range is 26 to 27. Similarly, differences exist in the qualifications of the participants. Of some participants, 11% are MSc level; the other 04% belong to Master of Arts. Most participants belong to the business administration department,which is 28%, and 19% belong to the information technology department. Only 6% of the participants' education is BSC, and 32 % of the participants' qualifications are others.

The gaming device frequencies that participants used for playing games are most of the participants playing games from computers that are 60%. Secondly, the source of playing games is mobile phones, with 28% of participants playing games via mobile. Some participants used a gaming console for playing games that are 10%. Only 2% of participants play games on television.

The types of games that participants play and time duration hours per day, according to results, most of the participants play action games, frequency is 152, and the percentage is 76%. For some participants playing puzzle games, the rate is 36, and the percentage is 18%. Only 12 participants play board games. The minimum time limit is half an hour (30 minutes), and the maximum time for playing games is six and a half hours (390 minutes) within a day. According to the results, most of the participant's duration of playing games is 0.5 hours

to 2.5 hours per day, frequency is 140, and the percentage is 70%—some students 26% playing games for 2.6 hours to 4.5 hours within a day. Only 8 participants play games for 4.6 hours to 6.6 hours each day.

Table 2 showsthe correlation of all the concerned variables at the level of significance is the value of correlation among gamers and non-gamers. The amount of association shows no significant relationship between cognitive failure and playing games. In the case of non-gamers, an insignificant relationship exists or an inverse relationship in which a low score of gaming increases cognitive failure. In physical aggression, thecorrelation value is 0.873** among gamers, showing a significant relationship between playing games and physical aggression. The (*) stars on the values of correlation show the significance. In the case of non-gamers, value shows no significant relationship exists between non-gamers and physical aggression. On the scale of verbal aggression, the correlation value is 0.917** among gamers, indicating an essential relationship between verbal aggression and playing games. In the case of non-gamers, the correlation value shows no significant relationship.

Similarly, the scale of the anger correlation value is 0.749** respectively among gamers, showing a significant relationship. In the case of non-gamers, the correlation value shows insignificant relationships. A study conducted by (Eirich et al., 2022) showed consistency with the current findings that excessive use of video games showed a significant relationship with behavioral issues and cognitive disturbances such as anger and other externalizing disorders.

Table 3 predicted the analysis of differences among physical aggression, verbal aggression, cognitive failure, anger, and hostility between gamers and non-gamers. The cognitive failure means the score of gamers is 64.07, non-gamers 61.88, and the standard deviation is 6.57. Meanwhile, the non-gamers standard deviation score is 7.78. Results indicated that gamers experience more cognitive failure as compared to non-gamers. On the scale of physical aggression,the mean score of gamers is 12.11, and the non-gamers score is 11.42, which shows gamers are more physically aggressive than non-gamers. Verbal aggression and anger also prevail more in gamers as compared to non-gamers. On the hostility scale, the mean score of gamers is 22.49, and the non-gamers score is 21.05, which shows a significant difference between both participants. Results indicated that the overall level of aggression is high in gamers as compared to non-gamers.The comparison of gamers and non-gamers respondents in case of cognitive failure from the entire sample 200 are gamers, and 198 are non-gamers. The average score of gamers is greater than that of non-gamers. Therefore, we conclude that cognitive failure in gamers is higher as compared to non-gamers. The t-test is used for the comparison of gamers and non-gamers. Hence, the hypothesis is accepted.In a similar vein, a study by(Kuhnet al., 2019) also suggested it seems that gamers who spend more time on video games show increased aggression and impulsivity and interfere with mood and cognition. On the other hand,it showed a reduction in prosocial behavior in players.A study results (Olejarnikand Romano, 2023) also support that video games that are violent in content are predictors of aggression, hostility, and narcissism.

Table 4 shows the comparison of the male gamers and female gamers respondents in case of analysis of differences among cognitive failure, verbal aggression, physical aggression, anger, and hostility. From the results, we can conclude that the levels of cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically significantly higher in males than that of female gamers. The hypothesis is accepted. Research conducted by(Lemmens et al., 2011) showed consistency with the findings that more use of

pathological gaming, regardless of the violent content, predicted a higher level of physical aggression among boys.

Table 5 represents the results of the levels of physical aggression, verbal aggression, anger hostility, and cognitive failure in gamers playing different types of games. From the results, we concluded that cognitive failure, physical aggression, verbal aggression, anger, and hostility are statistically different among gamers playing other games.The study by (Dowsett and Jackson, 2019) showed consistency with the findings as content or type of video games increased aggression and hostility as well as the effect on cognition.

Table 6 shows the regression analysis results with cognitive failure as an independent variable and physical aggression as the outcome variable. The result indicates that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will result in 0.478 positive changes in physical aggression. Study findings by (Dickmeis and Roe, 2019)found following our results that video games both consisted on competitive and violent activities influenced physical aggression.

Table 7 indicates the regression analysis results with cognitive failure as an independent variable and verbal aggression as the outcome variable. The result shows that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will have 0.259 positive changes in verbal aggression.Table 8 shows the regression analysis results with cognitive failure as an independent variable and anger as the outcome variable. The result indicates that cognitive failure leads to physical aggression.

Furthermore, we conclude that one unit change in cognitive failure will result in 0.384 positive changes in anger. Table 9 shows the regression analysis results with cognitive failure as an independent variable and hostility as the outcome variable. The result indicates that cognitive failure leads to physical aggression. Furthermore, we conclude that one unit change in cognitive failure will result in 0.426 positive changes in hostility. Another study supported the findings of theimpact of violent and non-violent video games on anger and behavioral aggression. Videogames influence mood,which leads to behavioral impulsivity, frustration, and an increase in anger(Devilly et al., 2021).

Conclusion

The present study shows that students who play video games excessively have more aggression and cognitive problems than students who avoid playing video games. The results of studies indicated that the students who do not play video games have less physical aggression, verbal aggression, anger, hostility, and cognitive failure problems.

Implications and future recommendations

Playing video games has been considered an alarming things for children, especially students. According to social learning theory, students learn aggressive behavior by viewing others. Children learn the way, how to attack, shout, show anger, lack of sympathy, etc. The students who play video games for a long time face cognitive failure problems like inattention, hyperactivity, memory problems, and perception in daily life. So by playing video games, the students feel more aggressive and cognitive failures. Many countries work to stop

playing video games because of negative impacts on student's life, e.g., the U.S. Due to the increase in aggression and cognitive failure.

The study developed a consensus definition of the negative impact of video games, identified its occurrence in students of universities and colleges, and explored physical aggression, verbal aggression, anger and hostility, and cognitive failure. These findings have worth for government rule-makers, particularly in schooling, law and order, information, technology, and forensic departments. The power of this study lies in its methodology, surplus sample size, a reliable and valid translated tool used, and results, which identified the harmful effects of video games and the contribution to the video games inquiry through the creation of a consensus definition of video games impacts along with the supportive literature. The result will also help inform new initiatives that the government, students, and individual families can apply to address the possible negative impacts of video games.

Limitation

Every research has certain margins and demerits. Various difficulties were faced during the study, which are felt and considered necessary to be discussed, such as convincing the students to fill out questionnaires was difficult.Students were too busy with their work, so they were not interested in completing the questionnaire.The sample was insufficient due to lack of time.Students had study problems, so they didn't have sufficient time to complete the questionnaire.Some students avoid providing correct information because they have leakage fear.

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