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IMPACTS OF VIDEO GAMING ON AGGRESSION AND COGNITIVE ABILITY OF PAKISTANIS VIDEO GAMERS

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ABSTRACT

A video game is an electronic device that employs electronic algorithms to create an interactive engaging system with a human. This study investigated the impact of excessive video gaming on aggression and cognitive ability of video gamers; Buss-Perry Aggression Questionnaire, Mindfulness Attention Awareness Scale and Video Game Survey were used to measure aggression, attention span and time span of video gamers respectively. The age of the sample ranged from 11-35 years old. The correlation, regression, t-test and ANOVA analysis were applied. The results of the study indicated that time-span is significantly positively correlated to aggression and negatively to cognitive ability. Timespan as an independent variable predicted 97% variance in aggression and cognitive ability. Video gaming and aggression are found high among males and cognitive ability among females. The study is applicable in careful designing of policy for advanced computerized technology in Universities and the world of work that addresses reduced aggression and increased cognitive ability.

1. INTRODUCTION

In today's world, the extensive use of video games is becoming a trend for which it became essential now to study its impact on humans. The human-machine interaction was for the good instead it turned out decaying the health psychologically and physically both.

This study is significant because of the relationship between the variables i.e. aggression and cognitive ability and its relationship to extensive time spent on video gaming. Much of the researches have done in western culture and similar to that the young adults are playing these games at homes and out of homes like clubs, gaming zones, etc. The nature of many video-games shows that Video gaming is a way of manipulating minds. They tend to have weak social life affecting their mental health and hence certain precautions and interventions need to be taken for Video gamers to make

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their psychological and physical well-being better.

Individuals who are not having any physical activity are more aggressive because of less physical activity and exertion. So, this is also happening in people playing video games for more than 2 hours a day because video gaming is being in a room (closed room in most of the cases) playing on electronic devices for pleasure purposes. The user does not roam around and does not let others interrupt in most of the cases, this results in less physical activity and more aggressive behavior (Farah, 2015).

Most of the previous research has depicted that people who spent two hours a day in front of screens either TV, computers, cell phones, etc. are shown to have difficulties in concentration. The brain scans have shown that It is because these electronic gadgets produce specific kinds of rays that interfere with the normal neural pathways and contribute to lowering concentration and cognitive ability (Gouveia, 2015; Klein, 2017).

The children particularly students who are involved in playing video-games for more than two hours a day are deemed impulsive, they desire to get to the solutions of the problem in hasty. The excessive video gaming aggravates agitation and irritability and less patience. The biological theory of neuro-development explains that the neuronal wiring of such students is different from the students who spend less time playing video games (Evans, Roush, Pitts, and Hornby, 2018).

2. LITERATURE REVIEW

The interaction between human and electronic gadgets has gained great importance since the world has termed as “Global Village”. The electronic devices are used from desk workers to pleasurable tasks like video games. The video games have their own autonomous status among other playing devices. Its excessive use includes detrimental outcomes like obesity, brain hemorrhage, low cognitive ability, weak attention span, high impulsivity, high levels of aggression and many of the types of psychological illness yet to be discovered (Desai, Krishnan-Sarin, Cavallo, and Potenza, 2010).

Video games also impact the changing levels of stress, aggression, and loneliness among adolescents. It was found that males were more pathological gamers than females. A significant difference in the mean scores of males and females on loneliness and aggression and stress scale was found concluding that pathological video gaming may induce feelings of loneliness in adolescents (Gee, 2003).

The effect of violent internet gaming on aggression among males was measured in a longitudinal study that took place in two phases. In phase 1 the effect of violent gaming was studied among the junior and high school males and was found that they were engaged in more aggressive behaviors. The other group showed that the males who played violent video games punished their participants for a longer period of time than others (Williams and Skoric, 2005).

The research on violent television exposure has shown that watching violent content may predict aggression among young adults and children, as a result of the meta-analysis. The results also stated that the exposure of the subjects to the aggressive video games increases physiological arousal and aggressive thoughts, emotions, and feelings (Anderson, et al., 2010).

Another longitudinal and experimental study was conducted in Europe. In this study, the experimental group was allowed to play the game most of the time and the control group was given less time to play video games than the experimental group. It was found that the experimental group was more affected as compared to the control group. The experimental group people had less focus on details than control group the MRI and brain scans also showed that the people who played less time and more physical activities had better brain scans than others (Polman, Castro, and Aken, 2008).

In Canada, the work is being done on how cognitive ability is impacted due to pocket electronic devices. The survey included 2000 Canadian participants with ages ranging from 18 and above. The brain activity was studied through brain MRIs and EEGs known as the neurological component, attention component through performance-based tasks. It was found that human has less cognitive ability than a goldfish and males scored better on cognitive ability than females (Jenkins, et al., 2016).

Swing and his colleagues conducted research on 13000 school going students to study their cognitive ability in relation to T.V watching and playing video games and less physical activity and it was found that the students shown sever problems to concentration. They had weak attention. Swing also concluded to study the cognitive ability with respect to working and long term memory. The correlates i.e. depression was studied and it was found that students with low cognitive ability showed higher depression levels (Jenkins, et al., 2016).

The amount of time involved in playing affects the psychological health of children. To further understand the concept it was found that gaming severity leads pathological gaming that further leads to high impulsivity with preferred smaller timed rewards than larger time. The level of achievement motivation is also affected by undue video gaming (Dossey, 2014).

A sample of 3,034 was studied for 1 year for the effect of video gaming on impulsivity and attention-related problems. Controlling the sex, race, ethnicity and socio-economic status, it was found that video gaming is the predictor variable predicting attention problems and impulsivity. It was also found that initial video gaming leads to pathological and violent video gaming (Murphy, 2016).

The correlation between video gaming and patience was studied and found negative among the students. It was explored that students playing more video games displayed a poor level of patience than others. The low levels of patience do not explain impulsivity and rather to be studied separately. The less patient students also showed difficulty in having trust in their parents, peers, and siblings (Yienger, 2016).

A study was conducted on 1068 Chinese students to study the underlying relation between impulsivity, self-esteem, internet and video game addiction. The correlation among the said variables was positive and multivariate regressions displayed that video game addiction mediates the relationship between self-esteem and impulsivity and it may act as a buffer (Tesoriero, Gallud, Lozano, and Penichet, 2014).

3. CONCEPTUAL MODEL

This study conceptual model is given in Figure 1.

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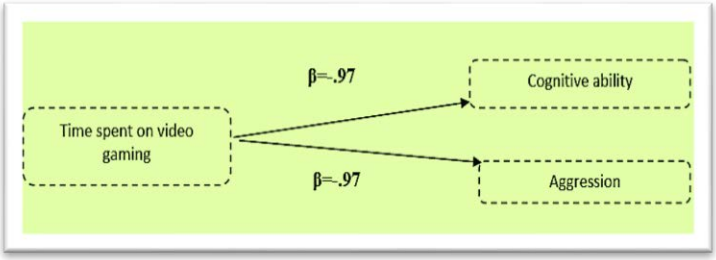

Figure 1: Effects of excessive video gaming, on the cognitive ability and aggression of students.

4. METHODOLOGY

4.1 RESEARCH STRATEGY

This study was based on a cross-sectional research design. The data was collected through questionnaires from video gamers from different walks of life.

4.2 RESEARCH DESIGN

The research was based on the cross-sectional design in which data is collected only one time from the one sample.

4.3 OBJECTIVES

The investigation of the impact of video gaming on aggression and cognitive ability of video-gamers.

To investigate the impact of a time span as a predictor variable on aggression and cognitive ability as an outcome variable across the gender.

4.4 HYPOTHESIS OF THE STUDY

Timespan and aggression are positively correlated among video-gamers.

Timespan and cognitive ability are negatively correlated among video-gamers.

Timespan significantly positively predicts aggression among video-gamers.

Timespan significantly negatively predicts cognitive ability among video-gamers.

Male-video-gamers will score high time spent on playing Video games than females.

Male-video gamers will score high on aggression than females video-gamers.

Female-video-gamers will score high on cognitive ability than male video gamers.

4.5 SAMPLE

In this study, the participants' age ranged from 11-35 years old which means that participants were adolescents and early adults. The participants were known as the "video gamers" from the Rawalpindi/Islamabad area. The education level included was a secondary school, college, and university (undergraduate students).

The selection criteria used for sampling was convenient from all the ethnicity, demographics and backgrounds residing in Pakistan. A total of 260 video-gamers were selected. Most of them were students, few were desk workers. An equal number of male and female video gamers were pooled.

4.5.1 INCLUSIVE AND EXCLUSIVE CRITERIA

In this study, only those participants were included who are involved in playing Video games for a longer period of time like more than an hour in a day.

4.5.2 EXCLUSION CRITERIA

Participants not involved in playing video games for longer periods on time on a continuum were excluded from the study.

4.6 INSTRUMENTS

The following instruments were used in the present study.

4.6.1 VIDEO GAME SURVEY

The video game survey was used to measure the time span of the video-gamers. The survey consisted of 38 items measuring the daily routines, work habits and time spent on video gaming of the video-gamer. The video gaming survey was developed in the USA by (Zendle and Cairns, 2018) and the psychometric properties of the survey were established (α=0.88)

4.6.2 BUSS–PERRY AGGRESSION QUESTIONNAIRE (AGQ)

Arnold Buss and Mark Perry (1992), developed a 29 item scale measured on a 5-point Likert scale. There is no cut-off score and the highest scores refer to high aggression and vice versa. The instruments were validated by university students. The AGQ has four subscales i.e. physical aggression, verbal aggression, anger and hostility (Valizadeh, Davaji, and Nikamal, 2010).

4.6.3 MINDFULNESS ATTENTION AWARENESS SCALE (MAAS)

Brown and Ryan (2013) defined mindfulness as an inherent state of consciousness, characterized by the presence of awareness of the surrounding happenings. Brown and Ryan (2013) developed a 15-item uni-dimensional scale titled "Mindful Attention Awareness Scale (MAAS)" with internal consistency and validity on university students. The responses are gathered on 6 points Likert scale from almost always=1 to almost never=6 (Lawlor, Schonert-Reichl, Gadermann, and Zumbo, 2014).

4.7 PROCEDURE

The current research variables were selected due to the higher prevalence rate of video-gaming in our society. Video gaming has a high prevalence rate especially in adolescents, which impacts aggression and cognitive ability primarily when Video gaming time is exceeded more than 2 hours (literature). The Buss–Perry Aggression Questionnaire (AGQ), Mindfulness Attention Awareness Scale (MAAS), and Video Game Survey for all the variables were selected.

The sample was adolescents studying in schools (English Medium Schools/Educational Institutions) therefore the scales were not translated. The English version of scales with no language ambiguity; was clearly understood by the entire sample. Before starting the main study the permission letter from the ethical committee of the university, was taken to formally ensure the code of ethics in research.

5. RESULTS

In the present research, the effect of excessive E-gaming was studied with impulsivity, aggression and attention span. The descriptive and inferential statistics were applied. The quantitative data were analyzed through SPSS-XXIII and displayed through tabulation.

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5.1 ANALYSIS PLAN

The current study involved the following analysis plan.

Alpha reliability of the variables was established

The correlation was found between the variables.

Regression analysis was done to check the effect of predictor variables on outcome variables.

5.2 INFORMATION AND ANALYSIS RESULT

Table 1 shows the descriptive analysis on three scales. All the scales and their subscales show the good reliability that qualifies them to be used in the main study.

Table 1: Psychometric properties of the three scales

Variables	M	SD	Skewness	Kurtosis	α
VGS	3.59	.57	.10	-.27	.67
MAAS	4.61	.57	.04	-.24	.77
AQ	4.59	.54	.02	-1.13	.72

Note: N=Total number of participants; M=Mean; SD= Standard Deviation; α=Alpha Reliability; VGS= Video Game Survey; MAAS= Mindfulness Attention Awareness Scale; AQ= Buss-Perry Aggression Questionnaire

Table 2 shows the item-total correlation of all the scales and its scales i.e. VGS, MAAS and AGQ. The table shows that the time span is negatively correlated attention span and positively correlated with aggression.

Table 2: item-total correlation among VGS, MAAS, UPPS-P and their subscales (N=131)

Variables	VGS	MAAS	AGQ	ANG	PH.AG	HOS	VER.AG
VGS	-	-.97**	.97**	.21*	.21*	.21*	.21
MAAS		-	-.97**	-.20*	-.20*	-.20*	-.20
AGQ			-	.18*	.18*	.18*	.18*
ANG				-	1.00**	1.00**	1.00**
PH.AG					-	1.00**	1.00**
HOS						-	1.00**
VER.AG							-

Note: VGS=time spent on video gaming; MAAS=Attention Span; AGQ=Aggression Questionnaire; ANG=Anger; PH.AG=Physical Aggression; HOS=Hostility; VER.AG=Verbal Aggression.

Table 3: Linear Regression Analysis on the Effect of TimeSpan spent on Video Gaming on Aggression and Attention Span (N=131)

Variables	B	SE	β	95% CI
Effect of time span on aggression				
Constant	1.28	.06		
VGT	.92	.02	.97	[1.14, 1.41]
R2	.97			[.88, .96]
F	2338.0			
ΔR2	.94			
Effect of Timespan on Attention Span				
Constant	1.11	.06		
VGT	.97	.01	-.97	[1.11, .68]
R2	.97			[.97, .01]
F	2744.5			
ΔR2	.95			

Table 3 shows that the time span as an independent variable has explained 97% variance in aggression and time span negatively predicted the attention span and explained 97% variation in attention span.

Table 4: The *t*-test analysis on Video Gaming, Attention Span and Impulsivity (N=131)

Variables	Males		Females		P	t	LL	UL	Cohen's d
	Mean	SD	Mean	SD					
VGS	4.06	.25	2.97	.13	<0.001	29.1	1.01	1.15	5.42
MAAS	2.07	.28	4.01	.24	.03	24.2	.96	1.12	4.37
AGQ	5.08	.23	4.00	.12	.04	32.3	.97	1.11	6.02

In Table 4, the statistical analysis shows the significant gender differences that exist for VGS, MAAS, and AGQ with the value of *t* (*t*=29.43, 24.47, 32.33) and the effect size Cohen's d value (5.42, 4.37, 6.02) respectively. On further observations, it can be said that male video-Gamers have high scores on all the scales mentioned above (M=4.06, 5.06, 5.04) respectively as compared to females (M= 2.98, 4.01, 4.00) respectively.

6. DISCUSSION

The aim of the present study was to identify the impact of video gaming and time associated with it on aggression and cognitive ability of video-gamers. In the research, Video Game Survey, Buss-Perry Aggression Questionnaire (1992) and Mindfulness Attention Awareness Scale (2003) were used to measure time spent in playing video games, aggression and attention span respectively. The video gamers were from adolescent and adulthood group whose age ranged from 11-35 years (Andreassen, *et al*., 2016; Brunborg, Mentzoni, and Frøyland, 2014; Király, Nagygyörgy, Koronczai, Griffiths, and Demetrovics, 2015).

The sample of the study included 260 participants. The data were screened for normality through SPSS. The objective devised for the study was to study the impact of video gaming on aggression and cognitive ability of video-gamers. To measure aggression and cognitive ability, the inter-item correlation analysis was conducted among the variables and their subscales. The results showed that time span and aggression are positively correlated while time span and cognitive ability are negatively correlated among video-gamers (Farmer, et al., 2017; Mayes et al., 2015).

The linear regression showed the effect of time span on aggression and cognitive ability. The results showed that the time span as an independent variable explained 97% variance in aggression and cognitive ability. The evolutionary theory explains the behavior through the increased technological developments that enable the students to spend most of the time on the electronic gadgets and hence the student prefers sitting and playing in the same place instead of moving. Therefore, the increasing students' time of inactivity (Peltzer and Pengpid, 2016; Pengpid, et al., 2015).

The impact of time span on aggression and cognitive ability was studied across the gender and t-test was applied. It was found that males spend more time playing video games as compared to females; and which is why males score high on aggression, and low on cognitive ability. Whereas, females spend less time playing video games and found to have the high cognitive ability and low aggression. The gender is explained through the biological theory that explains that men and women are biologically active in their own way. Particularly, in Pakistani culture, men are more exposed to video games than females which is why men showed more time of play than women (Caetano, Schafer, and Cunradi, 2017; Kuehner, 2017).

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7. CONCLUSION

In light of the research findings, video-Gamers with excessive video gaming have a higher level of aggression and lower cognitive ability and found high among males than females. The time spent in playing video games highly impacts the aggression and cognitive ability (Dakanalis, *et al.*, 2015). Therefore, if video gaming is played with appropriate time and under firm supervision, this may help to control aggression and improve the cognitive ability of video-gamers.

8. AVAILABILITY OF DATA AND MATERIAL

This study information is available upon requesting to the corresponding author.

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