

# Studying the Effectiveness of Collective Cognitive-Behavioral Intervention on Reducing Problematic Video Game Playing (PVGP) in Female and Male Adolescents

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## ABSTRACT

This study investigates the effectiveness of cognitive-behavioral intervention on the reduction of Problematic Video Game Playing (PVGP) in high school students.

In this quasi-experimental research, pretest-posttest design was used with control group. Sample included high school girls and boys in Ahvaz, southwest Iran. Sampling was done by random clustering method.

To do so, 48 boys and girls students (24 boys and 24 girls) with mean age 16.5 years and highest score in PVGPT (King et al, 2011) were randomly divided into two test and control groups. Then, eight 45min cognitive-behavioral intervention was administered for test group students. In the last session, it was administered for both groups.

Covariance analysis results indicated significant difference between test and control groups regarding after PVGPT (King et al, 2011) after cognitive-behavioral intervention. And, PVGP was reduced.

Accordingly, cognitive-behavioral intervention was effective on improving adolescents played video games in a problematic way. Female adolescents take more advantages of CBT.

**KEYWORDS:** Problematic Video Game Playing Test (PVGP), Video games, cognitive-behavioral therapy, adolescents

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## INTRODUCTION

Technology has changed the nature of individuals' problems. In addition, these problems require therapeutic strategies. Playing video games brings about great advantages for players. They can be educational (Griffiths, 2002; De Freitas & Griffiths, 2007), social (Cole & Griffiths, 2007; Hussein & Griffiths, 2008), and (or) therapeutic (Griffiths, 2005a&b). Results of a study specifically indicate the increases of computer games playing among adolescents in Iran. Forghani and Alizadeh (2007) showed that %80.7 Tehran high schools students play computer games. Most of them (%46) spend all and (or) a few days of week on playing these games. Amini et al (2007) also demonstrated that over half Zanjan high schools students (%53.4) play computer games. Long term video game playing leads to numerous negative conditions. They can be studies in three physical, behavioral, and mental-social groups (Gunter, 1997). The physical effects of playing game are more related to muscular-skeletal diseases such as wrist ache (Mc Cowan, 1981), neck ache, elbow ache (Miller, 1991), elbow vibration syndrome (Clearly et al, 2002), and abnormal increase or decrease of metabolism (Kang et al, 2003; ctd. by Asadollahpour, 2009), and significant changes of blood immunity cell numbers (Faraji et al, 2002). Regarding behavioral effects, most studies are focused on the relationship between tough games and manifestation of aggressive behaviors in individuals' real life (Alipour et al, 2008; Abdolkhaleghi et al, 2003). Major mental-social effects of computer games include getting addicted to them. There are evidences indicating that excessive video game playing can be addictive (Griffiths, 2004). Studies estimate that about %12 players in the UK (Grusser et al, 2007), between %10 and %20 players in the USA (Chak & Leung, 2004), and %15 users in Iran (Zamani et al, 2009; Allahverdipour et al, 2010) are addicted to video games. Although a small number of people may be addicted, the existing concerns are legitimate and extensive (Collins et al, 2012). There are reports on the existence of behavioral symptoms of playing video games among adolescents. They include robbing money for passage games or buying new game cards (Keepers 1990; Griffiths & Hunt, 1995, 1998), school absence for game (Keepers 1990; Griffiths & Hunt, 1998), not doing home works, gaining bad scores at school (Griffiths & Hunt, 1998; Phillips et al, 1995), giving social activities for playing (Griffiths & Hunt,

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1998), irritability and sadness when they are not playing games (Griffiths & Hunt, 1998), and playing more than desirable time and losing time (Griffiths & Hunt, 1998; Wood & Griffiths, 2007; Wood *et al.*, 2007).

Problematic game playing (Lemmens *et al.*, 2009), compulsive game playing (Soule & Kleen, 2007), problematic game playing (Salguero & Moran, 2002), problematic video game playing (Loton, 2007), and pathological gaming (Keepers, 1990) are all technical terms indicating uncontrollable and compulsive video games playing. Based on six main components of addiction, measures used by experts for problematic video games playing include: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Griffiths, 2005b). And, diagnosis measure of pathological gambling is from DSM-IV (Lemmens *et al.*, 2009; Salguero & Moran, 2002). Like internet-addiction (Griffiths, 2000), it is considered to be a kind of behavioral addiction (Griffiths & Meredith, 2009; Griffiths, 2005a).

In response to the increasing reports of video game addiction, the American Medical Association proposed the addition of a diagnosis for video game addiction to the next revision of the Diagnostic and Statistical Manual of Mental Disorders, the fifth edition (DSM-V). The American Psychiatric Association responded with a cautionary statement against prematurely classifying video game addiction as a mental disorder and suggested that more research is needed before it can be considered for inclusion as a formal diagnosis (APA, 2007). However, "Internet Use Gaming Disorder" included in an appendix of the DSM-V to encourage further study (APA, 2013).

There are weak evidences regarding serious and acute effects on health resulted from usual and normal video game playing. Side effects are probably insignificant and transient. They are automatically resolved as the number of playing games is reduced (Griffiths & Merediths, 2009). As mentioned, case studies and medical reports on negative consequences of playing video games on individuals excessively playing has shown that they are at high health risk. However, further studies are required.

Cognitive-behavioral therapy is shown as an effective therapy for obsessive disorders such as intermittent explosive disorder, pathological gambling, and trichotillomania (Kimberly & Young, 2007). Similarly, it has been effective in treating drug abuse, emotional disorders, and eating disorders (Halgin & Whitbourne, 2003). Maybe, this is the most effective method of resolving on-line addictions (including on-line game addiction). The therapy teaches individuals to detect distorted emotions, and learn coping skills to correct and prevent their relapse (Orzack *et al.*, 2006; Young, 2007).

Cognitive-behavioral therapy is a familiar treatment of the presumption that thoughts determine emotions. Clients are trained to monitor their thoughts and detect those resulting in addictive emotions and actions. They also learn new skills for coping stress and ways to prevent the relapse of the problem. The primary step of therapy is behavioral. Here, behaviors and specific conditions where impulse control disorder has led to the main issue are focused. As the treatment progresses, there will be further focus on cognitive assumptions and distortions developed. This intervention includes reviewing the type of distortions, problem-solving skills, and training coping skills, modeling in treatment, support groups, care and daily reports (Kimberly & Young, 2007). Improvement of addictive game playing is impossible without therapeutic interventions. Cognitive-behavioral therapy regarding video games can identify problematic cognitions. This therapeutic pattern shows why an individual uses video game as mental crutch. For most players, improvement requires paying attention to issues leading to game habit (Orzack *et al.*, 2006). Using cognitive-behavioral view, players review emotional incentives encourages them to excessive playing games and search for substitution ways to satisfy the needs. The therapy is aimed to direct individuals toward realizing the existence of a mental underlay for their behavior and that they need to control and modify it (Orzack *et al.*, 2006). Other techniques include motive interviews for determining positive objectives, getting committed to the certain use of video games, and development of other recreational fields. With respect to motive factors and clients' testimony to change, the effects of therapeutic progress can be long term (Orzack *et al.*, 2006). Kimberly and Young (2007) conducted a survey using cognitive-behavioral therapy on 114 internet-addicted clients of On-line Addiction Center. Variables like clients' incentive, on-line time management, improving social communication, improving sexual performance, participating on-line activities, and ability to avoid problematic programs were examined in treatment sessions. They indicated the effectiveness of therapy and continuance and persistence.

In 2009, one of the main organizations of addiction care in Netherland experimentally studied the possibility of administering cognitive-behavioral therapy for treating internet addiction on 12 internet addicts. Analyses were carried out qualitatively. Therapists adopted the therapeutic plan normally used for pathological drug and gambling dependencies for internet addicts. Interventions done were mainly based on controlling and reducing of internet use, developing of social communication, gaining a suitable daily structure, effective use of leisure, and reorganizing beliefs. Therapists showed that treatment was successful based on patients' progress and content as well as the improvement of behavior (Van Rooij *et al.*, 2010).

Another study in Australia on the Chinese sample of internet addiction was examined using collective cognitive-behavioral therapy as compared to control group. Test group manifested improvements in emotional moods, and ability to self-organization and self-management as compared to control group (Van Rooij *et al.*, 2010). Reviewing research evidences showed that cognitive-behavioral therapy can be effective for improving

different disorders. Despite the special attention to cognitive-behavioral therapy in psychological therapies, the method has not drawn researchers' attention regarding PVGP. Conducting such study not only enters the therapeutic method into a new area of modifying human behaviors resulted from interaction with technology, but also measures the validity of cognitive-behavioral method. Accordingly, this study investigates the effectiveness of cognitive-behavioral intervention on the reduction of Problematic Video Game Playing (PVGP) in Ahvaz high school students.

## METHODOLOGY

### Participants and Sampling Method

Sample of the study included all public high schools' boy and girl students studying at the first, second, and third grades in Ahvaz. It was impossible to directly select sample among society members. Hence, educational area, high school, and classroom were used in sampling rather than individuals. Random clustering procedure was conducted. Due to the heterogeneity of Ahvaz educational areas, sampling was carried out in all areas. That is four schools (2 boy and 2 girl schools) were randomly selected. And, in each, three classrooms at three educational grades (first, second, and third) between 15 and 18 years of age (mean=16.5 & SD= ) were selected. Then, problematic video games playing test was administered, as arranged ahead.

After scoring PVGPT (pretest), four (2 boy and 2 girl schools) of the first step high schools were randomly selected; two schools (boy and girl) as test group and two (boy and girl) as control group. It must be explained that at least 12 participants were scored higher than 40 in PVGPT. Hence, at high schools - where more than 12 were scored higher than 40 in PVGPT – twelve were randomly selected in test or control group. Then, two schools (12 boy and 12 girls) and two schools (12 boys and 12 girls) were separately selected in groups as sample to conduct therapeutic intervention. The method of administration is explained in the forthcoming.

### Procedure

This study is among the quasi-experimental designs with pretest, posttest, and control group. Before random placement, PVGPT was implemented on both groups. Two test group schools (12 boys and 12 girls) were collectively undergone cognitive-behavioral therapy in separate groups during eight 45min sessions. After the end of treatment sessions, both experiment and control groups filled out PVGPT once again by independent surveyors. In providing therapeutic protocol, Hawton et al (1989) cognitive-behavioral therapy and Karol (1998) manual on drug abuse cognitive-behavioral therapy were applied. The framework of treatment sessions is given in Table 1, in short.

### Data Collection Tools

#### Demographics

Adolescents completed the questions about their age, gender, and grade.

#### Problematic Video Game Playing Test (PVGT)

Problematic Video Game Playing Test (PVGT) by King et al (2011) was provided. It included 20 questions in 5-Likert scale (never, rarely, sometimes, frequently, and always). Participants marked one of the degrees. Examining reliability on two samples showed high consistency ( $\alpha=0.93$  &  $\alpha=0.92$ ). Validity of the test was reported as significant based on mean time spent on playing video games during a week ( $r=0.41$  &  $p<0.01$ ) and total time ( $r=0.05$  &  $p<0.01$ ). There was a good adoptability between PVGPT and addiction components. It indicated that the test has good validity for measuring the problematic aspects of video games playing (King et al, 2011). After being translated, the test was examined in terms of adoptability to various behavioral addiction measures by four MS psychology experts. Reliability coefficients 0.90 indicated acceptable internal consistency of the test. The correlation coefficient of the test with mean time spent on video game playing during the first week ( $r=0.46$  &  $p<0.000$ ) and mean total time spent in the end of the week ( $r=0.42$  &  $p<0.000$ ) as well as total time spent in playing video games ( $r=0.50$  &  $p<0.000$ ) were significant.

**Table 1- Sessions and objectives of PVGP cognitive-behavioral therapy**

Therapy sessions	Objectives of cognitive-behavioral therapy
<b>1-Introducing cognitive-behavioral therapy</b>	receiving history, explaining number of sessions, advantages of attending sessions, determining structure of sessions, providing logic of therapy, introducing cognitive-behavioral model, presenting rules and activities of group and objectives of therapy as well as commitment to them, necessity for doing assignments
<b>2-Familiarity with PVGP</b>	talking about PVGP and excessive video playing, about short and long term physical, mental and social effects of playing video games, group discussion and practice regarding risky and protective factors affecting PVGP and how to use leisure, presenting practical assignments regarding behavioral and social features of PVGP individual
<b>3-Coping tendency to video games</b>	understanding the experience of tendency to play, transmission of the tendency as a short term fleeting natural experience, identifying symptoms and incentives of video games playing tendency, training and practicing control techniques, presenting assignment regarding the provision of a list of incentives via self-revision

<b>4-Promoting motive and commitment to control and withdraw video game</b>	revising and clarifying therapy objectives, accepting and paying attention to officials' ambivalence regarding the withdrawal and control of video game playing, identifying and coping with the thoughts related to video games, presenting assignments on revision of thoughts and record of coping skills
<b>5-Avoidance skills regarding video games and courageousness</b>	evaluating accessibility to video game and required steps to limit them, reviewing strategies for getting disconnected with suppliers of video games, learning and practicing video games avoidance skills, reviewing differences between passive, aggressive, and courageous response via role playing, presenting practical assignments regarding session practices
<b>6-Multi-purpose coping</b>	anticipating risky situations and formulating a coping plan, practical assignments include anticipating crises and reactions and coping with them
<b>7-Problem solving</b>	introducing and revising basic steps for problem solving and practicing on problem-solving skills, practical assignments using reminder note of problem solving
<b>8-End of therapy</b>	revising therapy plan and objectives, summing up different techniques taught, providing feedback on individual's progress, receiving feedback regarding successful and failed aspects of therapy, posttest implementation

## RESULTS

Descriptive results of the study are presented in Table 2.

**Table 2- Mean and standard deviation (SD) of adolescents PVGPT scores in pretest and posttest**

Variable	Step	Statistical index		Mean	SD	Number
		Group	Participants			
PVGPT	Pretest	experiment	Boy	55.67	7.60	12
			Girl	61.42	10.08	12
			Total	58.54	9.21	24
		Control	Boy	60.50	9.93	12
			Girl	56.00	5.86	12
			Total	58.25	8.30	24
	Posttest	experiment	Boy	42.50	13.76	12
			Girl	44.42	17.73	12
			Total	43.46	15.55	24
		Control	Boy	61.42	15.54	12
			Girl	56.50	8.81	12
			Total	58.96	12.60	24

As seen in the table, there is no significant difference between experiment and control groups mean pretest scores. Yet, the difference was significant regarding mean posttest scores. It indicates the reduction of computer-video games dependencies in the test group as compared to the control group.

Before reviewing the main results for compliance with the default of research regarding variables variance equality, Levin test was used. Results are listed in Table 3. Results of examining the default of the study regarding regression slopes homogeneity for video games variable are shown in Table 4.

**Table 3- Default regarding the equality of scores variances of dependency to computer-video games using Levin test**

F coefficient	FD1	FD2	Sig. level
1.690	1	46	0.20

Based on Table 3, the default regarding the equality of variances is approved. On the other hand, there is no significant difference between the variance of computer-video games dependency in groups under study.

**Table 4- Results of examining regression line slopes homogeneity variable in two groups**

variable	modifications source	step: pretest-posttest	
		(interaction) F	Sig. level
PVGPT	group interaction*pretest	3.48	0.065

As seen in Table 4, F value for similar regression line slope for research variable is insignificant. Namely, the homogeneity of regression line slope is approved.

**Table 5- ANCOVA results on mean posttest scores for boy adolescents in PVGPT between test and control groups with pretest control group**

variable	modification source	sum squares	FD	mean squares	F	Sig. level (p)	Eta square
PVGPT	pretest	892.36	1	892.36	4.87	0.039	0.18
	group	1322.15	1	1322.15	7.21	0.014	0.25
	Error	3847.54	21	183.21			

Based on the table, by controlling pretest, significant difference is seen between experiment and control groups ( $F=7.21$  &  $P<0.014$ ). Then, based on mean PVGPT of experiment group (as compared to control group), collective CBT test leads to the reduction of PVGP in the experiment group. The extent of effect or difference is 0.25. That is %25 individual differences in posttest scores of PVGPT are related to the effect of CBT raining (group membership).

**Table 7- ANCOVA results on mean posttest scores for girl adolescents in PVGPT between test and control groups with pretest control group**

variable	modification source	sum squares	FD	mean squares	F	Sig. level (p)	Eta square
PVGPT	pretest	181.79	1	181.79	21.76	0.0001	0.51
	group	2195.62	1	2195.62	18.50	0.0001	0.47
	Error	1866.02	21	100.87			

Based on the table, by controlling pretest, significant difference is seen between experiment and control groups ( $F=18.50$  &  $P<0.0001$ ). Then, based on mean PVGPT of experiment group (as compared to control group), collective CBT test leads to the reduction of PVGP in the experiment group. The extent of effect or difference is 0.47. That is %47 individual differences in posttest scores of PVGPT are related to the effect of CBT raining (group membership).

**Table 6- ANCOVA results on mean posttest scores for boy and girl adolescents in PVGPT between test and control groups with pretest control group**

variable	modification source	sum squares	FD	mean squares	F	Sig. level (p)
PVGPT	Pretest	2894.82	1	2894.82	20.21	0.0001
	group	2985.87	1	2985.87	20.84	0.0001
	gender	52.47	1	52.47	0.366	0.548
	group interaction*gender	22.78	1	22.78	0.159	0.692
	Error	6159.00	43	143.23		

As seen in the table, by controlling pretest, F value is insignificant for group interaction and gender ( $p=0.692$ ). Namely, group CBT training (cognitive-behavioral therapy) has no significant effect in boy and girl adolescents PVGP reduction. Again, gender F is not significant ( $p=0.548$ ). Group F is significant. Respective explanations are presented in Table 5.

## DISCUSSION AND CONCLUSION

Since we may face a serious behavioral problem, lack of research background regarding completely documented clinical interventions on PVGP or video games addiction is not surprising. In the light of neural, mental, and behavioral similarities between internet addiction and traditional addiction problems (Van Rooij et al, 2019), it may be possible to use research results related to these addictions to explain the present study's results.

This study investigated the effectiveness of cognitive-behavioral intervention on the reduction of Problematic Video Game Playing (PVGP) in high school boy and girl students. Statistical analyses indicated that CBT(cognitive-behavioral therapy) was effective in reducing PVGP. This result was in accordance with the previous results of Ozarck et al (2006), Young (2007), Kimberly and Young (2007), and Van Rooij et al (2010). There are few experimental studies for supporting most of therapeutic plans related to excessive playing. Cognitive-behavioral model – as an applied plan for treating video games dependency – is promising (Griffiths and Merdit, 2009). The objective of all treatment plans is to enhance social skills through social activities and substituting the time spent on real life activities for the time spent on computer. Besides, talking about how to resolve individual problems like anxiety and depression must be provided during treatment. Integration of management skills such as setting goals and time so that players can control their behaviors is required.

There are clinics of specialized treatment of addiction across the world (e.g. Netherland, China, Korea, and USA). Yet, the details of treatment plans have been released on scientific backgrounds (Griffiths,2007). Apparently, treatment clinics and experts apply diverse spectrum of therapeutic interventions. Therapy plans are divided into two areas. In one area, perpetual avoidance model is completely presented. And, in another, playing video games is taught again. A group also uses multiple model components (Griffiths and Merdiths, 2009).

Cognitive-behavioral therapy is one of the most effective therapeutic models on modifying individual's behavior and perception of events. Regarding the importance given to behavioral and practical aspects (in terms of homework, notation, self-revision, practice, and brainstorming) during evaluating and treatment, suitable organization existing in it for designing and implementing therapeutic plan has been effective in its development and applied capability in different individuals. It is appropriate for different cultural and social conditions (Hawton, 1989; trans. by Ghasemzadeh, 2008).

According to Tables (5) and (6), it seems there is a difference between the effectiveness of CBT on female and male adolescents such that this was higher for girls than boys. Two reasons are behind this fact. First, the frequency difference for boys in playing video games in comparison with girls was confirmed in studies reported by Griffiths and Hunt (1995), Li et al (2005), Lucas and Sherry (2004). Some researchers believe that this is because of game content, different required skills as well as different feedbacks of them to the computer and the games (Griffiths and Hunt, 1995; Sango et al, 1997; Erfani et al, 2012; Almasi and Haj Mohammadi, 2014), while others attributed this to differences in the cognitive, social conditions and attitudes (Bussey and Bandura, 1999). Different performance between males and females in video games could indirectly have an impact on the effectiveness of CBT in different rehabilitation. Second reason for effectiveness of CBT on female adolescents may be due to this fact that women take more advantages of CBT. However, due to lack of past solid works for this type of treatment associated with PVGP in literature, one can refer to research studied the role of gender on the effectiveness of CBT in the treatment of other disorders (Pitch et al 2012).

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