



# Psychological Effects of FIFA, PES, and Clash of Clans Games on Young Men at Risk of Developing Internet Gaming Disorder

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## Abstract

**Background:** The present study aimed to investigate the psychological effects of FIFA, PES, and Clash of Clans games on young men at risk of developing internet gaming disorder (IGD).

**Methods:** The sample consisted of 150 young men, 50 of whom were in the FIFA and PES group, 50 in the Clash of Clans group, and 50 in the control group. Two groups of young men at risk of developing IGD were compared with a control group. The participants completed the General Health Questionnaire (GHQ), Quality of Relationships Inventory (QRI), Game Addiction Scale, and Behavior Rating Inventory of Executive Function (BRIEF).

**Findings:** The results of the study showed that the scores of mental health problems, conflict with friends, and executive function problems in the Clash of Clans group were significantly higher than those of the FIFA, PES, and control groups. Concerning conflict with parents, the FIFA group had a higher score than the Clash of Clans and control groups. In addition, the results indicated that gaming addiction affects mental health by affecting executive functions.

**Conclusion:** The Clash of Clans game has more negative effects on psychological functions.

**Keywords:** Clash of Clans, FIFA, PES, Internet gaming disorder

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## Introduction

Internet games are the most popular entertainments globally because of their participatory and competitive nature.<sup>1</sup> These are a fun way to reduce stress, communicate with friends, and spend time.<sup>2</sup> Clash of Clans is one of the most famous games among Iranians. Approximately, 7% of the total population of Iran is playing Clash of Clans and 60% of the audience of this game in Iran belongs to students.<sup>3</sup> Clash of Clans is a free online strategy game for smartphones designed by the Finnish company, Supercell. In Clash of Clans, the gamers take the lead of small tribes and go to war with other tribes and plunder them. Utilizing the peripherals of the game requires the payment of diamonds. A limited number of diamonds can be obtained by moving trees and stones in the village, but the easier way is to buy diamonds with real money.<sup>4</sup> It acts as an entertainment done during break time. When players leave the environment of the game, the players' positions remain defenseless against attacks, and the players are forced to constantly take care of their positions. Therefore, this game is addictive.<sup>5</sup> There are different prospects about Clash of Clans online game; for instance, a study showed playing Clash of Clans during

break hours could reduce the employees' stress in the workplace.<sup>5</sup>

PES and FIFA are football game series from Konami and Electronic Arts. Approximately, 6600000 people have played FIFA or PES games in Iran among whom 25% are in favor of FIFA, 49% in favor of PES, and 26% in favor of both games.<sup>3</sup> Young men use sports video games for fun, group affiliation, and team assimilation.<sup>6</sup> Aliyari et al<sup>7</sup> found that FIFA games positively affect the stress system and the perceptual-cognitive system. These changes are visible in cognitive and hormonal tests and brain waves. Amouzadeh et al<sup>8</sup> found that playing FIFA games reduces the symptoms of hyperactivity and attention deficit disorder in students with attention deficit hyperactivity disorder (ADHD).

Increasing the time spent and extensive use can lead to negative consequences such as internet gaming disorder (IGD) and aggression in boys who play action games.<sup>9</sup> IGD is characterized by persistent gaming and dysfunction in various areas of life.<sup>10</sup> According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), if in a period of 12 months, people have 5 or more features of withdrawal,



preoccupation with the game, tolerance, loss of control, loss of non-gaming interests, deceiving others about the game, gaming despite harms, gaming to escape problems or relieve negative mood, interference with daily activities, and conflict with others, they will receive a diagnosis of IGD.<sup>11</sup> According to DSM-5 criteria, one percent of the population has IGD.<sup>12</sup> However, more people may be at risk for IGD since they receive fewer criteria but experience noticeable distress from playing.<sup>13</sup> IGD is a complex disorder developed and maintained by different factors such as demographic (e.g., age, gender), psychological, game-related, and contextual (e.g., social influence processes) factors.<sup>10,11</sup> IGD is determined by cognitive and emotional impairments.

Previous studies have indicated that IGD is related to mental health problems such as anxiety, social phobias, low academic achievement, and insufficient sleep.<sup>2,10,14,15</sup> Some studies have confirmed co-occurrence of IGD and depression<sup>16-18</sup> so that longitudinal studies indicated a bidirectional relationship between IGD and depression symptoms.<sup>19</sup> A study reported that students with IGD were 1.5 times higher than non-IGD participants at risk for depression and loneliness.<sup>20</sup> A recent study revealed that IGD was correlated with depression, social anxiety, and loneliness. Moreover, further analysis on gender differences, showed that male adolescents with IGD reported more social anxiety.<sup>21-23</sup>

Lo et al<sup>23</sup> found that internet games affect the quality of interpersonal relationships as spending more time on internet games may undermine the quality of interpersonal relationships and increase the level of social anxiety. Previous studies have shown that poor quality of interpersonal relationships, such as defective social support and loneliness, may increase a preference for internet social interaction, which menace individuals for IGD.<sup>24-27</sup> Besides, poor communication with family and friends may increase IGD symptoms.<sup>28</sup> It is mentioned that individuals try to cope with their emotional discomforts by playing internet games, but the inordinate play of internet games for a long time may isolate them from actual social communications, hence increasing mental disorders.<sup>19</sup>

Cognitive models have revealed that higher cognitive functions, particularly executive functions, play a crucial role in the development and persistence of internet addiction.<sup>29</sup> Executive functions are non-specific cognitive control processes that enable individuals to respond intelligently and consciously toward goal stimulus.<sup>30</sup> Cognitive control impairments may conduce a limited perception of the situation and inefficient inhibition of internet-related behaviors.<sup>29</sup> Previous studies have found that radical internet users show more deficits in inhibition and working memory,<sup>31</sup> decision-making,<sup>32</sup> shifting,<sup>33</sup> and cognitive flexibility<sup>31,33</sup> than normal internet users. Recently, Moradi et al<sup>34</sup> showed that

difficulty in inhibitory control in individuals with IGD is similar to substance abuse. It has been confirmed that the addiction pattern of individuals with IGD may be related to abnormal brain activity.<sup>29,35,36</sup> It has been suggested that impaired inhibitory control may be related to the weak interconnection between the medial prefrontal cortex and dorsolateral prefrontal cortex observed among individuals with internet addiction.<sup>37</sup> Furthermore, Ye et al<sup>38</sup> collected resting-state fMRI data from individuals with IGD and found that topological neural features of the precentral gyrus significantly predict IGD severity.

According to reviewed studies, psychological factors such as mental health and higher cognitive functions are associated with IGD. It seems that some psychological problems expose people to addiction, and with the excessive use of the Internet, psychological problems are exacerbated. Due to the widespread use of FIFA, PES, and Clash of Clans online games, this study specifically sought to investigate the effects of these three games on the psychological functions of male students. Therefore, this study examined the following hypotheses:

1. There is a difference between FIFA, PES, and Clash of Clans groups and the control group in the level of game addiction.
2. There is a difference between FIFA, PES, and Clash of Clans groups and the control group in mental health.
3. There is a difference between FIFA, PES, and Clash of Clans groups and the control group in executive function.
4. There is a difference between FIFA, PES, and Clash of Clans groups and the control group in quality of relationships.
5. Gaming addiction is related to mental health through executive functions.

## Methods

The present study was conducted using a causal-comparative method. The study population included all male students of Bojnord universities. The male students playing online games, especially FIFA, PES, and Clash of Clans were selected using purposive sampling. The students who spent more than 3 hours a day playing FIFA, PES, and Clash of Clans online games were asked to complete the Game Addiction Scale, and those who scored 14 and higher on the scale were considered as the sample. The students who have not played games and those who scored below 14 on the scale were considered as the control group. Therefore, there were 50 participants in the FIFA and PES group, 50 participants in the Clash of Clans group, and 50 participants in the control group. For ethical reasons, the participants were reassured that their information would be kept confidential and they were asked to complete a research consent form. The minimum age of the participants was 18 years, and the

maximum was 25 with a mean of 21.06 and a standard deviation of 1.52.

### Measures

1. Game Addiction Scale: Lemmens et al<sup>39</sup> developed the Game Addiction Scale to measure computer and video game addiction among adolescents. It measures criteria of IGD such as salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems. This study used the 7-item version. The game addiction items are rated on a 5-point Likert scale (never=0, rarely=1, sometimes=2, often=3, and very often=4). Game Addiction Scale was correlated significantly with time spent on games (0.58), loneliness (0.31), life satisfaction (-0.29), social competence (-0.18), and aggression (0.26). This scale has a good structural fit in confirmatory factor analysis. The reliability of this scale was determined in this study with a Cronbach's alpha of 0.87. The Game Addiction Scale was used in this study to distinguish game addiction.

2. General Health Questionnaire (GHQ): This is a self-report questionnaire, measuring mental health problems. This study used the 12-item version. The questions are answered on a 4-point Likert scale. The high score in this questionnaire indicates mental health problems. High internal consistency and good test-retest reliability have been reported for GHQ.<sup>40</sup> It has good discriminatory power and a significant correlation with independent clinical assessments.<sup>41</sup> The Persian version of the questionnaire has showed appropriate psychometric properties for use in Iran.<sup>42</sup> The GHQ was used in this study to measure the level of mental health.

3. Quality of Relationships Inventory (QRI): Pierce et al<sup>43</sup> designed this questionnaire. It includes 25 items and three subscales of social support, interpersonal conflicts, and depth of relationships. It is scored on a 4-point Likert scale (none = 1, low = 2, medium = 3, and high = 4). In each of the 25 items, the individual should evaluate the quality of his relationships with parents, friends, and spouse. The high scores are an indicator of problems in interpersonal relationships. Inventory designers obtained test-retest reliability with a two-week interval between 0.75 and 0.92. In Iran, the reliability coefficient was reported to be 0.93 for the whole questionnaire.<sup>44</sup> This study used only the interpersonal conflicts subscale since the participants were single.

4. Behavior Rating Inventory of Executive Function (BRIEF): Roth et al<sup>45</sup> developed this questionnaire which is used to measure adults' executive functions in daily activities in normal environments. It includes 75 items that measure inhibition, shift, emotional control, self-monitoring, initiation, working memory, planning/organization, task monitoring, and organization of materials. It is scored on a 3-point Likert scale (never=0, sometimes=1, often=2). The Cronbach's alpha of the

scale was in the range of 0.73 to 0.9, with a global executive composite of 0.96. The test-retest reliability of the scale over 4 weeks was between 0.82 and 0.93 with a global executive composite of 94.4. The inter-rater reliability of the scale was in the range of 0.44 to 0.68 for the entire index and 0.63 for the global executive composite. The internal consistency coefficient was calculated in the range of 0.35 to 0.98. for the subscales. The high scores are an indicator of difficulty in executive functions. Mani et al<sup>46</sup> translated BRIEF-A into Persian for use in Iran and examined its psychometric properties. The Cronbach's alpha of BRIEF-A subscales was in the range of 0.65 to 0.83. This study used inhibition, shift, emotional control, self-monitoring, planning/organization, and task monitoring subscales.

### Results

To test the first to third hypotheses, one-way analysis of variance was used to analyze the data and determine the differences between the three groups in the variables of mental health, quality of interpersonal relationships, and executive functions. Moreover, the correlation test was used to examine the relationships between the studied variables. Then, based on the correlation between the variables, the proposed model was fitted to examine the effects of internet addiction on mental health, the quality of interpersonal relationships, and executive functions.

As Table 1 shows, the scores of gaming addiction differed between the three groups. The results of the Bonferroni test also showed that FIFA, PES, and Clash of Clans groups had significantly higher scores than the control group. Regarding mental health, the results indicated a significant difference between the groups and post hoc test of Bonferroni showed that the scores related to mental health problems in the Clash of Clans group were significantly higher than those of the FIFA, PES, and control groups. There was a significant difference between the groups in the quality of interpersonal relationships. In conflict with friends, the FIFA, PES group had a higher score than the Clash of Clans and control groups, and in conflict with parents, the Clash of Clans group had significantly higher scores than the other two groups. The results also showed that in all subscales of executive functions, there was a significant difference between the groups and the Clash of Clans group had significantly higher scores than the other two groups.

Table 2 shows gaming addiction was significantly correlated with mental health, interpersonal conflicts, and executive functions. Game duration was correlated with all variables but was not related to the mental health and emotional control subscale. Mental health was not significantly correlated with interpersonal conflicts.

Based on the correlation results, the proposed model was such that a direct path was drawn from game addiction to executive functions and mental health, as

**Table 1.** Differences between groups in studied variables

		Mean	SD	ANOVA		Mean Difference		
				F	P	Control (P)	FIFA, PES (P)	
Mental health	FIFA, PES	18.08	5.33	3.89	0.023	1.96 (P>0.21)	-	
	Clash of Clans	19.14	4.61			3.02 (P<0.02)	1.06 (P>0.63)	
	Control	16.12	6.39			-	1.96 (P>0.21)	
Game addiction	FIFA, PES	15.32	3.91	218.66	0.0001	11.48 (P<0.0001)	-	
	Clash of Clans	16.94	3.35			13.10 (P<0.0001)	1.62 (P>0.06)	
	Control	3.84	2.90			-	11.48 (P<0.0001)	
Conflicts	Friends	FIFA, PES	34.54	5.94	15.89	0.0001	8.20 (P<0.0001)	-
		Clash of Clans	28.64	8.92			2.30 (P>0.31)	5.90 (P<0.001)
		Control	26.34	7.34			-	8.20 (P<0.0001)
	Parents	FIFA, PES	32.20	9.19	15.76	0.0001	8.48 (P<0.0001)	-
		Clash of Clans	32.00	9.24			8.28 (P<0.0001)	0.20 (P>0.99)
		Control	23.72	7.27			-	8.48 (P<0.0001)
Inhibition	FIFA, PES	6.38	3.09	12.73	0.0001	1.20 (P>0.17)	-	
	Clash of Clans	8.38	3.94			3.20 (P<0.0001)	2.20 (P<0.009)	
	Control	5.18	2.37			-	1.20 (P>0.17)	
Self-monitoring	FIFA, PES	3.12	2.80	12.57	0.0001	0.08 (P>0.98)	-	
	Clash of Clans	5.30	2.60			2.26 (P<0.0001)	2.18 (P<0.0001)	
	Control	3.04	2.23			-	0.08 (P>0.98)	
Executive function	Planning/organization	FIFA, PES	7.10	3.13	17.48	0.0001	1.34 (P>0.19)	-
		Clash of Clans	10.04	4.20			4.28 (P<0.0001)	2.94 (P<0.001)
		Control	5.76	3.69			-	1.34 (P>0.19)
	Shift	FIFA, PES	4.40	1.88	14.62	0.0001	0.68 (P>0.32)	-
		Clash of Clans	6.08	2.54			2.36 (P<0.0001)	1.68 (P<0.001)
		Control	3.72	2.27			-	0.68 (P>0.32)
Task monitoring	FIFA, PES	4.32	2.33	5.08	0.007	0.08 (P>0.98)	-	
	Clash of Clans	5.60	2.61			1.36 (P<0.02)	1.28 (P<0.03)	
	Control	4.24	2.21			-	0.08 (P>0.98)	
Emotional control	FIFA, PES	7.30	3.08	6.17	0.003	0.70 (P>0.71)	-	
	Clash of Clans	10.14	4.66			2.14 (P<0.04)	2.84 (P<0.004)	
	Control	8.00	4.68			-	0.70 (P>0.71)	

**Table 2.** Correlation between gaming addiction and duration of game with dependent variables

	Mental health	Conflict with parents	Conflict with friends	Inhibition	Self-monitoring	Planning/organization	Shift	Task monitoring	Emotional control	Executive function
Game addiction	0.17*	0.41**	0.26**	0.33**	0.20*	0.47**	0.43**	0.21**	0.21**	0.39**
Duration of game	0.15	0.42**	0.30**	0.32**	0.22**	0.31**	0.21*	0.23**	0.038	0.26**
Mental health	1	0.02	0.03	0.37**	0.36**	0.26**	0.27**	0.24**	0.37**	0.38**

well as from executive function to mental health. Due to the insignificance of the effect of gaming addiction on mental health, it was eliminated and the model was modified as follows (Figure 1).

As Figure 1 shows, gaming addiction affects executive functions and executive functions affect mental health. The indirect effect of gaming addiction on mental health was 0.15. The value of the Sobel test for the mediator variable was 3.62 indicating the significant effect of

executive functions, as the mediator variable, in the relationship between gaming addiction and mental health. Model fit indices were also good ( $\chi^2/DF=0.075$ ,  $P=0.78$ ,  $RMSEA=0.0001$ ,  $CFI=1$ ,  $RFI=0.99$ ,  $NFI=0.99$ ,  $AGFI=0.99$ )

**Discussion**

This study aimed to investigate the psychological effects of FIFA, PES, and Clash of Clans games on male students

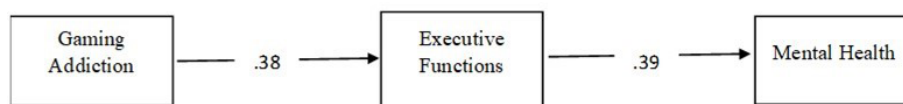


Figure 1. Fitted model for the effect of gaming addiction on executive functions and mental health

at risk for gaming addiction. The results showed that although both groups had higher scores on gaming addiction, the Clash of Clans group had higher scores on gaming addiction. That is, players experienced disability to reduce playing time, failure to leave the game, withdrawal from daily activities, and reduced social interactions in actual relationships.<sup>39</sup>

Clash of Clans players believe that they can skip this game at lower levels. However, at higher levels, they lose the power to cancel the game. In Clash of Clans, players are forced to constantly watch their positions, because leaving the game environment weakens the player's positions and the player is exposed to attack.<sup>5</sup> Gamers of Clash of Clans may experience difficulty in stopping playing as well as preoccupation about gaming at other activities.<sup>47</sup> FIFA and PES gamers play to entertain and imitate the prominent players and teams.<sup>6</sup> These games may be perceived as a self-regulatory activity because players believe that online games distract their minds from their problems.<sup>47</sup> Thus, they achieve sporting success by playing in the virtual world, forgetting their failures, and feel good about themselves. In this way, the desire to continue the game remains stable in a person despite the problems it creates in daily activities.

The results showed that the scores of internet addiction were positively correlated with mental health problems. Consistent with the present study, many studies have confirmed that gaming addiction is associated with mental health problems.<sup>2,10,21,22,14-18</sup> It seems that mental health problems depend strongly on the intensity of the game addiction. People who spend much time playing and have no control over playing time, are also more likely to have problems with job, education, and communication performances.

Furthermore, this study revealed that the scores of mental health problems in the Clash of Clans group were significantly higher than those of the FIFA, PES, and control groups. In line with the present study, Aliyari et al<sup>7</sup> indicated that playing FIFA games has not significantly changed mental fatigue and mental health.

Clash of Clans game strengthens the spirit of destructiveness and creates restlessness and stress in people because one can kill others' soldiers. Besides, gamers should destroy to gain more trophies and points. In addition, they have more stress and anxiety in the higher level of success because they are constantly worried about attacks on their castle and are excited to continue playing and reaching higher levels.

This study showed that gaming addiction was

related to interpersonal conflicts. These results are consistent with the results of the studies indicating poor communication with family and friends was correlated with IGD symptoms.<sup>19,23,28</sup> Internet games affect the quality of interpersonal relationships as spending more time on internet games may undermine the quality of interpersonal relationships.<sup>23</sup> It seems that inordinate play of internet games for a long time may isolate them from actual social communications.<sup>19</sup>

The results of this study revealed that the FIFA, PES group had a higher score than the Clash of Clans and control groups in the variable of conflict with friends while the Clash of Clans group had significantly higher scores than the other two groups in conflict with parents. FIFA and PES players may consider their friends a contestant and try to obviate them. Moreover, as they imitate famous footballers, they consider themselves superior and deal badly with their friends.

If the relationship between the family members is warm, intimate, and without conflict, it creates a calm and appropriate atmosphere for children, but if the family is full of conflict and the members do not respect each other, the family environment becomes a cold and rejecting one. Thus, the children look for a safe environment to escape from these conflicts. Internet games provide an online interactive environment to satisfy the need for communication and social support. Furthermore, by increasing playing time and withdrawing from family members, impairing the functions of daily life, parents warn their children about these injuries and playing time, which increases the conflict between parents and children.<sup>48</sup>

The results showed game addiction was linked to problems of executive functions. This is consistent with the results of the studies indicating that difficulty in inhibitory, shifting, and cognitive flexibility was related to IGD.<sup>31,33,34</sup> In this regard, some studies revealed that IGD was related to abnormal brain activity<sup>29,38,35,36</sup> and the Clash of Clans group had significantly higher scores in problems of executive functions than the FIFA, PES, and control groups.

Given the high score of game addiction in the Clash of Clans group, it can harm the player's social, educational, family, and psychological functioning.<sup>49</sup> When faced with game-related cues, individuals with IGD have a distortion in response inhibition and attentional bias.<sup>50</sup>

Gola<sup>51</sup> showed that addictive behaviors are related to several neural mechanisms such as increased responsiveness to reward signals, decreased impulse

control, and increased sensitivity to anxiety stimuli. The orbital cortex, ventral striatum, and nucleus accumbens play important roles in learning associations between signs and rewards. Furthermore, their activity is associated with learning various promising signs and motivation to win. Deficits of behavioral control may be due to dysfunctions of the dorsolateral prefrontal cortex because it is responsible for controlling the activity of the ventral striatum and amygdala.

In general, this study showed that online gaming addiction affects mental health through a negative impact on executive function. It seems that with increasing severity of gaming addiction, individuals with IGD focus more on game-related cues and ignore other cognitive activities. Due to the activation of brain pleasure centers by game cues, behavioral inhibition to stop the game is also disrupted. Due to more involvement in the game and decreasing self-awareness, individuals with IGD cannot monitor their performance and behavior and have difficulty planning and performing other game activities. Executive function deficits lead to an inappropriate assessment of the environment, others, and self so that compatibility with and adaptation to the environment become complex and with the continuation of this condition, mental health is weakened. Due to the harmful effects of IGD on mental health, it is recommended that people at risk of addiction be identified and game time is managed. Even in the case of highly addictive games such as Clash of Clans, the use of the game should be limited. Moreover, according to previous studies, it is recommended that the time of online games be less than 2 hours a day<sup>52</sup> so as not to interfere with mental health and daily functioning.

Like other studies, this study had some limitations. The first limitation was related to use of self-report tools. Participants may have been biased in answering the questionnaire questions. The second limitation was related to the research method. Although the study examined the effects of internet games, it is impossible to obtain a cause-and-effect relationship by comparing people who play and people who do not. People may not have psychological problems due to IGD, but psychological problems have led people to IGD. The third limitation was related to the sample under study. Because the sample included only male students, caution should be exercised in generalizing the findings. To examine the real effects of games on people, it is recommended that longitudinal studies be conducted to be able to investigate the psychological state of people before and after IGD.

### Conclusion

Nowadays, with the increase in the online gaming time, individuals, especially students, are at risk of developing IGD. In this study, students who played Clash of Clans, FIFA, and PES were compared to control group for

psychological functions. This study indicated that Clash of Clans game had more negative effects on psychological functions. Moreover, this study showed that online gaming addiction affects mental health through a negative impact on executive function. To prevent IGD, it is recommended to manage the time of playing online games.

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### Competing Interests

The author had no conflict of interest.

### Ethical Approval

The research was not an experimental or interventional type, there was no need to obtain an ethical approval code. Despite this, it has been approved in the psychology department of Bojnord University in terms of ethical considerations.

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