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Psychometric Properties of the Persian Translation of Video Gaming Addiction Test (VAT)

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ABSTRACT

Introduction: The aim of the current study is to measure the validity, reliability, and psychometric properties of the Persian translation of the Video Gaming Addiction Test (VAT).

Material and Methods: A total of 280 young men 14 to 20 years old entered the study (17.22 ± 1.8 years old) including excessive gamers and normal subjects. They answered Video Gaming Addiction Test (VAT), Visual Analog Scale (VAS), and Conner-Davidson Resilience Scale (CD-RISC). Translation and Back Translation were made for the VAT. For testing reliability, we used Cronbach's alpha, split-half method, and Guttman's method. Also, convergent and discriminant validity were tested to examine construct validity of the translated version of VAT.

Results: Cronbach's alpha for the total scale was equal to 0.81. Also, after splitting questions in half, 0.71 and 0.69 were calculated for Cronbach's alpha of each half. Six Guttman's lambdas were calculated with 0.75 minimum and 0.82 maximum, all showing a good reliability of the test. Convergent validity was tested by testing the correlation between VAT and VAS. Pearson's correlation with $P < 0.001$ was 0.73, showing a strong relationship between two factors. For testing discriminant validity, correlation of VAT and CD-RISC was tested, showing no correlation between these scales ($r = -0.157$, $P = 0.09$).

Conclusions: The Persian translation of the VAT is valid and reliable and is appropriate for research and clinical use with acceptable properties. Its properties are like those reported in the original non-translated test.

Keywords: Video gaming addiction test (VAT), Reliability, Validity, Psychometric Properties

1 INTRODUCTION

Since 1983 when the first report of Internet gaming addiction problem was published, the proper identification of problems involving this behavior was vexed among clinicians. The properties and components of this disorder were discussed in many research studies (Griffiths M. , 2005) (Griffiths, Kuss, & King, 2012) and after about thirty years, the American Psychiatric Association now , has documented the Internet Gaming Disorder officially as one of behaviors that may be considered by researchers and clinicians . Internet gaming disorder was mentioned in the new version of the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-5)'s appendix for the first time in June 2013 (American Psychiatric Association, 2013). Internet gaming disorder is described as the "Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period", stated by the new DSM-5 framework (American Psychiatric Association, 2013). The diagnostic criteria are withdrawal symptoms, preoccupation with Internet games, tolerance (i.e. increase in devoting time for gaming), ineffective efforts to manage it, lack of appeal in other hobbies, inability to control the behavior, deception of others about spent hours on gaming, using Internet games to improve mood, an important relationship harm, loss of job, career or educational opportunity or other important matters (American Psychiatric Association, 2013).

So far, researchers have developed multiple psychometric instruments, each of which measuring different characteristics of Internet gaming disorder (Charlton & Danforth, 2007) (Kim & Kim, 2010) (King, Delfabbro, & Zajac, 2011) (Salguero & Moran, 2002) (van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2012) (Demetrovics, et al., 2012) (Gentile, 2009) (Choo, et al., 2010) (Lemmens, Valkenburg, & Peter, 2009). Among these instruments, only VAT covers all aspects of this disorder mentioned by DSM-5. (van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2012).

The aim of Video game Addiction Test (VAT), a revised version of the Compulsive Internet Use Scale (CIUS) with 14 items in a Likert-type 5-point scale (0 for never; 1 for seldom; 2 for sometimes; 3 for often; and 4 for very often), is to assess the level of addiction of video game, such that higher scores indicate a higher level of the addiction symptom. In order to test its validity and reliability, Van Rooij used a sample comprising ten Dutch secondary schools. The overall sample response rate was 83%, leading to 4074 completed questionnaires. Adolescents items that did not play games at all were removed from the dataset (n=1024). For scale validation, we excluded the questionnaires having below four completed items on the Video Game Addiction Test (n=156). This made the final dataset including 2894 cases with a total average age of 14.3 (SD=1.0) years. Reliability was tested by Confirmatory Factor Analysis (CFA) and measurement invariance. Participants also filled Compulsive Internet Use Scale (CIUS) (Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009), Game Addiction Scale (GAS) (Lemmens, Valkenburg, & Peter, 2009), Rosenberg's Negative Self-Esteem Scale (Rosenberg,

1965), the UCLA Loneliness Scale (Russell, Peplau, & Ferguson, 1978), the Depressive Mood List (Kandel & Davies, 1982), and the “Revised Social Anxiety Scale for Children” (La Greca & Stone, 1993) used for testing convergent and discriminant validity (van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2012).

Finally, the psychometric characteristics of VAT were shown to be very good, enjoying the benefit of having a strong relationship with the CIUS, a current internet addiction scale; scores were proven to be trustworthy in the diagnosis of internet gaming addiction (van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2012)

2 MATERIAL AND METHODS

2.1 SAMPLE

A total of 300 young men aged 17.22 ± 1.8 (range 14-20) entered the study including normal subjects (from three high schools) and excessive gamers (from two gaming clubs). In order to validate the scale, participants with less than four completed items on each survey were excluded ($n=20$); this resulted in a final dataset with 280 cases. All participants provided written and signed an agreement before participating in the study.

2.2 MEASURES

Persian translated version of Video Gaming Addiction Test (VAT): As discussed before, VAT reliability and validity were tested before (van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2012) and we used a translated version of the questionnaire. Translation and Back Translation were done by two translators. one of them did not know the original English text. The final translation was modified with consensus.

Visual Analog Scale (VAS): The 3-item version of VAS was used to measure the level of dependency to gaming (with its Persian phrasing adjusted), and included these questions:

“How much do you want to play a video game now?”

“How much do you need to play a video game now?”

“How much are you forced to play a video game now?”

Participants answered these questions by determining their tendency by a number from 0 to 10

Persian translated version Conner-Davidson Resilience Scale (CD-RISC): The CD-RISC was created to improve the current values of resilience. it is a self-administered questionnaire, including 25 items evaluated based on a five-point Likert scale ranging from 0-4: 4 for “true nearly all the time”, 3 for “often true”, 2 for “sometimes true”, 1 for “rarely true”, and 0 for “not true at all” exhibiting good psychometric properties (Connor & Davidson, 2003). We used the Persian

version of the questionnaire, whose reliability and validity were tested before by Besharat (Besharat, 2007).

2.3 METHOD

Reliability: Reliability was evaluated with three various methods. Firstly, the internal consistency giving a measure of the stability of the items constituting a scale with the total score of the scale was measured. The internal consistency was verified with Cronbach's alpha coefficients as well as using Guttman's Split-Half method. Split-half is a way of measuring consistency, where a test is divided into two parts and the scores of each half of the test are compared with the other half. Cronbach's alpha was calculated separately for questions 1-7 and 8-14, and the correlation of these two groups was examined.

We also used Guttman's lambda-6 method in order to test the reliability. Guttman (Guttman, 1945) proposed a series of 6 so-called lambda indices to assess a similar lower bound for reliability, and Guttman's λ_3 lowest bound was strictly equivalent to Cronbach's alpha. Instead of estimating the true variance of every item as the average covariance between items, we considered the amount of variance in each item that could be accounted for by the linear regression of all other items (aka, the squared multiple correlations); we got the λ_6 estimate, which might be computed for multi-scale instrument as well.

Validity: We evaluated the construct validity (divergent or discriminant and convergent) by examining correlation of the index subscales scores with the other values used in the survey (VAS for convergent and CD-RISC for discriminant). Converging subscale with the scores of instruments targeting the same construct and diverging from the scores given by instruments or scales evaluating a different one can be expected. We used Pearson's correlation to measure these relationships.

Secondly, a factor analysis was used to determine whether or not the VAT has factor validity. In order to evaluate the questionnaire's factor validity and fitting, we used Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), using SPSS software. To determine that VAT was saturated with how many significant saturation factors, three parameters were inspected:

- 1) Eigenvalues
- 2) Assigned variance ratio of each factor
- 3) Eigenvalues plot (screen test)

3 RESULTS

3.1 RELIABILITY

Calculated Cronbach's alpha for total Items was 0.81 meaning that, totally, instrument has a good internal consistency. Also, the obtained values of Guttman's Split-half were listed in Table 1. The minimum value of halves and total is for the second half with value 0.69, which indicates a good consistency for the questionnaire.

	First Half	Second Half	Total
Cronbach's alpha	0.708	0.687	-
<i>Guttman Split-half coefficient</i>	-	-	0.768

Table 1) Guttman's Split-half calculated values

Guttman's lambda values were listed in Table 2. The minimum value was 0.752 for lambda-1, indicating a good consistency in the instrument.

	λ_1	λ_2	λ_3	λ_4	λ_5	λ_6
Guttman's lambda values	0.752	0.814	0.810	0.768	0.791	0.817

Table 2) Guttman's lambda values

3.2 VALIDITY

Pearson's correlation coefficient was calculated to determine the correlation between Visual Analog Scale and Video Addiction test and between Conner-Davidson Resilience Scale and Video Addiction test. This coefficient with $p < .001$ was 0.726, indicating that there is a significant correlation between VAS and VAT, and VAT has convergent validity.

The correlation between CD-RISC and VAT was tested and no correlation was found between these tests ($r=-0.157$, $P=0.09$). This indicates the discriminant validity of the translated instrument.

Table 3 shows the basic statistical data of VAT's factor analysis. Eigenvalues of 1st, 2nd and 3rd factors are over 1. These factors in summation have 51.17% of total questions variance.

Question	Initial	Factor	Eigenvalue	Variance explained %	Cumulative variance %
1	1	1	4.90	35.05	35.05
2	1	2	1.22	8.73	43.78

3	1	3	1.03	7.38	51.17
4	1	4	0.92	6.65	57.74
5	1	5	0.89	6.38	64.12
6	1	6	0.75	5.35	69.48
7	1	7	0.70	5.05	74.53
8	1	8	0.67	4.78	79.31
9	1	9	0.60	4.30	83.62
10	1	10	0.53	3.81	87.43
11	1	11	0.48	3.49	90.92
12	1	12	0.45	3.23	94.16
13	1	13	0.41	2.98	97.14
14	1	14	0.40	2.85	100

Table 3) VAT factor analysis statistical values

The extracted factors were transferred to the new axis by rotating the varimax to find a clearer analysis. The results of factor loadings of questionnaire's varimax rotation are reported in Table 4.

Question	1st Factor	2nd Factor	3rd Factor
1	0.158	0.364	0.680
2	0.045	-0.120	0.736
3	0.093	0.662	0.332
4	0.170	0.425	0.392
5	0.571	0.325	0.194
6	0.434	0.497	0.299
7	0.442	0.459	0.395
8	0.009	0.726	0.156
9	0.441	0.635	0.088
10	0.593	0.134	-0.178
11	0.387	0.413	0.037
12	0.606	0.285	0.190
13	593.0	206.0	469.0
14	676.0	139.0-	236.0

Table 4) VAT's questions rotated factor matrix

Also, the index of the model in the basis of the chi-square, comparative fit index (CFI), root mean square error approximation (RMSEA), the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) values are depicted in Table 5.

Chi-square	CFI	RMSEA	GFI	AGFI
582.32	0.954	0.043	0.899	0.837

Table 5) Fit indexes of VAT

RMSEA is 0.043, a rate between 0 to 0.05, and CFI, GFI, and AGFI values are near to 1; so, the model has a good fitting.

CONCLUSIONS

The Persian translation of the Video Addiction Test is both reliable and valid and is suitable for clinical and research use in game addiction criteria with the satisfactory properties. The findings of the present study should simplify future epidemiological studies on the occurrence and commonness of game addiction for Persian researchers. But, the limitations characteristics in using self-reporting scales should always be considered.

And according to the VAT questions, the important factors found with factor analysis may be 1st: negative reinforcement, 2nd: time, and 3rd: control.

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