Adaptation of Internet Gaming Disorder Questionnaire to Turkish: Reliability and Validity Study

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SUMMARY

Objective: This study aims to investigate the validity and reliability of the Turkish version of Internet Gaming Disorder Questionnaire.

Method: The Experimental Sample of this study included 1161 students aged between 10 and 18 from four different schools. Language equivalence study of the questionnaire was conducted by two experts one of whose native language was English and fluent in Turkish, and the other, vice versa. Reliability of the questionnaire was evaluated by Test-retest method and Cronbach's alpha internal consistency analysis. Construct validity of the questionnaire was examined by confirmatory factor analysis. SPSS and -MPLUS 6.1- softwares were used for statistical analyses.

Results: Cronbach's alpha coefficient for internal consistency was 0.86. Total score correlations varied between 0.23 and 0.70 ($p<0.01$). Test-retest score averages did not differ for both the total and sub-group scores. Test-retest correlation was calculated as 0.865 ($p<0.01$). Confirmatory factor analyses for construct validity showed that factor loadings of items varied between 0.165 and 0.785. Cut-off score of the questionnaire was determined as 69 after Cluster analyses and ROC analyses.

Conclusion: This study concluded that the validity and reliability of the Turkish version of Internet Gaming Disorder Questionnaire developed by Pontes et al.(2014) were satisfactory.

Keywords: Internet gaming disorder, validity, reliability, questionnaire

INTRODUCTION

When the Turkish Statistical Institute (TÜIK) 2016 data are analyzed, it can be seen that 40.8% of the individuals using the internet stated that they used the internet to play games (TÜIK 2016). When the data published by American Entertainment Software Association were examined, it can be seen that 59% of all American population stated that they played games using any online or offline tool (Entertainment Software Association 2014). According to two systematic reviews published in 2017, the average prevalence of Gaming Disorder (GD) differs between 0.7% and 27.5% in the population sample (Mihara and Higuchi 2017, Fenk et al. 2017). In our country, the data on the prevalence of GD is still very limited.

Internet Gaming Disorder (IGD) is included under the title of "Condition for Further Study" in the third section of DSM-5. DSM 5 defines IGD as continuous and recurrent internet use which causes clinically significant impairment and distress to play games on the internet, frequently with other players (American Psychiatric Association 2013). DSM-5 has included 9 criteria in the areas of preoccupation with games, withdrawal symptoms when not playing internet games, more time needs to be spent playing the games, failed interventions to control participation in games, continued overuse of games even with awareness of psychosocial problems, lying to others about internet game usage, spending more time for games in order to get away from stressed mood, emergence of danger at work, education or an important matter due to participation in games (American Psychiatric Association 2013).

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Both psychosocial and neurobiological harms of (GD) on human health have been reported systematically (Brunborget al. 2014, Henchozet al. 2016, Kussand Griffiths 2012a, Kussand Griffiths 2012b).

From psychosocial point of view, the harmful effects of gaming addiction can be seen in many areas such as work, education, hobby, socializing, spending time with the family, sleep, exercise and sports activities (Henchoz et al. 2016). Other effects can be listed as somatic problems, increased stress level and other psychiatric symptoms, decrease in school success, increase in behavioural problems, decrease in emotional and behavioural functionality and impairment in the quality of life (Brunborg et al. 2014).

There is no consensus about the definition, diagnostic criteria and assessment criteria of IGD. It is stated that tools which assess general internet addiction and IGD without making a differentiation between them will make an incomplete assessment from many aspects and increase conceptual complexity (Király et al. 2014). For players, the game content is more important than the presence of the internet. In addition, it is very important in the process of assessment to differentiate between daily players and those who use games in a way that will influence their lives. Reliability of scales used is also controversial. Problems put forward about the cut-off points of the psychometric tools used have also made the issue more complicated (Király et al. 2014, Király et al. 2015, King at al. 2013).

A great number of tools have been developed to assess GD. A study conducted by King et al. (2013) stated that these tools are not consistent with the diagnostic criteria, assessment fields, cultural adaptation and cut-off points (King et al. 2013). In addition, it was emphasized that a great number of the tools used were used only in a few studies and their validity had still not been shown in different languages and cultures (Király et al. 2015). Although there are two scales assessing GD, the reliability and validity of the Turkish language versions have been shown (Evren et al. 2018, Irmak and Erdoğan 2015), there is no scale assessing GD especially in adolescents, to the best of our knowledge. The aim of this study is to test Turkish validity and reliability of Internet Gaming Disorder Questionnaire (IGDQ) developed by Pontes et al. (2014) in adolescent cases.

MATERIAL AND METHOD

Sample

The sample of the study consists of adolescents between the ages of 10 and 18 who were studying in 5th, 6th, 7th, 8th, 9th, 10th, 11th and 12th grades of four private schools in Istanbul. The inclusion criterion was specified as "having an activity related with a game played online and/or offline on desktop/laptop computer, tablet, smart phone, game console or another kind of device". 1161 students who met the inclusion criteria and who agreed to participate in the study formed the sample of the study. Written and verbal consent were taken from all of the participants.

Data Collection Tools

Sociodemographic Characteristics and Gaming Activity Information Form

This information form was created by the researchers to assess the sociodemographic characteristics (age, gender, form) and internet and video gaming habits (way of accessing the internet, weekly hours of gaming, types of games played).

Internet Gaming Disorder Questionnaire

Internet Gaming Disorder Questionnaire was developed by Pontes et al. (2014) to assess IGD. This questionnaire has been developed according to addiction compounds model (salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse) and includes 9 criteria of IGD in DSM 5. Each element of the addiction compounds model corresponds to a sub-dimension of the scale. Within this context, six compounds of the model form the six sub-dimensions of the scale. The salience sub-dimension includes items 1, 7, 13; mood modification sub-dimension includes items 8, 2, 14; the tolerance sub-dimension includes items 3, 9, 15; the withdrawal symptoms sub-dimension includes items 4, 10, 16, the conflict sub-dimension includes items 5, 11, 17, 19, 20 and the relapse sub-dimension includes items 6, 12, 18. Items 2 and 19 of the scale which consists of 20 items and 6 sub-dimensions include negative expressions and they are scored reversely. The answers to the scale include a 5-Likert type of (1) totally disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, (5) totally agree (Pontes et al. 2014; Griffiths 2005).

Translation of The Scale and Ethical Issues

Before starting the validity and reliability study, permission was taken from the researchers who developed the scale through electronic mail. Language validity was first assessed before starting the study. First of all, the scale was translated into Turkish by the researchers. The first form was created with the reassessment of a linguist, a professional translator and the research team. This form was translated back to English by a different professional translator. The retranslated form was assessed by a researcher whose native language was English in terms of cohesion and suitability. The scale was finalized by the research team in terms of the suggestions. Reassessment was made on the items that were not understood in the pilot study that included 30 individuals answering the finalized form of the scale. Next, in order to assess the suitability of the items, views of 10 people who were experts in the fields of "Pediatric Psychiatry", "English Language", "Turkish Language" and "Assessment and Evaluation" were taken by using Lawshe technique and content validity was ensured. At

Table 1. Methods Used in the Assessment of Data

Analyses Defining the Participants	
Participants' socio-demographic and gaming characteristics	Number, percentage, mean, standard deviation
Reliability Analyses	
Internal consistency of the scale and its sub-dimensions	Cronbach alpha coefficient
Item total score analysis for the scale and its sub-dimensions	Pearson moment correlation analysis
Test-retest and fit analyses of the scale	Paired groups t-test Pearson moment correlation analysis
Validity Analysis	
Language Validity	Pilot Study
Content Validity of the Scale	CVI calculation with Lawshe technique
Construct Validity of the Scale	Confirmatory Factor Analysis
Clustering and ROC Analyses	
Determination of sub-groups	Clustering Analysis
Forming the cut-off scores	Roc Analysis

CVI: Content Validity Index

the beginning of the study, approval was taken from İstanbul University Faculty of Medicine Ethical Board.

Assessment of Data

The data obtained were analyzed statistically by using SPSS 24.0 (Statistical Package of Social Science) program. MPLUS 6.1 program was used for confirmatory factor analysis. In line with the data obtained, K-Modes algorithm and klaR package in R programming were studied for clustering analysis. Table 2 shows the statistical methods used in the assessment of the data (Yurdugül 2006, Akgül 2005, Aksakoğlu 2006).

RESULTS

Sociodemographic Characteristics

Sociodemographic characteristics of the students who participated in the study are shown in Table 2.

Results for Reliability

In the reliability analysis of IGD, Cronbach α reliability coefficient was used to measure internal consistency, item total score correlation was used for item analysis and t test for paired groups and Pearson correlation analysis were used for time-dependent invariance.

Cronbach alpha coefficient of the total IGD Turkish form was found as 0,86. Cronbach alpha coefficients for the sub-dimensions of salience-tolerance, mood modification, withdrawal, conflict and relapse were found as 0.75, 0.61, 0.66, 0.54, 0.56, respectively. Average, standard deviation and item-total score correlation values of IGD are presented in Table 3.

Table 2. Sociodemographic Characteristics

Variable	Min	Max	Mean±SD
Age	10	18	14.19±2.02
Variables		**Number**	**Percentage (%)**
Gender	Female	520	44.8
	Male	641	55.2
Grade	5-6-7-8	532	45.8
	9-10-11-12	629	54.2
Internet Connection at home	Yes	1030	88.7
	No	131	11.3
Weekly hours of gaming	1-7 hours	612	52.7
	8-14 hours	260	22.4
	15-20 hours	150	12.9
	21-30 hours	64	5.5
	31-40 hours	34	2.9
	40 hours and more	41	3.5
Male students	1-7 hours	251	39.2
	8-14 hours	172	26.8
	15-20 hours	112	17.5
	21-30 hours	49	7.6
	31-40 hours	23	3.6
	40 hours and more	34	5.3
Female students	1-7 hours	361	69.4
	8-14 hours	88	16.9
	15-20 hours	38	7.3
	21-30 hours	15	2.9
	31-40 hours	11	2.1
	40 hours and more	7	1.3

Table 3. Mean, Standard Deviation and Item-Total Score Correlations of the Items of IGDT (n:1161)

Items	Mean±SD	Item-Total Score Correlations	
		r	p
Item 1	1.89±1.08	0.532	.001
Item 2	3.12±1.27	0.386	.001
Item 3	1.98±1.15	0.555	.001
Item 4	2.09±1.20	0.577	.001
Item 5	1.76±1.07	0.614	.001
Item 6	1.96±1.14	0.585	.001
Item 7	2.09±1.21	0.653	.001
Item 8	2.39±1.35	0.570	.001
Item 9	1.98±1.12	0.700	.001
Item 10	2.01±1.19	0.698	.001
Item 11	1.68±1.07	0.592	.001
Item 12	2.32±1.37	0.566	.001
Item 13	2.03±1.22	0.642	.001
Item 14	2.71±1.43	0.551	.001
Item 15	1.88±1.18	0.663	.001
Item 16	1.77±1.05	0.653	.001
Item 17	1.79±1.14	0.426	.001
Item 18	1.90±1.13	0.602	.001
Item 19	2.55±1.33	0.232	.001
Item 20	2.27±1.38	0.316	.001

IGDQ: Internet Gaming Disorder Questionnaire

When the item-total score correlations of the 20-item scale were analyzed for reliability study (n = 1161), the correlation coefficients between the items of the scale and scale total score were found to differ between 0.23 and 0.70 and show a statistically positive highly significant association (p<0.0001). Test retest reliability study was conducted on a group of 33 students between the ages of 10 and 18 who had similar characteristics with the sample of the study after a 3-week interval. Statistically significant difference were not found between the total scores obtained from IGDs given after 3-week interval (t:0.692, p:0.494). In addition, a positive, multidimensional and highly significant association was found between the scores obtained (r:0.865, p:0.0001).

Results for Validity

Construct Validity of Internet Gaming Disorder Questionnaire

Confirmatory Factor Analysis (CFA) was conducted to assess the construct validity of IGDQ. Maximum Likelihood was used as prediction method. As a result of the first application of CFA, the scale's factor structure was not confirmed. A correlation coefficient of 1.006 between the first and third factors (it is accepted that this value has to be lower than 1 for differentiation) showed that these factors overlapped. In parallel with the modification suggestions, model fit was found to be confirmed after the first and third factors were combined. CFA conducted for a total of 20 items showed that X^2/sd, RMSEA, CFI, SRMR values were in the desired levels.

This modification caused salience and tolerance sub-dimensions of IGDQ to be combined. Factor loadings of this new combined sub-dimension were found to be between 0.495 and 0.733, while the factor loadings of mood modification sub-dimension were found to be between 0.425 and 0.785, the factor loadings of withdrawal sub-dimension were found to be between 0.555 and 0.743, the factor loadings of conflict sub-dimension were found to be between 0.165 and 0.636 and the factor loadings of relapse sub-dimension were found to be between 0.564 and 0.640. Fit indices of IGDQ were found as p: 0.0001, X^2/sd: 1.3638, RMSEA: 0.045, CFI: 0.923, GFI: 0.934, SRMR: 0.043. According to the CFA results of the scale, correlation coefficient results are as shown with PATH diagram in Figure 1.

Clustering and ROC Analysis

Clustering analysis was studied with klaR package at R program by using K-Modes algorithm. Clustering distribution found for 2,3,4,5 cluster numbers were transferred to Medcalc program, the trials were made and by applying Roc curves to the obtained data, the best cut-off values were found with 5 clusters. The results of these five clusters are shown in Table 4.

ROC Analysis

By looking at the average scores of the 5 sub-groups obtained as a result of clustering analysis, the group that received the highest score was defined as the "group with the disorder".

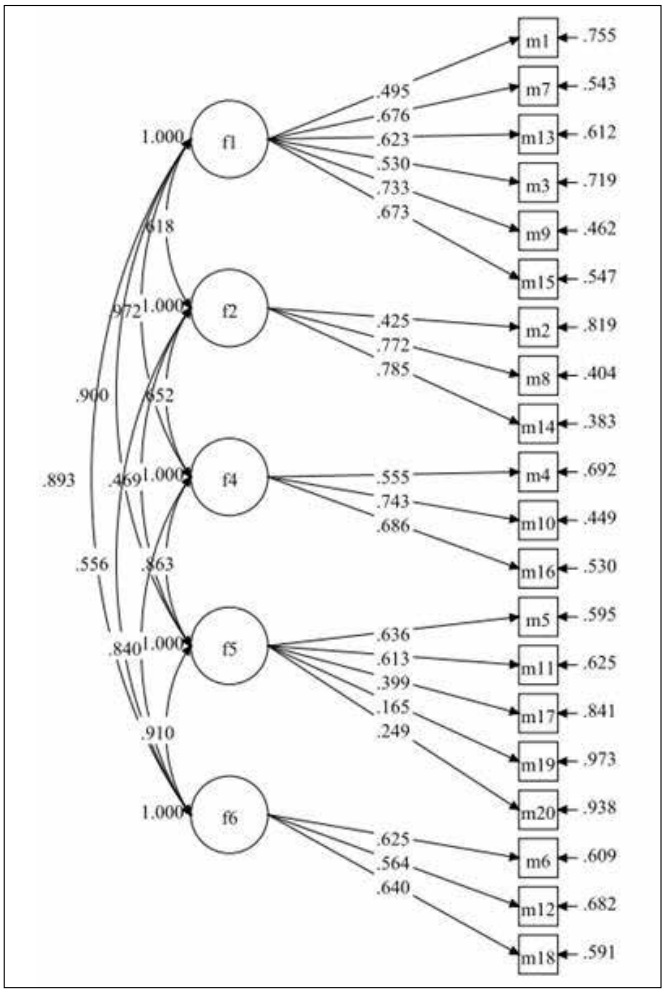

Figure 1. Confirmatory Factor Analysis Path Diagram of the Gaming Disorder Questionnaire

(f1: salience-tolerance sub-dimension, f2: mood modification sub-dimension, f4:withdrawal sub-dimension, f5:conflict sub-dimension, f6:relapse sub-dimension)

Chi-Square = 539.019, dF = 160, p-value = 0.0001, RMSEA = 0.045

Table 4. Clustering Analysis Results (n:1161)

Group	n	Mean score	When 95% confidence interval is taken for mean score	
			Lowest score	Highest score
1	581	33.87	33.22	34.53
2	312	45.84	45.22	46.47
3	113	53.47	51.79	55.15
4	96	58.30	56.75	59.86
5	59	68.43	66.85	70.02
Total	1161	42.75	42.10	43.40

The results of the ROC analysis conducted by considering all the other groups as "groups without disorder" showed that the cut-off point for IGDQ was "60" when sensitivity was taken as 88% and specificity was taken as 94%. Area under the curve (AUC) value was found as 0.963 and this value was found to be statistically significant. ROC Analysis results are shown in Figure 2.

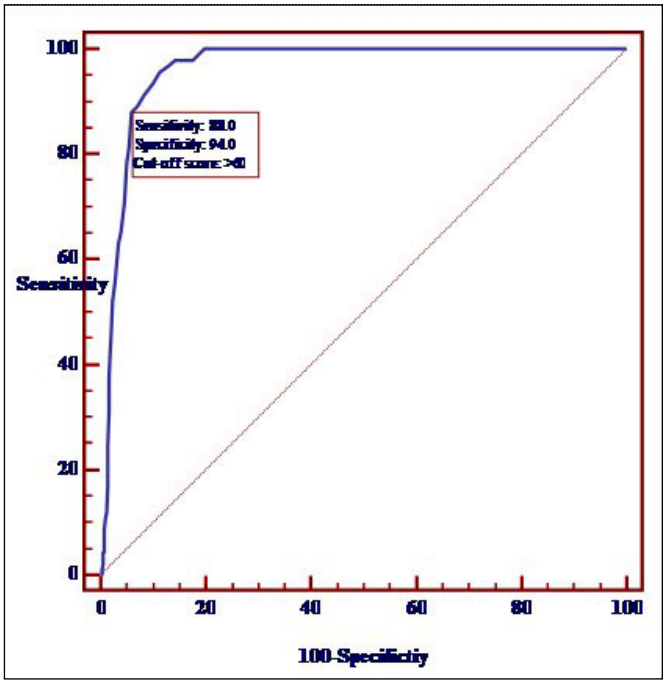

Figure 2. ROC Analysis Results

DISCUSSION

Analysis of the Validity and Reliability of Internet Gaming Disorder Questionnaire

Reliability is the degree of consistence a measurement tool shows in repeated measurements under the same conditions (Yurdugül 2006). Cronbach alpha coefficient is a value that shows internal consistency in Likert type scales. This value shows whether the items are related with the measured subject. It is desired for Cronbach alpha coefficient to be as close to 1 as possible (Tavşancil 2014). Cronbach alpha reliability coefficient of IGDQ developed by Pontes et al. (2014) is 0,88. In the present study, the Cronbach alpha reliability coefficient of the version in Turkish was found as 0,86. Analysis results show that internal consistency of the version inTurkish is sufficient.

The primary purpose of item-total score analysis, which is known as item reliability, is finding out the contributions of each item to the total score of the scale and to find out to what extent they are related with the whole scale (Şencan 2005). In this analysis, the variance of each item in the scale is compared with the scale total score variance and their association is analyzed with Pearson correlation and reliability is accepted to be high as the r value gets closer to 1 (Şencan 2005, Tavşancıl 2014, Akgül 2005). When the 20-item IGDQ item-total score correlations were analyzed for reliability study, it was found that correlation coefficients of IGDQ differed between 0.23 and 0.70 and a statistically significant association was found for all items. According to these results, the scores of all items in IGDQ were found to be highly and statistically correlated with sub-dimension scores and scale total score. In addition, sub-dimensions of the scale were also found to be highly correlated with the scale total score.

Correlation analysis of the fit between test- retest score averages is conducted to analyze the time-dependent consistency feature. It is recommended for this questionnaire to have a period of time between 2 and 6 weeks between the first and the second measurements and the questionnaire to be conducted on a group consisting of at least 30 people who have similar characteristics with the sample group (Şencan 2005, Tavşancıl 2014, Akgül 2005). Statistically significant difference was not found between the total scores obtained from IGDQ conducted on a group of 33 individuals with an interval of 3 weeks in-between. In addition, positive, strong and highly significant association was found between the total scores obtained from IGDQ. The results show that the questionnaire is appropriate in terms of time-dependent consistency.

Validity of Internet Gaming Disorder Questionnaire

Validity is the ability of a measurement tool to measure completely and accurately the characteristics it aims to measure without confusing them with other characteristics (Şencan 2005, Aksayan and Gözüm 2003). Construct validity was used in this study to find out the validity of the scale. Construct validity is used to find out the degree of association between the items measured and the latent variables desired to be measured, and how compatible the association between variables is with the constructed model (Şencan 2005, Aksayan and Gözüm 2003). In the present study, CFA analysis was used to assess construct validity since it is a method that analyzes whether the conceptual structure of the subject researched and the data obtained from the individuals are compatible (Şimşek 2007, Erkorkmaz et al. 2013, Çapık 2014). When the CFA results in our study were analyzed, the fact that covariance matrix them with other characteristics (Şencan 2005, Aksayan and Gözüm 2003). Construct validity was used in this study to find out the validity of the scale. Construct validity is used to find out the degree of association between the items measured and the latent variables desired to be measured were not positive (correlation coefficient being greater than 1), showed that these factors overlapped. This result shows that the data obtained and the existing conceptual structure are not compatible. The structure with six sub-dimensions was not found to be compatible with the data obtained. At this stage, with the modification suggestion of CFA results, salience and tolerance sub-dimensions were combined in one dimension. This new, combined sub-dimension was found to be valid with its factor loadings between 0.495 and 0.733.

When the results of the Latent Profile Analysis (LPA), which was conducted on the original scale, were analyzed in detail, it was found that some sub-dimensions were closely correlated with each other (Pontes et al. 2014). In addition, it was emphasized that the association between the sub-dimensions of salience and tolerance was high with a value of 0,94 in the

original questionnaire (Pontes et al. 2014). We believe that the reason why these two sub-dimensions were not differentiated in our study could be the strong association between these two sub-dimensions in the original questionnaire.

Factor loadings of items 19 and 20 in the conflict sub-dimension were found as 0.165 and 0.249, respectively. It is stated in the literature that acceptable values for the factor loadings of a scale should be higher than 0.30 (Şimşek 2007, Erkorkmaz et al. 2013, Çapık 2014). Hence, in the analyses conducted after excluding these two items from the questionnaire, Cronbach Alpha internal consistency coefficient was found not to change. This result shows that keeping the two items in the questionnaire does not cause a negation in the general structure of the questionnaire (Şimşek 2007, Erkorkmaz et al. 2013, Çapık 2014, Şencan 2005). Considering that the items did not influence the general structure of the questionnaire negatively and in order to protect the 20-item structure of the original questionnaire, it was decided not to exclude these items from the questionnaire.

These results support the construct validity of IGDQ and shows that this questionnaire is a valid tool that can be used in the Turkish population.

Analysis of Clustering Analysis

The primary purpose of clustering analysis is to group units based on the characteristics they have. Clustering analysis researches the number and structure of clusters of heterogeneous data (Kaufman and Rousseuw 2008). In the present study, 5 clusters were obtained by clustering analysis. It was found that the average scores of each cluster differed. When the original questionnaire and its Spanish version were analyzed, it was found that 5 groups were defined as a result of the LPA used (Pontes et al. 2014, Fuster et al. 2016). Latent profiles defined were daily players, regular players, low risk players with high participation and players with disorder. Pontes et al. (2014) identified the cut-off score of the group with disorder as 71 and above, according to LPA results of the questionnaire (Pontes et al. 2014, Fuster et al. 2016). In our study, ROC analysis was conducted on the clusters obtained by clustering analysis and the cut-off score was found as 60, which very low when compared with 71 in the original questionnaire and 75 in the Spanish version. For this reason, considering that the average score of the group that played games the most was 68.43, it was decided that the cut-off score should be 69. It is thought that the players with a score of 69 and above can be defined as players with disorder, while those that got a score of 60 and above can be accepted as being risky.

CONCLUSION

Internet Gaming Disorder Questionnaire is a valid and reliable questionnaire that can be used in the Turkish population. Confirmatory factor analysis results showed that the questionnaire had a good fit with the original questionnaire; however, it was found to have a better fit with the five factor structure. As a result of the clustering analysis, it was decided that the cut-off score from the questionnaire should be 69.

The scales which are filled by the participants using self-assessment technique should be assessed carefully in terms of bias. In addition, the fact that the sample group was chosen from only private schools is a limitation for this study and the results should be examined with samples chosen from state schools.

Our study has contributed to the literature a scale evaluating GD in children and adolescents in the Turkish language in accordance with DSM 5 system.

REFERENCES

Akgül A (2005) Tıbbi Araştırmalarda Istatistiksel Analiz Teknikleri - SPSS Uygulamaları. Ankara, Yükseköğretim Kurulu Matbaası, s.467.

Aksakoğlu G (2006) Sağlıkta Araştırma ve Çözümleme. Izmir, Dokuz Eylül Üniversitesi Rektörlük Basımevi, s.368.

Aksayan S, Gözüm S (2002) Guidelines for crosscultural adaptation of scales I: psychometric properties and cross-cultural comparison. Journal of Research and Development in Nursing 4: 9-14.

Aksayan S, Gözüm S (2003) Guidelines for crosscultural adaptation of scales II: psychometric properties and cross-cultural comparison. Journal of Research and Development in Nursing 5: 1-25.

American Psychiatric Association (2013) DSM-V - Diagnostic and Statistical Manual of Mental Disorders – 5th Ed. American Psychiatric Association, Washington DC.

Brunborg GS, Mentzoni RA,Frøyland LR (2014) Is video gaming, or video game addiction, associated with depression, academic achievement, heavy episodic drinking, or conduct problems? J Behav Addict 3: 27-32.

Çapık C (2014) Use of confirmatory factor analysis in validity and reliability studies. Journal of Anatolia Nursing and Health Sciences 17: 196-205.

Entertainment Software Association (2014) (http://www.theesa.com/wp-content/uploads/2014/10/ESA_EF_2014.pdf downloaded. Date of access 15.06.2018

Erkorkmaz Ü, Etikan I, Demir O et al (2013) Confirmatory factor analysis and fit indices: Review. Turkiye Klinikleri J Med Sci 33: 210-23.

Evren C, Dalbudak E, Topcu M et al (2018) Psychometric validation of the Turkish nine-item Internet Gaming Disorder Scale–Short Form (IGDS9-SF). Psychiatry Res 265: 349-54.

Feng W, Ramo DE, Chan SR et al (2017) Internet gaming disorder: trends in prevalence 1998-2016.Addict Behav 75: 17-24.

Fuster H, Carbonell X, Pontes HM et al (2016) Spanish validation of the internet gaming disorder-20 (IGD-20) test. Comput Human Behav 56: 215-24.

Griffiths M (2005) A 'components' model of addiction within a biopsychosocial framework. J Subst Abuse 10: 191-97.

Henchoz Y, Studer J, Deline S et al (2016) Video gaming disorder and sport and exercise in emerging adulthood: a longitudinal study. Behav Med 42: 105-11.

Irmak AY, Erdoğan S (2015) Validity and reliability of the Turkish version of the digital game addiction scale. Anatolian Journal of Psychiatry 16: 10-18.

Kaufman L, Rousseeuw PJ (2008) Finding groups in data: an introduction to cluster analysis. New York, John Wiley & Sons, Inc. p.335.

King DL, Haagsma MC, Delfabbro PH et al (2013) Toward a consensus definition of pathological video-gaming: a systematic review of psychometric assessment tools. Clin Psychol Rev 33: 331-42.

Király O, Griffiths MD, Urbán R et al (2014) Problematic internet use and

problematic online gaming are not the same: findings from a large nationally representative adolescent sample. Cyberpsychol Behav Soc Netw 17: 749-54.

Király O, Nagygyörgy K, Koronczai B et al (2015) Assessment of problematic internet use and online video gaming, Mental Health in the Digital Age: Grave Dangers, Great Promise, E Aboujaoude, V Starcevic (Ed),North & South America,Oxford University Press, p.46-68.

Kuss DJ, Griffiths MD (2012a) Internet gaming addiction: a systematic review of empirical research. Int J Ment Health Addict 10: 278-96.

KussDJ, Griffiths MD (2012b) Internet and gaming addiction: a systematic literature review of neuroimaging studies. Brain Sciences 2: 347-74.

Mihara S, Higuchi S (2017) Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: a systematic review of the literature. Psychiatry Clin Neurosci 71: 425-44.

Pontes HM, Kiraly O, Demetrovics Z et al (2014) The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: the development of the IGD-20 Test. PLoS One 9: 1-9.

Şencan H (2005). Sosyal ve Davranışsal Ölçümlerde Güvenilirlik ve Geçerlilik, Ankara, Seçkin Yayıncılık, s.867.

Şimşek ÖF (2007) Yapısal Eşitlik Modellemesine Giriş: Temel İlkeler ve LISREL Uygulamaları. Ankara, Ekinoks Eğitim ve Danışmanlık Hizmetleri, s224.

Tavşancıl E (2014) Tutumların Ölçülmesi ve SPSS ile Veri Analizi, 5. Baskı, Ankara, Nobel Yayın Dağıtım, s.230.

Turkish Statistical Instıtute 2016 (http://www.tuik.gov.tr/Start.do) Date of access 15.06.2018.

Yurdugül H (2006) The comparison of reliability coefficients in parallel, tau-equivalent, and congeneric measurements. Ankara University, Journal of Faculty of Educational Sciences 39: 15-37.