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Psychometric validation of the Turkish Ten-Item Internet Gaming Disorder Test (IGDT-10)**ABSTRACT**

Objective: The main aims of the current study were to test the factor structure, reliability and validity of the Ten-Item Internet Gaming Disorder Test (IGDT-10), a standardized measure to assess symptoms and prevalence of Internet gaming disorder (IGD).

Method: In the present study participants were assessed with the IGDT-10, the nine-item Internet Gaming Disorder Scale- Short Form (IGDS9-SF) and the Motives for Online Gaming Questionnaire (MOGQ).

Results: Confirmatory factor analysis showed that the IGDT-10's one-factor structure (i.e., dimensional structure) was satisfactory. The scale was also reliable (i.e., internally consistent with a Cronbach's alpha of 0.79) and showed adequate convergent and criterion-related validity as shown by positive correlations between average daily spent playing games over the past year, IGDS9-SF and MOGQ scores. By applying the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) threshold to diagnose IGD (e.g. endorsing at least five criteria), the incidence of individuals with IGD was found to be 7.4 percent ($n = 56$) in the entire sample.

Conclusion: These results support the Turkish version of the IGDT-10 as a valid and reliable instrument for determining the magnitude of problems associated with IGD among young adults and for early diagnosis of IGD in clinical environments and comparable studies.

Keywords: e-sports; Internet gaming disorder; IGDT-10; scale; university students; video gaming; young adults

INTRODUCTION

Internet gaming is a common legitimate leisure Internet activity, but gaming may become pathological for some players when it becomes dysfunctional, harming the social, occupational, family, school, and psychological functioning of an individual (1). "Pathological gaming" can generally be defined as ongoing, recurrent, and excessive participation with uncontrollable computer or video games despite related problems (2,3). In accordance with this, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) included "Internet Gaming Disorder" (IGD) as a condition requiring further studies before being completely recognized as an distinct disorder in later DSM publications (4,5). According to the DSM-5, IGD is clinically characterized by a "persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress" (5). Although IGD contains the word "Internet," the DSM-5 states that IGD most often involves excessive involvement with particular Internet games, but it may also include involvement with computerized non-Internet games (5). The nine IGD criteria resemble those of gambling disorder and substance use disorder (6). More specifically, the nine IGD criteria are preoccupation with Internet games, withdrawal symptoms, tolerance, ineffective efforts to regulate involvement in Internet games, loss of interest in prior hobbies, ongoing excessive use of Internet games, deceiving family members, using Internet games to escape, and losing an important relationship, job or education, or career chance (5). In order to be diagnosed as IGD, the APA suggests that the gamer must endorse at least five of these nine criteria over a 12-month period (5). Furthermore, the current state of research regarding the clinical relevance of gaming, its health burden and the neurobiological similarities to other addictive disorders warrants inclusion of this condition in ICD-11 as a behavioral addiction (7). Also IGD is classified as a mental disorder in International Classification of Diseases 11th Revision (ICD-11) (8).

In terms of the validity of a diagnostic entity, the establishment of a formal gaming-related diagnosis was discussed among academics over three centuries (9-14). Some of the primary arguments against formalizing the disorder are the absence of agreement on the term used, its operational definition (i.e. criteria), its evaluation, the course of the disorder, and the precise characteristics of the problem behavior (9).

Although there are arguments against the formalization of the disorder (9,12) and the APA has not yet recognized IGD as an official clinical entity (4), following the initial inclusion of this condition by the APA in the DSM-5 several new promising psychometric tools covering the nine IGD criteria were developed (5,6,15-21). A recent mini-review of IGD's psychometric evaluation reported several IGD evaluation tools based on the diagnostic criteria defined by the APA in DSM-5 (5,22); the Internet Gaming Disorder Scale (IGDS) (18), the 20-item Internet Gaming Disorder (IGD-20) Test (19), the nine-item Internet Gaming Disorder Scale–Short-Form (IGDS9-SF; 20), the 10-item Internet Gaming Disorder Test (IGDT-10) (17), the updated Clinical Video game Addiction Test (23) and the Video Game Dependency Scale (24).

Unfortunately, some of these measures may be lengthy, while some (including some short ones) either do not specifically reflect the nine IGD criteria or have adopted the DSM-5 item-word too closely, which may be difficult for gamers to understand and respond (12,17). Thus, Király et al. (17) developed and psychometrically validated a brief tool for assessing IGD using the definitions suggested in the DSM-5, and adopted a simple, clear, and more consistent wording that adequately reflects the concept of IGD. The IGDT-10 (17) is a short screening tool that evaluates IGD as being operationalized in the DSM-5, adopting a concise, clear and consistent wording that adequately reflects the IGD construct. It was theoretically formed through the debate of specialists. In order to retain high content validity, IGD's nine DSM-5 criteria were strictly followed, while also taking into consideration the suggestions of Petry et al. (6) concerning item operationalization. Given the complexity of the final IGD criterion (“Has

jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games”), Király et al. (17) operationalized this criterion via two items to prevent using double-barreled questions (12). It was developed using a large sample of online gamers and based on original analysis showed promising psychometric characteristics (12).

The IGDT-10, which was created to be used in large-scale studies, has been validated in several languages and has outstanding psychometric and concise characteristics to evaluate IGD in time-limited studies. The IGDT-10 was used in both adolescent and adult samples to evaluate the symptoms and incidence of IGD and has a number of benefits over other comparable instruments. First, it was created directly using the nine IGD criteria identified by DSM-5, making it helpful for clinicians to diagnose IGD by the scores acquired by respondents evaluated with this instrument (12). Second, IGDT-10 can be administered quickly because it includes only ten items, possibly assisting clinicians in crowded clinical environments. Petry et al. (6) suggested that “establishing the psychometric properties of instruments assessing these nine (IGD) criteria should begin using a cross-cultural perspective” and, since gaming behavior may vary across cultures, studies examining the psychometric characteristics of IGDT-10 are required in different languages and cultures around the world. This notion is partly supported by studies conducted in different languages; i.e. Chinese (25) Finnish (26), Hungarian, Persian (Iranian), English, French, Norwegian, Czech, and Spanish (Peruvian) (12).

The comparative advantages of the IGDT-10 over the other brief tools, such as IGDS (18) and IGDS9-SF (20) are the clear and user-friendly wording and extensive coverage of all IGD criteria as suggested by DSM-5 (12). Although IGDS (27) and IGDS9-SF (28,29) were validated in Turkish previously, these advantages of the IGDT-10 over the other measures motivated the authors to conduct the present study. The objective of this research is therefore to assess the psychometric characteristics (i.e. internal consistency, unidimensionality, construct validity,

convergence and criteria-related validity) of the Turkish version of the IGDT-10 among both professional and non-professional gamers. Hopefully, by carrying out the present study and achieving the proposed goals, this study will make a unique contribution to advancing the knowledge base on cross-cultural implications in IGD evaluation using the new framework developed by the APA within the DSM-5. Furthermore, the results reported here may be fruitful for clinicians in need of expanded data on the diagnostic efficacy of the frequently used IGD evaluation instrument.

METHOD

Participants and procedure

To test the psychometric characteristics of the Turkish IGDT-10, an online survey was performed using a cross-sectional design. Initially data were collected from people who were in the e-mail database of a company located in Istanbul that organizes e-sports tournaments (ESL Turkey Amateur e-sport players), who were in the e-mail database of a game development company located in Ankara (Taleworlds Entertainment), and Turkish speaking gamers from gaming forums. Moreover, additional data were collected from Turkish university students in Ankara. People who reported that they don't play any games were excluded from the study.

The research protocol was approved by the Cankaya University (Turkey) Ethical Committee and the study was confidential and anonymous. All participants gave informed consent after reading the Plain Language Information Statement. The online survey was created using Qualtrics. Participants sampled from Cankaya University who agreed to engage in the research gained bonus credit, which added to their overall grade for particular courses they were assigned.

A total of 980 potential participants initiated the online survey. In the initial phase of the data collection stage, which spanned from 4 March to 12 April, 370 amateur or professional gamers

initiated the online survey, among whom 323 were included in the study because data from the rest of the participants were systematically missing. Although these respondents gave informed consent, they were excluded from the research because they did not finish the survey completely. None of this group marked the option of “I never play video games”. In the second phase of the data collection stage, which spanned from 16 April to 29 May, 610 university students initiated the online survey, among whom 429 were included in the study because among the rest of university students, 35 did not fully complete the survey and 146 marked the option of “I never play video games”. Thus, a total of 752 participants were included in the study.

The main sociodemographic characteristics of the sample are shown on Table 1. The mean age of the sample was 23.09 years (SD = 5.10; Min.=11, Max.=60). Among these, 519 were male (69.0%) and 233 were female (31.0%). While 566 (76.6%) of the participants were student, 665 (88.4%) were single, 504 (67%) were living with family and 329 (45.8%) had a romantic relationship. Among the participants 43 (5.7%) reported themselves as an amateur e-sport gamer, whereas 13 (1.7%) reported themselves as a professional e-sport gamer. Among the participants 640 (85.1%) reported that they started gaming before the age of 6, 46 (3.7%) reported that they are involved in gaming more than 42 hours per week (h/pw) (More than 6 hours per day [h/pd]), 368 (48.9%) reported that they are gaming more than usual in weekends and 215 (28.6%) reported that they have problems related with gaming (Table 1).

Measures

Gaming time: Categories for weekly gaming time were the following: (1) “less than seven hours weekly (less than one hour a day)”, (2) “7-14 hours weekly (1-2 hours per day)”, (3) “15-28 hours weekly (2-4 hours per day)”, (4) “29-42 hours weekly (4-6 hours per day)”, and (5) “more than 42 hours weekly (more than 6 hours per day)”.

Ten-Item Internet Gaming Disorder Test (IGDT-10): The IGDT-10 evaluates past-year IGD (17), with 10 items comprising the nine diagnostic criteria of IGD based on DSM-5 (5). Respondents reported each statement's frequency (0 = "never ;" 1 = "sometimes ;" 2 = "often"). "Never" and "sometimes" responses were coded as the criterion was not met (0 point), while "often" was evaluated as the criterion was met (1 point) to resemble the dichotomous structure of IGD's DSM-5 criteria. Items 9 and 10 were merged during the scoring because both items referred to the final DSM-5 criterion. The "often" response to either of the two items or both provided one point in the scoring. Hence, IGDT-10's composite rating ranged from 0 to 9. According to DSM-5 (5), a score of five or more points shows clinically relevant cases. This threshold was therefore used to identify the percentage of respondents on the IGDT-10 (the potential risk group) who met the cut-off score.

In this study, two Turkish psychiatrists fluent in English translated the IGDT-10 from English to Turkish. The translated version was agreed by these specialists. In order to establish their comparability, the Turkish version of the IGDT-10 was then translated from Turkish to English by a separate translator. The final translation was presented to 30 students (15 were male and 15 were female) from the Cankaya University to determine whether the language was clear and to ensure the scale's face validity.

Internet Gaming Disorder Scale–Short-Form (IGDS9-SF): The IGDS9-SF evaluates the symptoms and severity of IGD and its detrimental impacts by examining online and/or offline gaming actions that occur over a period of 12 months (20). The scale includes nine items that correspond to the DSM-5's nine main criteria. They are answered on a five-point Likert scale ranging from (1) never to (5) very often and high scores on the scale translate onto higher level of gaming disorder. Turkish version of the IGDS9-SF has been used in this study (28) and Cronbach's α was 0.89

Motives for Online Gaming Questionnaire (MOGQ): Online gaming motives were evaluated by the Motives for Online Gaming Questionnaire (MOGQ), which is a 27-item self-report that measures 7 motives (Social, Escape, Competition, Skill Development, Coping, Fantasy, and Recreation) for online gaming (30). The MOGQ uses a 5-point Likert scale from “never” to “almost always/always” with higher scores indicating higher frequency of the respective motivational dimension. Internal consistencies ranged from 0.79 to 0.90 for all 7 dimensions (30). Coping and escape factors, which are separate factors in original scale are found to be single factor (coping/escape) in Turkish version, thus this version has six factors not seven. Item 18 was deleted from Turkish version because it showed a negative loading. Thus, total number of items was 26. Internal consistencies for the present sample were excellent, ranging from 0.87 (social) to 0.91 (coping/escape and skill development). The estimation of a six factor model produced a good fit ($\chi^2/df = 710.5/251 = 2.83$; GFI = 0.929, CFI = 0.971, TLI = 0.962 and RMSEA = 0.049) (31).

Statistical Analysis

IBM SPSS Statistics Version 20 was used for statistical analyses, other than Confirmatory Factor Analysis, for which IBM SPSS Amos was used. Before the analyses, data cleaning was performed by inspecting cases with serious missing values across the main tools of interest.

The following strategies were used to investigate the psychometric properties of the Turkish IGDT-10: (a) its factorial structure was firstly examined using Exploratory Factor Analysis (EFA) then CFA; (b) convergent and criterion-related validity were determined by estimating Pearson product moment correlation coefficients between the total scores of the IGDT-10, IGDS9-SF, MOGQ and the self-reported average daily time spent playing games during last year; (c) internal consistency was assessed using Cronbach's alpha.

RESULTS

Factor structure

To investigate the MOGQ's factor structure and dimensionality, the data collected were used to conduct an initial EFA followed by CFA.

Bartlett's Sphericity Test and Keiser-Meyer-Olkin (KMO) measurement of sampling adequacy were used to verify the adequacy of the sample size before any further evaluation. The Bartlett's Sphericity Test was significant for the MOGQ ($\chi^2 = 1343.874$, $df=36$, $p < 0.001$), and the sampling adequacy measure of KMO was acceptable at 0.877. Principal Axis Factoring extraction method with Promax (oblique) rotation on the nine items (item 9 and 10 was condensed) of the IGDT-10 was performed to preliminary examine its factorial structure and construct validity. The number of components to be extracted was determined through examination of scree plot (32) in combination with the conventional Kaiser criterion guideline (all factors with eigenvalues greater than one) (33). Furthermore, the acceptable threshold of items with factor loadings above 0.50 and/or parallel loadings below 0.20 was used to retain items (34). Based on these procedures, the EFA resulted in a one-factor solution for the nine items of the IGDT-10 by reaching the criterion of an Eigenvalue greater than one (3.949). Overall, the total variance accounted for by this component was 43.88% (Table 2).

The unidimensionality of the Turkish IGDT-10 was then subsequently assessed via CFA with maximum likelihood. In order to evaluate the quality of the model estimated in the CFA, several fit indices were used and the following thresholds adopted: $\chi^2/df \leq 5$, Goodness of Fit Index (GFI), Tucker-Lewis Fit Index (TLI) and Comparative Fit Index (CFI) > 0.90 , and Root Mean Square Error of Approximation (RMSEA) < 0.05 (35-38). The estimation of a unidimensional model produced a good fit ($\chi^2/df = 43.7/25 = 1.75$; GFI = 0.987, CFI = 0.986, TLI = 0.980 and RMSEA = 0.032). As seen in Table 2 and 3, all item-component loadings were statistically

significant and within the conventional acceptable threshold of > 0.50 . Thus, results from the EFA and the CFA suggest that the IGDT-10 assesses a unidimensional construct.

Convergent and criterion-related validity

Convergent validity was assessed by correlating the IGDT-10 scores with the scores of two related scales (i.e., the IGDS9-SF and MOGQ) and criterion-related validity was evaluated through examination of the correlation between the IGDT-10 scores and self-reported average daily time spent gaming during the last year. The correlation between the IGDT-10 and the IGDS9-SF ($r = 0.710, p < 0.001$) was moderate. The correlation between the IGDT-10 and the MOGQ dimensions (Coping/Escape: $r = 0.491, p < 0.001$; Recreation: $r = 0.301, p < 0.001$; Fantasy: $r = 0.423, p < 0.001$; Skill Development: $r = 0.393, p < 0.001$; Social: $r = 0.459, p < 0.001$; Competition: $r = 0.402, p < 0.001$) were mild and statistically significant. Moreover, this result was also consistent with the association between the IGDT-10 scores and self-reported average daily time spent on gaming during the last year ($r = 0.463, p < 0.001$) (Table 4). Overall, these results demonstrate positive correlations among the variables of interest in the expected direction according to the underlying theory, thus supporting the validity of the Turkish IGDT-10.

Internal Consistency Reliability

In terms of reliability of the Turkish IGDS9-SF, the Cronbach's alpha coefficient was high for both 10 items, 3 response options ($\alpha = 0.85$) and 9 items, 2 response options ($\alpha = 0.79$) (Table 3). Moreover, the Cronbach's alpha did not increase by deleting any of the nine items of the scale. Furthermore, item-total correlations for the IGDT-10 were significant, ranging between 0.358 (item 4 [Lost of control]) and 0.583 (item 6 [Continuation]) (Table 2). Finally, inter-item correlations ranged between 0.123 (between item 1 [Preoccupation/salience] and item 4 [Loss

of control]) and 0.465 (between item 6 [Continuation] and item 9 [Negative consequences]) (Table 3).

Prevalence rates of IGD

Participants endorsing at least five of the nine IGD criteria in this study were operationally defined as possibly meeting a positive IGD diagnosis according to the diagnosis recommendation taken by the APA (4,6). Based on the approach utilized by previous research using the IGDT-10 (12,17,25,26), participants' answers to the IGDT-10 items as (1) "often" were operationalized as endorsement of a criterion. Thus, the rate of potential IGD was about 7.4% (n = 56) for the whole sample. This rate was higher among males (9.6%, n = 50) than females (2.6%, n = 6), and was higher among gamers (13.9%, n = 37) than university students (3.9%, n = 19) (Table 2).

Consistent with these males spent significantly more daily time gaming during the last year than university students ($\chi^2 = 142.872$, $df = 4$, $p < 0.001$) and those involved in e-sports spent significantly more daily time gaming during the last year than university students ($\chi^2 = 125.224$, $df = 4$, $p < 0.001$).

Finally, age at first gaming was negatively correlated with IGD symptom severity ($r = -0.15$, $p < 0.001$) in a Spearman correlation analysis.

DISCUSSION

The main aim of the current study was to evaluate the psychometric properties of the Turkish IGDT-10. According to this aim, the IGDT-10 was tested in a cross-sectional study using an online survey to recruit Turkish university students and amateur or professional online gamers. The results of the present study support the validity and reliability of the IGDT-10.

EFA and CFA found a single-factor solution for the IGDT-10, further supporting the one-dimensional factor structure of the IGDT-10 found in previous studies (12,17,25,26). The

findings of the EFA and CFA produced statistically important and comparatively high factor loadings, further showing that all items were appropriate indicators of the IGD construct and that the scale has appropriate psychometric characteristics in addition to a strong factor structure.

In the original study, the IGDT-10 showed adequate reliability (Cronbach's alpha of 0.68) (17), whereas it was 0.85 for Chinese version (25) and 0.87 for Finnish version (26). Other languages also exhibited adequate internal consistency (12). Cronbach's alphas ranged between 0.77 (French-speaking and English-speaking) to 0.86 (Persian [Iranian]) for 10 items, 3 response options, whereas it ranged between 0.62 (French-speaking) to 0.75 (Persian [Iranian]) for 9 items, 2 response options (12). Consistent with these Cronbach's alphas, the Turkish version obtained similar results regarding the reliability of the IGDT-10 (Cronbach's alpha of 0.85 for 10 items, 3 response options and 0.79 for 9 items, 2 response options). A powerful correlation with the Problematic Online Gaming Questionnaire (POGQ) (15) was found in the original IGDT-10 validation study, a measure evaluating a similar structure, and both tools were mildly linked with weakly gaming time, supporting the construct validity of the IGDT-10 (17). Similarly, in the current research, the anticipated positive correlations occurring between the IGDT-10 and all the associated measures supported criterion-related and convergent validity. The convergent validity of the scale was shown by the positive correlations between the IGDT-10 and the IGDS9-SF and the MOGQ, whereas the criterion-related validity of the scale was stated by the positive correlation with the average daily gaming time spent in the last year. Overall, higher mean results on the IGDT-10 indicate higher average daily time spent on games and higher IGD severity and gaming motivation. The IGDT-10 provided a valid and reliable measure of IGD with good diagnostic accuracy that can be used for research and diagnostic purposes among young adult male and female gamers. Overall, previous validity studies on the IGDT-10 (12,17,25,26) were corroborated by the findings of this research.

The prevalence of IGD among adolescent gamers in Taiwan was 3.1% (25), whereas it was 1.3% among Finnish vocational school students (26). Cross-cultural validation study reported that the proportions of each sample that met the cut-off score on the IGDT-10 varied between 1.61% (Norwegian) and 4.48% (English-speaking) in the individual samples, except for the Spanish (Peruvian) sample (13.44%) (12). Thus, rates of IGD according to the cut-off score on the IGDT-10 ranged between 1.3% to 13.44% in different cultures. In the present study, prevalence of those potentially meeting a positive IGD diagnosis among the whole sample was 7.4% (n=56). When only those involved in e-sports (n=267) were considered, 13.9% (n=37) of the sample was classified as potentially IGD positive, while among the rest of the participants, who considered themselves as a university student playing games, 3.9% were classified as IGD positive (n=19). Similarly, those engaged in e-sports, whether as an amateur or as a professional, had more severe IGD symptoms and spent higher average daily gaming time over the past year than students at university. These results are consistent with our previous study (27,39). Also this rate was higher among males (9.6%, n = 50) than females (2.6%, n = 6). Finally, according to the results reported by previous studies (27,40), men appeared to be more involved in gaming behaviors compared to women as they displayed more severe symptoms of IGD and spent more average daily time on gaming over the past year. Consistent with this, in validation study of Finnish version of IGDT-10, male gender was related with higher IGDT-10 scores (26).

The present study has some limitations. First, using an online survey excludes individuals who have no Internet access. Therefore, these results may not be expanded to respondents who, owing to absence of Internet access, mostly play offline games. Second, for the face validity, the scale was administered only to university students, which do not reflect the all sample. Second, since all respondents were self-selected, it is not possible to generalize the current results directly to the general population. Third, the research may also be limited by the reality

that all information was gathered using self-report questionnaires, a technique that is subject to well-known related biases, such as social desirability biases, short-term recall biases, etc. Fourth, each participant did not have an IGD diagnosis using a gold standard. This research was therefore unable to determine IGDT-10's sensitivity and specificity in the detection of IGD. Future studies could benefit from replicating these results among people clinically diagnosed with IGD as there are presently sparse data on clinical samples.

Despite these possible limitations, the results of the Turkish IGDT-10's validity and reliability testing were observed to be comparable to prior study findings. The results presented support the Turkish version of IGDT-10, which measures a one-dimensional structure as a valid and reliable IGD screening instrument for evaluating the symptoms and incidence of IGD among young adults. These results support the use of the IGDT-10 for making early diagnosis and other relevant studies investigating excessive and addictive play of video games. Hopefully, the current study will facilitate research into gaming addiction among Turkish-speaking communities, thereby extending research into culture-specific variables and, at the same time, facilitating a national and international consensus to define video game addiction using the IGD framework.

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	n	%
Age , years; Mean (SD) Minimum-Maximum	23.09 (5.10)	11-60
Gender (male, n, %)	519	69.0
Romantic relationship	329	45.8
Marital status		
Married	39	5.2
Divorced	8	1.1
Single	665	88.4
Other	40	5.3
Living with...		
Alone	74	9.8
.. partner	39	5.2
.. roommate	84	11.2
.. family	504	67.0
.. in dorm	51	6.8
Employment		
Working	93	12.4
Part-time worker	25	3.3
Unemployed	36	4.8
Student	576	76.6
Other	22	2.9
Type of participant (n, %)		
Professional e-sport gamer*	13	1.7
Amateur e-sport gamer***	43	5.7
Plays games for his/her own pleasure and/or follow e-sports	211	28.1
University student and frequently play games on the Internet	485	64.5
Time daily spend on the gaming^A , hours (n, %)		
Less than 7 h/pw (Less than 1 h/pd)	716	57.3
More than 7 hour, less than 14 h/pw (More than 1 hour, less than 2 h/pd)	285	22.8
More than 15 hour, less than 28 h/pw (More than 2 hour, less than 4 h/pd)	148	11.8
More than 29 hour, less than 42 h/pw (More than 4 hour, less than 6 h/pd)	55	4.4
More than 42 h/pw (More than 6 h/pd)	46	3.7
Gaming more than usual in weekends	368	48.9
Age at first gaming		
Before age of 6	205	27.3
Ages between 7-12	435	57.8
Ages between 13-17	84	11.2
Ages between 18-25	13	1.7
After age of 25	15	2.0
Having problems related with gaming	215	28.6

h/pw: hour per week, h/pd: hour per day, * Regularly receives monthly salary, **Has a team and participates to the tournaments and makes money in the tournament, ^ADuring last year

Table 2. Summary of the results from the EFA on the Ten-Item Internet Gaming Disorder Test (IGDT-10) obtained from the whole sample (n=752)

Item ^a	Criterion endorsement		Factor loadings		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
	n	(%)	Factor 1 ^c			
1. Preoccupation/salience	109	14.5	0.619		0.477	0.764
2. Withdrawal symptoms	48	6.4	0.622		0.486	0.766
3. Tolerance	83	11.0	0.653		0.511	0.760
4. Loss of control	67	8.9	0.478		0.358	0.779
5. Giving up other activities	80	10.6	0.613		0.476	0.764
6. Continuation	141	18.8	0.715		0.583	0.747
7. Deception	61	8.1	0.570		0.444	0.769
8. Escape	191	25.4	0.538		0.410	0.780
9. Negative consequences	113	15.0	0.690		0.558	0.752
	≥5 items		<5 items			
	n	%	n	%	χ²	p
Whole sample	56	7.4	696	92.6		
Age					0.000	0.983
Lowest to 21	21	7.1	262	92.6		
22 to highest	35	7.5	434	92.5		
Gender					11.625	0.001
Female (n=233)	6	2.6	227	97.4		
Male (n=519)	50	9.6	469	90.4		
Groups					24.687	<0.001
Gamers (n=267)	37	13.9	230	86.1		
University students (n=485)	19	3.9	466	96.1		
Eigenvalue			3.949			
Variance %^b			43.88			
Mean±SD			1.19±1.82			
Cronbach's α (10 items, 3 response options)			0.85			
Cronbach's α (9 items, 2 response options)			0.79			

a: Full description of items were omitted from the table for the shake of clarity

b: Percentage of the total variance explained

c: Only one factor was possible to be extracted from the EFA.

Table 3. Summary of CFA results of factor loadings, Cronbach's alpha and inter-item correlations obtained from the nine items of the IGDS9-SF

Item	Factor Loadings	Inter-item correlations							
		2	3	4	5	6	7	8	9
1. Preoccupation/salience	0.569	0.356	0.349	0.123	0.323	0.402	0.251	0.246	0.313
2. Withdrawal symptoms	0.514		0.429	0.205	0.316	0.334	0.221	0.260	0.286
3. Tolerance	0.551			0.203	0.333	0.364	0.253	0.272	0.339
4. Loss of control	0.435				0.210	0.256	0.283	0.214	0.326
5. Giving up other activities	0.542					0.365	0.229	0.235	0.350
6. Continuation	0.678						0.344	0.299	0.465
7. Deception	0.503							0.252	0.366
8. Escape	0.458								0.285
9. Negative consequences	0.645								-

All factor loadings and item-item Pearson correlations were statistically significant ($p < 0.001$)

Table 4. Correlations between IGDT-10 and IGDS9-SF, average gaming time and MOGQ

	IGDT-10*
IGDS9-SF	0.710
Average gaming time**	0.463
MOGQ	
Coping/Escape	0.491
Recreation	0.301
Fantasy	0.423
Skill Development	0.393
Social	0.459
Competition	0.402

*9 items, 2 response options, **Spearman correlation, all the other correlations are Pearson correlations, All the correlations are significant at the level of $p < 0.001$, MOGQ: Motives for Online Gaming Questionnaire IGDT-10: Ten-Item Internet Gaming Disorder Test, IGDS9-SF: Internet Gaming Disorder Scale-Short Form