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Psychometric Characteristics of Turkish Version of Metacognitions about Online Gaming Scale

Çevrimiçi Oyun Oynama Hakkında Üstbilişler Ölçeği'nin Türkçe Versiyonunun Psikometrik Özellikleri

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Abstract

Objective: The purpose of the present study was to assess the psychometric properties of the Turkish version of the Metacognitions about Online Gaming Scale (MOGS-T).
Method: Two studies were carried out with samples of video gamers (n1 = 196, n2 = 150) who filled a set of questionnaires including the demographic information form, MOGS-T, Gaming Addiction Scale, Internet Addiction Test, and Depression Anxiety Stress Scales (DASS).
Results: MOGS-T had good internal consistency and test-retest reliability. The factor structure of the MOGS-T was examined through exploratory factor analysis in the first study. A two-factor solution with positive metacognitions about online gaming and negative metacognitions about online gaming subscales showed the best fit to the data. A second study was performed to verify the factor structure of the scale and examine the predictive ability of MOGS-T factors. Hierarchical regression analyses demonstrated that positive metacognitions about online gaming significantly predicted weekly online gaming hours, negative metacognitions about online gaming significantly predicted Internet addiction, and both metacognitions about online gaming significantly predicted gaming addiction.
Conclusion: MOGS-T has reliable and valid psychometric properties for this population.

Keywords: Metacognition, video games, addiction, psychometrics

Öz

Amaç: Bu çalışmanın amacı Çevrimiçi Oyun Oynama Hakkında Üstbilişler Ölçeği'nin Türkçe versiyonunun (MOGS-T) psikometrik özelliklerini araştırmaktır.
Yöntem: Video oyunu oynayanların katıldığı iki çalışma yapılmıştır (n1 = 196, n2 = 150) ve katılımcılar demografik bilgi formu, MOGS-T, Oyun Bağımlılığı Ölçeği, İnternet Bağımlılığı Ölçeği ve Depresyon Kaygı Stres Ölçeği'ni doldurmuştur.
Bulgular: Çalışmanın bulguları MOGS-T'nin iç tutarlılığının ve test-tekrar test güvenilirliğinin yüksek olduğunu göstermiştir. Birinci çalışmada, MOGS-T'nin faktör yapısı açımlayıcı faktör analizi ile sınanmıştır. Çalışmanın bulguları MOGS-T'nin çevrimiçi oyun oynama hakkında pozitif üstbilişler ve çevrimiçi oyun oynama hakkında negatif üstbilişler olmak üzere iki faktörlü yapıya sahip olduğunu göstermiştir. Ölçeğin faktör yapısını doğrulamak ve yordama geçerliliğini ölçmek üzere ikinci çalışma yapılmıştır. Hiyerarşik regresyon analizleri, çevrimiçi oyunlarla ilgili olumlu üstbilişlerin haftalık çevrimiçi oyun saatlerini, çevrimiçi oyunlarla ilgili olumsuz üstbilişlerin İnternet bağımlılığını ve çevrimiçi oyunla ilgili her iki üstbilişin de oyun bağımlılığını anlamlı olarak yordadığını göstermiştir.
Sonuç: MOGS-T güvenilir ve geçerli psikometrik özelliklere sahip bir ölçektir.

Anahtar kelimeler: Üstbiliş, video oyunları, bağımlılık, psikometri

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Introduction

With the technological improvements of the 21st Century, online gaming has become one of the most preferred leisure activities (1). However, excessive online gaming may have adverse effects on daily living when it turns into an addictive behavior (2). Based on lots of studies and clinical practice over many years, problematic gaming behavior was positioned as 'Internet Gaming Disorder' (IGD) in the "Condition for Further Study" chapter of the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (3). Moreover, 'Gaming Disorder' was included in the 11th revision of the International Classification of Diseases (ICD-11) (4). In recent years, various studies have been conducted to reveal etiological factors such as gender (5), self-esteem (6), attachment styles (7) that are underlined in problematic gaming behavior.

In debates emerging from the literature surrounding the classification of IGD, King and Delfabbro pointed out the lack of research on cognitive factors (8). Although most of the measurements used to assess IGD include the 'preoccupation/cognitive salience' criterion (9), evidence showed a weak relationship between preoccupation and IGD symptoms (10-12). Furthermore, the content of these thoughts about gaming has not been well investigated. However, uncovering the idiosyncratic set of maladaptive beliefs about a particular psychopathology (e.g., distorted body image in anorexia nervosa) is essential to make a differentiation between problematic and nonproblematic behavior (8). Regarding this issue, King and Delfabbro suggested four cognitive factors that are specific to problematic gaming: (1) beliefs about game reward value and tangibility (e.g., "Rewards in video-games are as real to me as anything else in my life."), (2) maladaptive and inflexible rules about gaming behavior (e.g., "When I have a goal or objective in a video-game, I must complete it."), (3) gaming-based self-esteem (e.g., "I would be a failure without my gaming."), and (4) gaming as a method of gaining social acceptance (e.g., "People who do not play video-games do not understand me.") (13). Moreover, it has been found that gaming-related positive and avoidance expectancies are associated with symptom severity of IGD (14).

As well as cognitions, stable knowledge about one's own cognitions (i.e., metacognitions) may be important to understand motivational and self-regulatory aspects of IGD (15). According to Wells and Matthews's Self-Regulatory Executive Function (S-REF) Model, some generic (e.g., "I need to control my thoughts at all times"), positive (e.g., "Worrying helps me to avoid problems in the future"), and negative (e.g., "My worrying is dangerous for me.") metacognitions may lead to activation and maintenance of maladaptive self-regulatory strategies (e.g., rumination, worry, thought suppression) resulting in persistent psychological distress (16). Evidence demonstrated that increased metacognitive beliefs were associated with many psychological disorders including eating disorders, generalized anxiety disorder, major depressive disorder, and obsessive-compulsive disorder (17). Similarly, metacognitions have a significant role as being both precipitating and perpetuating factors of behavioral addictions (18). Researchers have suggested the triphasic metacognitive formulation of addictive behaviors which is compatible with the S-REF model (19, 20). The model proposes that 'negative metacognitive beliefs about extended thinking' and 'positive metacognitive beliefs about engagement' are related to increased craving, negative affect, and dysfunctional coping styles across pre-engagement, engagement, and post engagement phases of any addictive behavior (21). There have been many studies supporting the link between metacognitions and addictive behaviors such as gambling (22,23), smoking (23), and problematic smartphone use (25). Moreover, a mediator role of metacognitions was found in various studies. For instance, two positive metacognitions, which are escapism (e.g., "Using the Internet is a way to forget about the things I must do but really don't want to do.") and controllability (e.g., "During online communication I have more time to think about what I want to say than in face-to-face communication.") about Internet use mediated the relationship between emotional dysregulation and problematic Internet use (26). Similarly, metacognitions fully mediated the relationship between negative emotions and problematic Internet use (27).

Regarding problematic online gaming, Spada and Caselli developed an assessment tool, namely the Metacognitions about Online Gaming Scale (MOGS), to measure metacognitions about online gaming (28).

The authors found that positive metacognitions about online gaming (e.g., "Online gaming reduces my negative feelings."), negative metacognitions about the uncontrollability (e.g., "I have no control over how much time I play."), and the dangers (e.g., "Thoughts about online gaming are becoming an obsession.") of online gaming were positively correlated with weekly online gaming hours and Internet addiction (28). Specifically, positive metacognitions about gaming were suggested to be important in the development of gaming behavior, while negative beliefs about control and consequences of gaming proposed to be crucial in the maintenance of problematic gaming behavior (29). Recently, a study conducted with adolescents supported the importance of metacognitions in predicting IGD among adolescents (30). It was found that positive meta-worry was associated with salience, tolerance, conflict, and relapse, whereas negative meta-worry was associated with withdrawal and conflict.

Taken together, validating specific metacognitive beliefs about gaming behavior in different samples may be essential to confirm common underlying processes involved in this kind of addictive behavior. Although the Turkish adaptation of the Metacognitions Questionnaire-30 has been used in several studies with good psychometric properties (31), an instrument to assess specific metacognitions about online gaming is still needed. The present research aimed to address this concern by adapting the MOGS into Turkish and investigate its reliability and validity in a sample of Turkish gamers. For this reason, two studies were designed. Specifically, it was aimed to explore the factor structure of the MOGS in study 1. In study 2, the purpose was to test the predictive validity of the scale and to confirm its factor structure. It was hypothesized that the Turkish version of the MOGS (MOGS-T) will have good reliability and validity and will show a factor structure similar to the original version.

Study 1: Exploring Factor Structure of the Metacognitions about Online Gaming Scale (MOGS)

Method

Participants

The study was conducted with a total of 196 individuals (79 women, 116 men, and 1 unspecified) who agreed to voluntarily participate in the online study. Inclusion criteria were determined as (1) being 18 years of age or above; (2) giving consent to participate; (3) understanding spoken and written Turkish; and (4) reporting frequent playing online games. Age of the participants ranged from 18 to 40 ($M = 20.49$, $SD = 2.87$). Participants reported mean online gaming of 2.25 hours per day ($SD = 1.11$) and mean online gaming of 3.5 days per week ($SD = 2.00$) during the last 6 months.

Measures

The online survey included a demographic information form, the Metacognitions about Online Gaming Scale (MOGS), and the Game Addiction Scale (GAS).

Demographic Information Form

The participants were asked to indicate their age, gender, and mental health diagnosis history. Also, this form included questions concerning game-player characteristics such as game-playing days/hours per week/days.

The Metacognitions about Online Gaming Scale (MOGS)

The MOGS (28) was developed to measure metacognitions about online gaming. It includes 12-item measuring three subscales: (1) positive metacognitions about online gaming (6 items, $\alpha = .84$), (2) negative metacognitions about the uncontrollability of online gaming (3 items, $\alpha = .86$), and (3) negative metacognitions about the dangers of online gaming (3 items, $\alpha = .79$). Each item (e.g., "Online gaming makes me lose control") is rated on a 4-point Likert type scale ranging from 1 (do not agree) to 4 (agree

very much). Higher scores on the subscales indicate a greater frequency of metacognition about online gaming. The Turkish translation and adaptation of this scale (MOGS-T) were conducted with this study.

Game Addiction Scale (GAS)

Lemmens et al. (32) developed a 21-item GAS to assess online game addiction on 12-18 years old. The scale was adapted into Turkish to measure game addiction and related factors on an adult sample (33). The adapted Turkish form (α = .96) determines 7 criteria measured by 3 items: (1) salience (α = .80), (2) tolerance (α = .86), (3) mood modification (α = .76), (4) relapse (α = .87), (5) withdrawal (α = .93), (6) conflict (α = .84), and (7) problems (α = .78). Each item (e.g., "Have you felt addicted to a game?") is rated on a 5-point Likert type scale ranging from 1 (never) to 5 (very often). Higher scores show a higher level of game addiction. For the present study, a total score of GAS was computed and used for analyses and the internal consistency coefficient was computed as .93.

Procedure

After getting permission from the developers of the scale, the English version of the MOGS was translated into Turkish by two independent researchers who have a doctoral degree in clinical psychology and back-translated into English by an independent translator. Then, two clinical psychologists compared the original and back-translated versions of the MOGS. After this comparison, two specialists discussed the content and the grammar of the edited Turkish version of the scale. Based on the feedback provided by them, required corrections were done and the form was finalized.

Before data collection, the study was approved by the ethics committee of Çankaya University (No: 80281877-050.99, Date: 04.01.2018), Turkey. Before entering the study, an informed consent form was presented to the participants and all of them agreed to voluntarily participate in the study. In the present study, criterion sampling was used to collect data. The participants were asked to participate the present study if they frequently played video games. The administration of the instruments was implemented via an online survey tool. Data were collected through online survey invitations in social media channels (e.g., Facebook, Instagram, YouTube, and WhatsApp).

Results

A principal components analysis with varimax rotation was conducted on the scores of the original 12 items. The score of the Kaiser-Meyer-Olkin Measure of the Sampling Adequacy test was found to be .85 indicating that the items were suitable for factor analysis. According to the results, two components with eigenvalues were found to be over 1.00 and they explained 62.79% of total variance together. The scree plot also revealed a two-factor solution (eigenvalues of 4.71 and 2.83). Items that loaded to both factors and had loadings lower than .40 were planned to be excluded from the analysis. On the other hand, six items loaded on each factor with more than .70 of factor loadings. The adapted version of the scale consisted of 12 items. The factor loadings and communalities of the individual items are shown in Table 1. The internal consistency coefficient was computed for each factor and found to be satisfactory (.89 for factor 1 and .86 for factor 2). Since the original study (28) reported an alternative model with a three-factor solution, the scores of MOGS-T items were fixed to three factors. The three-factor solution explained 70.44% of total variance but the eigenvalue of the third factor was not over 1.00 and the scree plot again revealed a two-factor solution. Moreover, items did not load as in the original study (e.g., item 10 loaded on two factors with .52 and .65 of factor loadings). Therefore, the two-factor solution was assumed better to distinguish the MOGS-T.

Consistent with the original MOGS, items in the first factor reflected positive metacognitions surrounding the benefits of online gaming as cognitive-affective self-regulatory strategy. As in the original study, we named this factor 'positive metacognitions about online gaming' (P-MOG). Moreover, items in the second factor pictured the uncontrollability and dangers of online gaming and online gaming-related thoughts. This

factor took the same term, 'negative metacognitions about online gaming' (N-MOG), as in the original study.

Table 1. Factor loadings for individual items of the MOGS in Study 1 and Study 2 depending on exploratory factor analyses

	Study 1			Study 2		
	F1	F2	Communality	F1	F2	Communality
Factor 1: Positive metacognitions about online gaming						
(1) Online gaming reduces my anxious feelings	.04	**.81**	.65	.04	**.73**	.54
(2) Online gaming distracts my mind from problems	.10	**.74**	.55	.17	**.78**	.64
(3) Online gaming helps me to control my negative thoughts	.02	**.85**	.71	.03	**.78**	.60
(4) Online gaming makes my worries more bearable	.06	**.83**	.70	.16	**.81**	.68
(5) Online gaming reduces my negative feelings	.13	**.82**	.69	.06	**.85**	.72
(6) Online gaming stops me from worrying	.23	**.77**	.65	.21	**.75**	.60
Factor 2: Negative metacognitions about online gaming						
(1) Once I start online gaming I cannot stop	**.72**	.27	.60	**.81**	.12	.66
(2) I have no control over how much time I play	**.77**	.20	.63	**.79**	.10	.63
(3) I continue to play despite I think it would be better to stop	**.81**	.16	.68	**.78**	.12	.62
(4) Online gaming makes me lose control	**.82**	.01	.68	**.80**	.20	.68
(5) Thoughts about online gaming interfere with my functioning	**.70**	-.04	.50	**.76**	.01	.57
(6) Thoughts about online gaming are becoming an obsessio	**.72**	.02	.52	**.66**	.10	.45

Bold values show item loading on factor.

Study 2: Testing the Factor Structure of the Metacognitions about Online Gaming Scale (MOGS)

A second study was performed to verify the factor structure of the scale and examine the predictive ability of MOGS-T factors. In compliance with the original study, weekly gaming hours and Internet addiction were chosen as dependent variables to examine the predictive validity of the MOGS-T factors.

Method

Participants

The study was performed with a total of 150 individuals (43 women and 107 men) who agreed to voluntarily participate in the online study. Inclusion criteria were determined as (1) being 18 years of age or

above; (2) giving consent to participate; (3) understanding spoken and written Turkish; and (4) reporting frequent playing online games. Age of the participants ranged from 18 to 50 (M = 25.11, SD = 5.74). Participants reported mean online gaming of 2.81 hours per day (SD = 1.90) and mean online gaming of 4.71 days per week (SD = 1.85) during the last 6 months.

Measures

The online survey included a demographic information form, the Metacognitions about Online Gaming Scale (MOGS), Depression Stress and Anxiety Scale (DASS21), Young's Internet Addiction Test-Short Form (YIAT-SF), and the Game Addiction Scale (GAS).

Demographic Information Form

This form included the same questions in Study 1.

The Metacognitions about Online Gaming Scale (MOGS)

The MOGS is the self-report scale adapted in Study 1.

Depression Stress and Anxiety Scale (DASS21)

The abbreviated 21-item version of the DASS (34) was developed to assess depression, anxiety, and stress levels and adapted into Turkish by Sarıçam (35). The Turkish version of DASS21 has three sub-scales, namely, depression (α = .87), anxiety (α = .85), and stress (α = .81). Each sub-scale includes 7 items and each item (e.g., "I found it hard to wind down") is scored on a four-point scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Higher scores obtained from each sub-scale indicate higher levels of emotional states of depression, anxiety, and stress. For the present study, Cronbach alpha internal consistency coefficient was found to be α = .73 for the depression subscale, α = .90 for the anxiety sub-scale, and α = .88 for the stress sub-scale.

Young's Internet Addiction Test-Short Form (YIAT-SF)

The short 12-item version of the YIAT-SF (36) was developed to assess the level of Internet addiction and adapted into Turkish by Kutlu, Savcı, Demir, and Aysan (37). The Turkish version of the YIAT-SF (α = .85) is a unidimensional measurement scale. Each item (e.g., "How often do you find that you stay on-line longer than you intended?") is scored on a five-point scale ranging from 1 (never) to 5 (too often). Higher scores obtained from the scale indicate higher levels of Internet addiction. For the present study, the internal consistency coefficient was found to be α = .83.

Game Addiction Scale (GAS)

GAS is the self-report scale used in Study 1. For the present study, the internal consistency coefficient was found to be α = .89.

Procedure

The procedures were identical to Study 1, with the only difference being that Time 2 measurement was taken to assess the test-retest reliability of the scale after 1 month. The MOGS-T and demographic information form were sent to the participants who participated in Study 2.

Results

Confirmatory Factor Analysis

In accordance with the original study, three confirmatory factor analyses (CFA) including a single factor solution, two-factor solution (i.e., positive metacognitions about online gaming and negative metacognitions about online gaming), and a three-factor solution (i.e., positive metacognitions about online gaming, negative metacognitions about uncontrollability of online gaming, and negative metacognitions

about the dangers of online gaming) were conducted to provide the best fit for the factor structure of the MOGS-T using IBM AMOS 24.0 (38). Model chi-square ($\chi 2$) and chi-square/degrees of freedom ratio ($\chi 2$/df-ratio) values and fit indices of Root Mean Square of Error of Approximation (RMSEA), Bentler Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Tucker Lewis index (TLI) were used to interpret the analysis. Briefly, the Chi-square result is expected to be small and non-significant in the perfect fit (Kline, 2005), while a chi-square/df-ratio that is less than 5 can be acceptable (39) if sample size is small. Browne and Cudeck (40) suggested that RMSEA < .05 refers to good fit, and RMSEA < .08 refers to reasonable fit. For CFI, GFI, and TLI, values range from 0 to 1 and .95 shows the perfect fit while .90 is the acceptable fit for those indices (41).

Table 2. Summary of the CFA fit statistics of the MOGS-T for different factor solutions

Factor solutions	$\chi 2$	$\chi 2$/df	p	RMSEA	CFI	GFI	TLI
Single factor	223.219	4.464	.000	.152	.796	.800	.731
Two-factor (P-MOG, N-MOG)	89.225	1.716	.001	.069	.956	.914	.944
Three-factor (P-MOG, NMOG1, NMOG2)	115.375	2.262	.000	.092	.924	.889	.902

P-MOG = Positive Metacognitions about Online Gaming; N-MOG = Negative Metacognitions about Online Gaming; N-MOG1 = Negative Metacognitions about Uncontrollability of Online Gaming; N-MOG2 = Negative Metacognitions about the Dangers of Online Gaming.

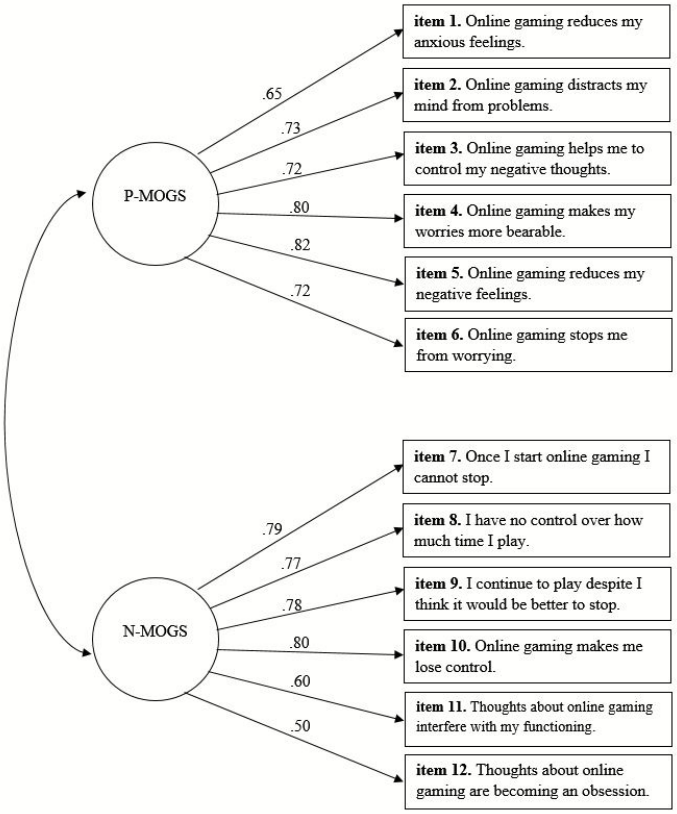

Figure 1. Factor structure of the MOGS-T

First CFA was performed based on the single factor structure of MOGS-T. The findings showed that a single factor solution had poor fit to the data [χ^2/df (223.219/50) = 4.464, p <.001, RMSEA = .152, CFI = .796, GFI = .800, TLI = .731], even when the errors between some items were covaried following the suggestions of modification indices. Second CFA was run based on the suggested three-factor solution in the original study. The findings revealed that the three-factor solution had also poor fit to the data [χ^2/df (115.375/51) = 2.262, p <.001, RMSEA = .092, CFI = .924, GFI = .889, TLI = .902]. On the other hand, after covarying the errors between Items 11 and 12, the CFA with two-factor solution results were

acceptable to have good fit to the data [χ^2/df (89.225/52) = 1.716, p <.01, RMSEA = .069, CFI = .956, GFI = .914, TLI = .944]. The loadings of the items were ranged from .50 to .82 (see Figure 1). The CFA fit statistics of the MOGS-T for different factor solutions are summarized in Table 2.

Reliability

The internal consistency coefficient and the test–retest correlations were used to compute the reliability of the MOGS-T. The Cronbach's alpha coefficients were .88 for positive metacognitions about online gaming and .86 for negative metacognitions about online gaming. The corrected item–total correlations ranged from .61 to .76 for the positive metacognitions about online gaming and from .53 to .73 for the negative metacognitions about online gaming. The test–retest reliability of the MOGS-T was determined using Pearson correlation on a subsample of 25 participants. The test retest reliability coefficients for the positive items and for the negative items were .72 ($p < 0.01$) and .58 ($p < 0.01$), respectively. In addition, paired samples t-tests were run to examine any changes in the factors of MOGS-T over the test–retest period. The result of these tests showed that there was no significant mean difference between these two intervals for the factors. Besides, Pearson correlations between the individual items and the relative factor scores were computed, as suggested in the original study. All correlations between the individual items and their related factor were above .5, except Item 12. The inter-correlation between positive metacognitions about online gaming and negative metacognitions about online gaming was found to be .27.

Predictive and Divergent Validity

After cleaning the data, descriptive statistics and correlations among study variables were computed (see Table 3). The findings showed that both positive metacognitions about online gaming and negative metacognitions about online gaming were positively and significantly correlated with weekly online gaming hours, Internet addiction, and gaming addiction. In addition, negative metacognitions about online gaming were also positively and significantly correlated with depression, anxiety, and stress whereas positive metacognitions about online gaming were not. Moreover, weekly online gaming hours were significantly and positively correlated with gaming addiction and metacognitions (both positive and negative) about online gaming.

Table 3. Descriptive statistics and inter-correlations of study variables

	X	SD	Range	IAT	GAS	DASS-D	DASS-A	DASS-S	P-MOG	N-MOG
WOGH	14.29	12.41	1-63	.02	.22**	.01	.06	.04	.29**	.19*
IAT	26.41	7.64	12-51	-	.67**	.42**	.24**	.45**	.21**	.63**
GAS	50.38	13.54	26-88	-	-	.31**	.21*	.43**	.45**	.75**
DASS-D	5.87	5.43	0-19	-	-	-	.46**	.61**	.04	.32**
DASS-A	2.67	3.10	0-13	-	-	-	-	.54**	.06	.21**
DASS-S	5.65	5.09	0-21	-	-	-	-	-	.10	.43**
P-MOG	14.58	4.73	6-24	-	-	-	-	-	-	.27**
N-MOG	10.21	4.08	6-24	-	-	-	-	-	-	-

N = 150.WOGH = Weekly Online Gaming Hours; IAT = Internet Addiction Test; GAS = Gaming Addiction Scale; DASS—A = Depression Anxiety Stress Scale—Depression; DASS—D = Depression Anxiety Stress Scale—Anxiety; DASS—S = Depression Anxiety Stress Scale—Stress; P-MOG = Positive Metacognitions about Online Gaming; N-MOG = Negative Metacognitions about Online Gaming. $p < .05$*, $p < .01$**

To examine the predictor roles of positive and negative metacognitions about online gaming on weekly online gaming hours, Internet addiction, and gaming addiction when negative affect is controlled, three hierarchical regression analyses (see Table 4) were carried out. Internet addiction, depression, anxiety, and stress were not involved in the first analysis due to their insignificant correlations with weekly online gaming hours. Similarly, the weekly online gaming hours variable was excluded from the second analysis because of its insignificant correlation with Internet addiction.

In the first regression analysis, weekly online gaming hours was the outcome variable. The first step of regression consisted of gaming addiction. Then, positive metacognitions about online gaming and negative metacognitions about online gaming were added into the equation in the second step. The overall regression model predicted approximately 10% variance in weekly online gaming hours (R2 = .10, F [3,

146] = 5.16, p < 0.01). Positive metacognitions about online gaming and negative metacognitions about online gaming accounted for 5% (p < .01) of variance after controlling for 5% (p < .05) of variance explained by gaming addiction; however, only positive metacognitions about online gaming significantly predicted weekly online gaming hours.

Table 4. Hierarchical multiple linear regression statistics with weekly online gaming hours, Internet addiction, and gaming addiction as outcome variables

	WOGH				IAT				GAS		
	β	t	*p*		β	t	*p*		β	t	*p*
Step 1											
GAS	.22	2.71	.01		.58	8.97	.00		-	-	-
DASS-D	-	-	-		.20	2.69	.01		-.07	-.90	.37
DASS-A	-	-	-		-.01	-.18	.86		-.04	-.56	.58
DASS-S	-	-	-		.08	.97	.33		.21	2.61	.01
YIA	-	-	-		-	-	-		.61	9.27	.00
WOGH	-	-	-		-	-	-		.20	3.48	.00
	R^2 = .05				R^2=.51				R^2=.52		
Step 2											
GAS	.04	.30	.76		.46	4.86	.00		-	-	-
P-MOG	.25	2.77	.01		-.07	-1.09	.28		.24	4.74	.00
N-MOG	.09	.74	.46		.22	2.49	.01		.45	7.09	.00
DASS-D	-	-	-		.18	2.50	.01		-.04	-.57	.56
DASS-A	-	-	-		-.01	-.08	.93		-.02	-.42	.68
DASS-S	-	-	-		.05	.61	.54		.10	1.58	.12
WOGH	-	-	-		-	-	-		.06	1.18	.24
YIA	-	-	-		-	-	-		.32	4.98	.00
	R^2 = .10				R^2 = .54				R^2 = .70		

N = 150.WOGH = Weekly Online Gaming Hours; IAT = Internet Addiction Test; GAS = Gaming Addiction Scale; DASS—A = Depression Anxiety Stress Scale—Depression; DASS—D = Depression Anxiety Stress Scale—Anxiety; DASS—S = Depression Anxiety Stress Scale—Stress; P-MOG = Positive Metacognitions about Online Gaming; N-MOG = Negative Metacognitions about Online Gaming.

In the second hierarchical regression analysis, Internet addiction was the outcome variable and gaming addiction, depression, anxiety, and stress were predictors in step 1. Also, positive metacognitions about online gaming and negative metacognitions about online gaming were run as predictors in step 2. Results indicated that the overall regression model explained approximately 54% variance in Internet addiction (R2 = .54, F [6, 143] = 27.54, p < 0.001). Gaming addiction, depression, anxiety, and stress accounted for 51% (p < .001) of variance in Internet addiction. However, gaming addiction and depression were significant predictors while anxiety and stress were not. After controlling all of them, positive metacognitions about online gaming and negative metacognitions about online gaming accounted for 3% (p < .05) of variance in the outcome, although only negative metacognitions about online gaming significantly predicted Internet addiction.

In the last hierarchical regression analysis, gaming addiction was entered as the outcome variable. In the first step, weekly online gaming hours, Internet addiction, depression, anxiety, and stress were entered and then, positive metacognitions about online gaming and negative metacognitions about online gaming were entered. The findings of this analysis showed that the total model explained approximately 70% variance in gaming addiction (R2 = .70, F [7, 142] = 46.82, p < 0.001). All predictors entered in the first step accounted for 52% (p < .001) of variance in gaming addiction. However, weekly online gaming hours, Internet addiction, and stress significantly predicted gaming addiction. Moreover, both positive and negative metacognitions about online gaming were significant predictors and accounted for 18% (p < .001) of variance in gaming addiction after controlling other study variables.

Discussion

In the present study, two studies were conducted to examine the psychometric properties of the MOGS in

Turkish culture. Compatible with the original study (28), the findings of the exploratory factor analysis in Study 1 showed a two-factor solution: positive metacognitions about online gaming and negative metacognitions about online gaming. Although negative metacognitions about online gaming were divided into two groups (i.e., negative metacognitions about the uncontrollability of online gaming and negative metacognitions about the dangers of online gaming) and a third-factor solution was confirmed in the further analysis of the original study (28), the two-factor structure of the MOGS-T was preserved with a confirmatory factor analysis in Study 2. Since our intent was to replicate the original factor structure of the MOGS, we selected to compare three factor structures for the best fit of the data. These three factor models were selected depending on the original research (28). The models were (a) a single-factor model; (b) a 3-factor model consisting of the positive metacognitions about online gaming, negative metacognitions about the uncontrollability of online gaming, and negative metacognitions about the dangers of online gaming; (c) 2-factor model including positive metacognitions about online gaming and negative metacognitions about online gaming. Concerning the EFA and CFA results obtained from the present sample, it was decided that the two-factor model showed the best fit to the data.

The present study revealed that there is no significant relationship between negative affect and weekly online gaming hours. This result supported the view that gaming hours itself does not necessarily mean that all gamers experience stress, anxiety, or depression (42). In addition, gaming addiction significantly predicted weekly online gaming hours, and vice versa, weekly online gaming hours significantly predicted gaming addiction. This result may be interpreted as a sign of a bidirectional relationship between these two variables. Nevertheless, it should be highlighted that time spent on an addictive behavior itself cannot be a reliable criterion due to differences among individuals (43). For both positive metacognitions about online gaming and negative metacognitions about online gaming, positive correlations with weekly online gaming hours were confirmed in the present study. As expected, these correlations were low; however, only positive metacognitions about online gaming significantly predicted weekly online gaming hours. This result is not consistent with the findings of Spada and Caselli's study (28) showing that negative metacognitions about the uncontrollability of online gaming predicted weekly online gaming hours while positive ones did not. For Internet addiction, positive correlations with the factors of the MOGS-T were also noticed. Moreover, hierarchical regression analysis showed that only negative metacognitions about online gaming significantly predicted Internet addiction. However, positive metacognitions about online gaming also significantly predicted Internet addiction in the original study (28). As mentioned before, Marino and Spada (29) suggested that positive metacognitions about online gaming serve as a precipitating factor but negative metacognitions about online gaming serve as a perpetuating factor. Hence, gaming characteristics of our sample may influence the relationships among study variables. To understand differences between the results of various studies, cross-cultural studies exploring detailed characteristics of samples are warranted. Besides, the associations between gaming addiction and metacognitions about online gaming were also examined in our study. Although negative metacognitions about online gaming had a stronger correlation with gaming addiction than positive metacognitions about online gaming did, both metacognitions about online gaming significantly predicted gaming addiction. This result may be crucial to emphasize the role of cognitive processes in understanding problematic gaming behavior.

To the best of our knowledge, there has not been a Turkish measurement tool to assess metacognitions about online gaming. Therefore, we consider that the Turkish version of the MOGS will assist scientific research on metacognitions about online gaming in Turkey. Regarding practical implications, metacognitive therapy was found to be effective in treatment of anxiety and depression (44). Despite growing evidence on Internet gaming disorder in recent years, the clinical validity and utility of this type of problematic behavior remain unknown (45). Therefore, it may be important to examine the metacognitive components of problematic gaming behavior in various cultures for the conceptualization as well as treatment of it. However, the present study has some limitations about the characteristic of the sample and methodology. Firstly, the sample size was limited since the participants (i.e., gamers) came from a specific population. In addition, no analysis was run to determine the degree of gaming addiction of the participants. The findings of this study relied on self-report measures in a cross-sectional design. To make

causal interpretations, longitudinal and experimental designs are needed in further studies. Lastly, we did not ask participants of Study 2 if they had already participated in Study 1 and so, this may have caused a multiple testing problem.

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Addendum. Turkish Version of Metacognitions about Online Gaming Scale

Çevrimiçi Oyun Oynama Hakkında Üstbilişler Ölçeği

Bu ölçek, kişilerin çevrimiçi (online) oyun oynama aktiviteleri hakkında sahip oldukları inançlar ile ilgilenmektedir. Aşağıdaki listede kişiler tarafından dile getirilen birçok inanç listelenmiştir. Lütfen aşağıdaki her bir maddeyi okuyunuz ve okuduğunuz maddeye genel olarak ne kadar katıldığınızı uygun sayıyı yuvarlak içine alarak belirtiniz. Lütfen bütün maddeleri değerlendiriniz. Yanlış ya da doğru cevap yoktur.

	Katılmıyorum	Çok az katılıyorum	Biraz katılıyorum	Tamamen katılıyorum
1. Çevrimiçi oyun oynamak, kaygı hislerimi azaltır.	1	2	3	4
2. Çevrimiçi oyun oynamak, zihnimi problemlerden uzaklaştırır.	1	2	3	4
3. Çevrimiçi oyun oynamak, olumsuz düşüncelerimi kontrol etmemde bana yardımcı olur.	1	2	3	4
4. Çevrimiçi oyun oynamak, endişelerimi daha katlanılabilir hale getirir.	1	2	3	4
5. Çevrimiçi oyun oynamak, olumsuz hislerimi azaltır.	1	2	3	4
6. Çevrimiçi oyun oynamak, endişe etmemi durdurur.	1	2	3	4
7. Çevrimiçi oyun oynamaya bir kez başladım mı duramam.	1	2	3	4
8. Ne kadar süre oyun oynadığımı kontrol edemem.	1	2	3	4
9. Durmamın daha iyi olacağını düşünmeme rağmen oyun oynamaya devam ederim.	1	2	3	4
10. Çevrimiçi oyun oynamak, bana kontrolümü kaybettirir.	1	2	3	4
11. Çevrimiçi oyun oynamayla ilgili düşünceler işlevselliğimi bozar.	1	2	3	4
12. Çevrimiçi oyun oynamayla ilgili düşüncelerim bir takıntı haline gelir.	1	2	3	4

Ölçeğin Puanlanması

Katılmıyorum 1, Çok az katılıyorum 2, Biraz katılıyorum 3, ve Tamamen katılıyorum 4 puan alır. Tüm maddeler aynı şekilde puanlanır ve toplanır. Tersine madde yoktur. Ölçek iki boyutludur. Puanların yükselmesi çevrimiçi oyun oynama hakkında üstbilişlerin artması olarak yorumlanır.

Çevrimiçi oyun oynama hakkında pozitif üstbilişler: 1-6 arasındaki maddelerin toplamı

Çevrimiçi oyun oynama hakkında negatif üstbilişler: 7-12 arasındaki maddelerin toplamı