

## Adaptation Study of the Turkish Version of the Gambling-Related Cognitions Scale (GRCS-T)

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**Abstract** This study aimed to adapt and to test the validity and the reliability of the Turkish version of the Gambling-Related Cognitions Scale (GRCS-T) that was developed by Raylu and Oei (*Addiction* 99(6):757–769, 2004a). The significance of erroneous cognitions in the development and the maintenance of gambling problems, the importance of promoting gambling research in different cultures, and the limited information about the gambling individuals in Turkey due to limited gambling research interest inspired the present study. The sample consisted of 354 voluntary male participants who were above age 17 and betting on sports and horse races selected through convenience sampling in betting terminals. The results of the confirmatory factor analysis following the original scale's five factor structure indicated a good fit for the data. The analyses were carried out with 21 items due to relatively inadequate psychometric properties of two GRCS-T items. Correlational analyses and group comparison tests supported the concurrent and the criterion validity of the GRCS-T. Cronbach's alpha coefficient for the whole scale was 0.84 whereas the coefficients ranged between 0.52 and 0.78 for the subscales of GRCS-T. The findings suggesting that GRCS-T is a valid and reliable instrument to identify gambling cognitions in Turkish samples are discussed considering the possible influence of the sample make-up and cultural texture within the limitations of the present study and in the light of the relevant literature.

**Keywords** Turkish · Gambling · Cognitions · Validity · Reliability

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## Introduction

Persistent gambling of some individuals in spite of the harm for both themselves (Namrata and Oei 2009; Petry and Mallya 2004) and others related to them (Wiebe et al. 2003a) has led the development of a cognitive approach to understand the errors in thinking associated with problem gambling in line with Beck's (1976) general cognitive conceptualization of psychopathology. A gambler may erroneously believe in the luck of a red color to increase his/her probability of winning or may expect a prospective win in vain as a consequence of prior serial or near misses. Faith of the gamblers in themselves to influence the outcome of the gamble or their belief that they can predict gamble's outcome are defined as general categories of gambling-related erroneous cognitions (Raylu and Oei 2002). Research findings showing the association of those gambling cognitions with problem gambling (e.g., Mitrovic and Brown 2009; Myrseth et al. 2010) in addition to the promising results indicating effectiveness of the cognitive interventions for problem gambling (e.g., Petry et al. 2007; Sylvain et al. 1997) encourage related ongoing studies.

Although there are findings that do not support the association between erroneous gambling cognitions and gambling problems (Cloutier et al. 2006; Coups et al. 1998), research results suggesting an association between them are various and robust. For instance, studies reporting that erroneous gambling cognitions are more common among pathological or problem gamblers as compared to non-problem gamblers and in connection those cognitions are correlated with problem gambling are plenty (e.g., Delfabbro et al. 2009; Jefferson and Nicki 2003; Joukhador et al. 2003; Moodie 2008) in addition to research findings indicating that gambling expenditure is associated with irrational gambling cognitions (e.g., Delfabbro and Winefield 2000; Miller and Currie 2008). Johansson et al. (2009) recently concluded that erroneous perceptions such as superstitious beliefs or probability computation errors and illusion of control suggesting inappropriate confidence in personal success while gambling were well established risk factors for pathological gambling according to the results of their review. Thus, the view suggesting that gambling cognitions may be important in the development and maintenance of problem gambling (Raylu and Oei 2002) has been empirically supported by various research findings from a cognitive perspective.

Understanding problem-maintaining input of the gambling-related cognitions is required to target and correct those erroneous cognitions in planning preventive programs and tailoring treatment content dependently since those cognitions are important ingredients of problem gambling. However, consensus is lacking in the literature about how to measure gambling-related cognitions and moreover the source of the data is restricted to Western research. Lack of relevant instruments is argued as the possible reason of the delay in determining gambling cognitions up today (MacKillop et al. 2006; Raylu and Oei 2004a). Various instruments that have been developed to assess gambling-related cognitions (e.g., Gambling Attitudes and Beliefs Scale, Breen and Zuckerman 1999; Gambling Belief Questionnaire, Joukhador et al. 2003) do not share much in common. The constructs of the scales, the content of the items, the labeling of the instruments and their subscales, or the sample features of their validation studies show great variations. This leads to a difficulty in comparing related research findings and achieving more comprehensive cognitive models to understand possible etiological pathways of problem gambling. Moreover it is also important to point out that research of gambling individuals from different cultures is stated as a necessity since most of the gambling literature is in general from Western samples (Raylu and Oei 2004b). Thus, lack of gambling cognitions research from non-Western samples is another limitation of the field. This is why validation of the

existing gambling cognitions scales in non-Western societies is proposed as a requirement (Wonq and Tsanq 2012).

Concerns mentioned above necessitate the conduction of both gambling-related research generally and gambling-related cognitions research specifically also in Turkey, a predominantly muslim developing country. Turkish gambling-related research did not contribute much to gambling literature up today. The lack of interest in research of gambling individuals in Turkish society is striking when the indicated increase in gambling research over the last years (Johansson et al. 2009) and the stated necessity of research in non-Western samples (Raylu and Oei 2004b) are considered together. This apathetic stance of the Turkish researchers may be due to lack of reliable and valid measurement instruments developed or adapted culturally and scientifically relevant to Turkish gamblers or due to the less salient gambling-related problems encountered in Turkey. A recent report based on a study with a nationally representative sample of 1536 participants that was published by Government Inspection Board (2009) which is a foundation of Turkish Presidency of Republic, gave some important indications of problem gambling rate in Turkey which seems to be comparable with societies where relevant gambling studies are broadly conducted. For instance, approximately 3 and 10 % of the sample respectively reported that they ‘gamble till they loose all their money in a given day’ and ‘chase their monetary losses’. Overall, there seems no reason not to conduct gambling-related studies in the Turkish samples except for the lack of available and appropriate gambling-related measurement instruments.

Taking into consideration the significance of cognitions in the development and maintenance of problem gambling, the necessity of gambling research in different cultures, and the lack of interest in Turkish gambling individuals which may be due to the lack of relevant measurement instruments, this study aimed to investigate the psychometric properties of the Turkish version of the Gambling Related Cognitions Scale (GRCS-T) developed by Raylu and Oei (2004a). The scale was indicated to be useful to specify the gambling cognitions of non-clinical gamblers (Raylu and Oei 2004a). GRCS is composed of five factors. Two factors that are stated to be inspired from substance abuse literature by Raylu and Oei (2004a) assess ‘perceived inability to stop gambling’ cognitions (GRCS-IS) that consist of incapability items of controlling gambling behavior (e.g., ‘I’m not strong enough to stop gambling.’) and ‘gambling expectancy’ cognitions (GRCS-GE) that consist of items suggesting hopes attributed to gambling (e.g., ‘gambling makes the future brighter.’). In addition; ‘interpretative control/bias’ (GRCS-IB), ‘illusion of control’ (GRCS-IC), and ‘predictive control’ (GRCS-PC) cognitions respectively assess reframing gambling outcomes (e.g., ‘Relating my winnings to my skill and ability makes me continue gambling.’), general confidence in superstition for gambling wins (e.g., ‘I collect specific objects that help increase my chances of winning.’), and baseless control beliefs over gambling wins (e.g., ‘I have some control over my gambling wins.’) in a manner that lead to continuation of gambling. These three domains of gambling cognitions follow the typology defined by Toneatto et al. (1997) and Toneatto (1999). The psychometric properties of the GRCS (Raylu and Oei 2004a) are detailed in the method section.

The findings of the present study will be a chance to test whether GRCS-T will show sound psychometric properties or cultural divergences will decrease the sensitivity of the scale to assess gambling cognitions in relation to gambling problems in the Turkish sample. It is hypothesized that the Turkish translation of the scale will show promising psychometric properties to identify gambling cognitions as the Chinese (Oei et al. 2007) and French (Grall-Bronnec et al. 2012) versions of the scale did. Factually, the conclusion will be rewarding in either case for the gambling literature. Either cultural features will

come into prominence to be discussed if the scale does not show adequate psychometric results in the Turkish sample or the role of erroneous thinking in gambling problems as measured by GRCS-T will be consolidated above-and-beyond cultural diversities if the results support the validity of the scale as the Chinese and French versions did.

## Methods

### Participants

The sample of the present study was composed of 354 gambling individuals selected through convenience sampling in legal betting terminals of horse races and sports on the basis of voluntary participation in Istanbul, Turkey. The selection of betting terminals as data collection places was to include large numbers of potential problem and pathological gamblers as possible in the study. Betting is not common among women in Turkey (GIB 2009) and women were not observed betting on horse races and sports in terminals during the data collection of the present study. Thus, the sample of this study was composed of completely males.

The mean age of the participants was 35.77 (SD = 13.51 and range 18–73 years). Two hundred and ten participants (59.3 %) reported that they were single as compared to 143 participants (40.4 %) who reported that they were married in addition to 1 participant who did not specify his marital status. Majority of the participants were high school graduates (38.7 %) followed by university graduates (22.0 %) and university students (17.2 %) whereas the rates of secondary school graduates (11.9 %), elementary school graduates (9.9 %), and the literate participant (0.3 %) were lower. Moreover, in addition to 5 participants (1.4 %) who did not specify their employment status, most of the participants reported that they were working (63.6 %) as compared to participants who reported that they were unemployed (5.4 %), retired (12.4), or university students (17.2 %).

### Materials

The following measures in relation to the findings of this study which are presented here were used:

#### *Demographics*

This form consisted of information about demographical variables such as age, education, marital status and employment status of the participants.

#### *Gambling-Related Information Form*

In this form, gambling involvement of the participants including devoted time to gambling, gambling frequency, gamble type they prefer, and duration of past gambling behavior were asked.

#### *The South Oaks Gambling Screen (SOGS)*

SOGS developed by Lesieur and Blume (1987) is a self-report questionnaire that assesses gambling related behaviors and problems by forced-choice items. The first three items of the total 20 items are excluded from scoring and the possible scores for the screen are

between 0 and 20. Scores of 5 or greater are used to identify probable pathological gamblers. The internal consistency of SOGS and test–retest reliability were found 0.97 and 0.71 respectively (Lesieur and Blume 1987). The Turkish version of the SOGS has high test–retest reliability and internal consistency reliability values reported as 0.95 and 0.88 respectively (Duvarcı and Varan 2001). Three items in the original form that did not discriminate between pathological and non-pathological gamblers in the Turkish culture were replaced with two culturally relevant items and the possible scores for the Turkish SOGS are between 0 and 19. The cut-off score offered by Duvarcı and Varan (2001) to identify probable pathological Turkish gamblers was 8. Moreover the researchers of the Turkish version of the screen suggested that it would not be convenient to generalize the results of the screen for female gamblers till relevant data with women is collected.

#### *The Positive Affect Negative Affect Scale (PANAS)*

PANAS was developed by Watson et al. (1988) to measure current negative affect and positive affect. It is a 20-item self-report scale and items are rated on a 5 point Likert-Scale. The internal reliability values were reported as 0.88 and 0.85 respectively for positive affect and negative affect. The Turkish version of PANAS was adapted by Gencoz (2000) revealing internal consistency reliability values 0.83 for positive affect and 0.86 for negative affect. The mean scores for ten items of the scale that assess negative affect were utilized for the present study.

#### *Eysenck Personality Questionnaire-Revised & Abbreviated (EPQR-A)*

EPQR-A (Francis et al. 1992) is an abbreviated version of the original Eysenck Personality Questionnaire (Eysenck et al. 1985). The participants are required to choose either ‘yes’ or ‘no’ forced choices for the 24 items of the questionnaire. The EPQR-A is composed of 3 personality dimensions and a lie scale with 6 items for each dimension. The personality dimensions are neuroticism, psychoticism, and extraversion. Neuroticism dimension of the scale was utilized for the current study by summing up the relevant 6 items. The internal reliability of the neuroticism scale was reported within a range of 0.70–0.77 for university students in studies conducted in different countries (Francis et al. 1992). The research of the Turkish version of the EPQR-A revealed values of 0.65 and 0.82 respectively for the internal reliability and test–retest reliability for the neuroticism scale (Karancı et al. 2007).

#### *The Gambling-Related Cognitions Scale (GRCS)*

GRCS is a 23-item self-report scale developed by Raylu and Oei (2004a) to measure gambling-related erroneous cognitions. Exploratory factor analysis revealed five factors accounting for 70 % of the total variance and confirmatory factor analysis verified the five-factor solution. GRCS-IS (e.g., ‘I will never be able to stop gambling.’), GRCS-IB (e.g., ‘Relating my losses to bad luck and bad circumstances makes me continue gambling.’), GRCS-IC (e.g., ‘I have specific rituals and behaviours that increase my chances of winning.’), GRCS-GE (e.g., ‘Gambling makes me happier.’), and GRCS-PC (e.g. ‘When I have a win once, I will definitely win again.’) are five factors of the scale with internal reliability values found between 0.77 and 0.91. The internal reliability value for the whole scale is reported as 0.93. Moreover, expected correlations of the GRCS with anxiety, depression, stress, motivations toward gambling, and SOGS scores were reported as

supporting the concurrent validity of the scale and the ability to discriminate between non-problem gamblers and problem gamblers were reported as supporting the criterion-related validity of the scale (Raylu and Oei 2004a). Adaptation studies of the GRCS in Chinese (Oei et al. 2007) and in French (Grall-Bronnec et al. 2012) also supported the validity and the reliability of the scale in two different cultures.

### Procedure

Translation and back translation method was carried out for the adaptation of the GRCS-T. Translation of the original form into Turkish by the authors of the present study was followed by the evaluation of the translated items through rating each item by two other independent judges considering the items' comprehensibility. Before the final version of the form was decided, GRCS-T was evaluated in respect to grammatical and semantic suitability by a Turkish language teacher and back translation of the Turkish items into English by two other independent judges was completed.

The instrument set was administered between May 1 and June 15 in 2011, after getting ethical approval from the Ethics Committee of Middle East Technical University, Ankara, as part of the official procedure of the first author's doctoral thesis. Participants signed a written informed consent form including the information that participation was voluntary and withdrawal at any time of the study was possible. The participants completed the instrument set on the average in 25 min. Sixteen, volunteer third year psychology major students who were selected from appropriate applicants conducted data collection after extensive training and they were given bonus points for the Psychopathology course. Potential problems, ethical concerns were discussed in detail within the training period of the students about the construct and content of the test battery.

### Statistical Analyses

All statistical analyses were conducted with Statistical Package of Social Sciences (SPSS) 16 Program except Confirmatory Factor Analyses (CFA) of the GRCS-T carried out by LISREL 8.71 Program. Accuracy of data entry, missing values, univariate and multivariate outliers were examined before the analysis. Two cases with extremely high z scores on negative affect and one case with extremely high z score on gambling severity were found to be univariate outliers. Deletion of those three cases resulted in 354 cases for subsequent analyses. Minor missing data detected to be at random and not exceeding 5 % of the measures were replaced with mean scores. The frequency of gambling and amount of time devoted to gambling reported by the participants as gambling participation indices were logarithmically transformed to improve pairwise linearity and to reduce extreme skewness and kurtosis for those variables. Logarithmically transformed values for those measures were used throughout the analyses.

## Results

### Gambling Participation and Severity of the Participants

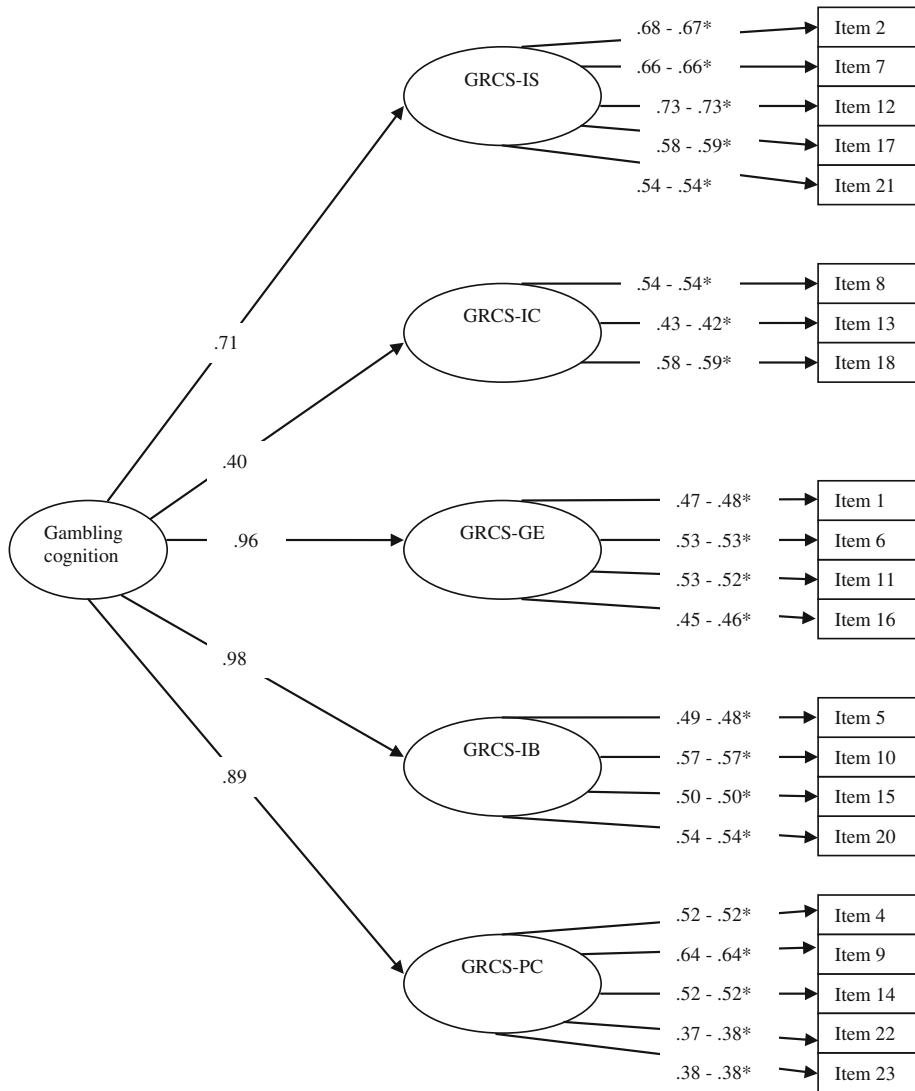
Gambling participation was rather intense within the sample of the study. Forty-four percent of the sample reported horse-race betting as the gamble they played for a longer

time while 47 % of the sample reported sports-betting as the gamble they played for the longest time. The range of the duration of past gambling behavior was between 2 to 480 months with a mean of 108.53 months ( $SD = 111.57$ ). Forty-three and 50 % of the sample respectively reported horse-race and sports betting as their most frequent gambling activity with a mean of 4.73 days ( $SD = 2.24$  and range 1–7 days) per week. The mean of the participants' reports with respect to the average time they devoted to gambling in a week including preparation for betting (examining past performances of horses or sports teams) or watching horse races or sports matches on T.V. was 9.91 h ( $SD = 13.16$  and range 0.20–64 h). In connection with the intense gambling involvement of the participants, their gambling severity scores as measured by SOGS were also found to be high supporting prior gambling participation and gambling problems relation findings reported in the relevant literature (e.g., Faregh and Leth-Steensen 2011; Matthews et al. 2009). Non-problem gamblers with SOGS scores 0 was 15.3 % of the sample including 54 participants. On the other hand, percent of the probable pathological gamblers according to the cut-off score of 8 as was suggested for the Turkish version of the SOGS (Duvarcı and Varan 2001) was 11.6 including 41 participants. In other words at least every 1 participant out of 10 could be identified as probable pathological gambler taking SOGS self-reports into consideration.

### Confirmatory Factor Analyses

Confirmatory Factor Analyses (CFA) were conducted to investigate the model that would best fit the data following the original GRCS's five-factor structure. The input to LISREL was in the form of covariance matrix produced by SPSS. Data fit indices of Chi Square ( $\chi^2$ ), ratio of  $\chi^2$  to degree of freedom (df), Root Mean Square Error of Approximation (RMSEA), standardized Root Mean Square Residual (sRMR), Comparative Fit Index (CFI), and Non-Normed Fit Index (NNFI) were assessed in the analyses. Values between 1 and 4 for  $\chi^2$  df ratio, 0.0 and 0.08 for RMSEA and sRMR, and values higher than 0.90 for CFI and NNFI were evaluated as acceptable criteria. The tested models and the utilized fit indices together with acceptable values were fundamentally modeled from the original GRCS and its Chinese version studies (Raylu and Oei 2004a; Oei et al. 2007).

In the analysis of the first model, all 23 items were forced to load on a single "gambling cognition" factor. The results of this analysis did not reveal acceptable fit for the data [ $\chi^2/df$  (733.03/230) = 3.19; RMSEA = 0.09; sRMR = 0.08; CFI = 0.86; NNFI = 0.85]. In the analysis of the five-factor model, there was a good fit of the data. The  $\chi^2$  df ratio was reasonable (536.18/220 = 2.44) in addition to the acceptable values for the selected fit indices (RMSEA = 0.07; sRMR = 0.07; CFI = 0.91; NNFI = 0.90). Third model, in which high covariation between the factors was accounted for by a higher order factor of 'cognition', also revealed similar acceptable fit values [ $\chi^2/df$  (549.35/225) = 2.44; RMSEA = 0.07; sRMR = 0.07; CFI = 0.91; NNFI = 0.90]. However, factor loadings of the item 3 ('Praying helps me win.') and the item 19 ('There are times that I feel lucky and thus, gamble those times only.') were found to be rather low according to the results of the second and third analyses: 0.27 and 0.27 respectively for item 3 and 0.12 and 0.10 respectively for item 19. Fourth analysis where the above mentioned two items were not included in the analysis, revealed relatively best values for fit indices [ $\chi^2/df$  (444.66/179) = 2.48; RMSEA = 0.07; sRMR = 0.06; CFI = 0.93; NNFI = 0.91] whereas the indices were also similarly found in the acceptable range according to the results of the higher order model with 21 items [ $\chi^2/df$  (456.80/184) = 2.48; RMSEA = 0.07; sRMR = 0.06; CFI = 0.92; NNFI = 0.91]. The factor structures of the fourth and fifth models that fitted the data best are shown in Fig. 1.



**Fig. 1** Factor structures of 21-item GRCS-T. *Note* Estimates without \*belong to higher-order model of GRCS-T

**Reliability**

Cronbach’s alpha values were computed to assess the internal reliability of the GRCS-T with 21 items. The computed values for the whole scale and GRCS-IS, GRCS-IB, GRCS-IC, GRCS-GE, and GRCS-PC were 0.84, 0.78, 0.60, 0.52, 0.57, and 0.61 respectively. Moreover the factors were significantly intercorrelated with each other and with the total score of the whole scale as shown in Table 1.

When the items 3 and 19 were included in the analyses, Cronbach’s alpha values of GRCS-IC, GRCS-PC, and the whole scale decreased to 0.49, 0.57, and 0.83 respectively.



**Table 1** Factors intercorrelations and factors' correlations with the total score

Factor	1	2	3	4	5	6
1. GRCS-GE	1.00					
2. GRCS-IS	0.43**	1.00				
3. GRCS-IB	0.52**	0.49**	1.00			
4. GRCS-IC	0.21**	0.22**	0.18*	1.00		
5. GRCS-PC	0.54**	0.37**	0.54**	0.25**	1.00	
6. GRCS-TOT	0.75**	0.75**	0.78**	0.45**	0.78**	1.00

\*  $p < .01$ ; \*\*  $p < .001$

**Table 2** GRCS-T's correlations with related variables

Variables	Correlation coefficient with GRCS-T total
SOGS	0.37**
Negative affect	0.15*
Neuroticism	0.15*
Devoted time to gambling	0.34**
Gambling frequency	0.26**

\*  $p < .01$ ; \*\*  $p < .001$

The item-total correlation statistics also indicated these 2 items have the lowest item-total correlation scores among the 23 items (0.20 for item 3 and 0.12 for item 19).

**Validity**

Concurrent validity and criterion-related validity were examined for GRCS-T following Raylu and Oei's (2004a) study for the original scale. GRCS-T scores were computed by adding values of relevant items separately for the subscales and for the whole scale.

*Concurrent Validity*

Relations of the GRCS-T with a range of variables that were found to be positively correlated with problem gambling in the relevant literature were explored in order to support the concurrent validity of the GRCS as Raylu and Oei (2004a) did for the original version of the GRCS since there wasn't a similar Turkish cognitive gambling instrument to compare the results of the present study. Thus, GRCS-T's correlations were examined with negative affect, neuroticism, gambling severity measured by SOGS, and gambling involvement indices (devoted time to gambling-related affairs and gambling frequency). All of the correlation coefficients were found to be significant and positive as shown in Table 2 supporting the concurrent validity of the GRCS-T.

*Criterion-Related Validity*

Participants of the present study were divided into two groups of non-problem gamblers who had SOGS scores 0 (SOGS group 1;  $n = 54$ ) and probable problem gamblers who had SOGS scores above 3 (SOGS group 2;  $n = 149$ ) in order to compare the groups to evaluate the criterion-related validity of the GRCS-T. It was hypothesized that SOGS group 2

**Table 3** SOGS groups comparisons on GRCS-T scores

Measures	SOGS group 1 <i>M</i> (SD)	SOGS group 2 <i>M</i> (SD)	<i>t</i>
GRCS-total	44.29 (17.65)	69.42 (21.01)	(201) = -7.84*
GRCS-GE	9.20 (4.44)	13.02 (5.45)	(201) = -4.62*
GRCS-IS	8.21 (5.22)	16.05 (7.87)	(201) = -6.79*
GRCS-IB	10.02 (5.64)	15.45 (5.90)	(201) = -5.87*
GRCS-IC	4.88 (3.14)	7.30 (4.28)	(201) = -3.80*
GRCS-PC	11.98 (6.30)	17.60 (6.94)	(201) = -5.22*

\*  $p < .001$

participants would score higher on GRCS-T total and its subscales as compared to SOGS group 1. According to the results of the independent samples t-tests, as expected, the groups differed significantly on their GRCS-T total and all of the subscale scores. Probable problem gamblers had higher scores on GRCS-T total and on its subscales than non-problem gamblers. Means and standard deviations of the GRCS-T scores for the two SOGS groups together with independent t-tests results are shown in Table 3.

## Discussion

The major purpose of the present study which was to validate the Turkish form of the GRCS (Raylu and Oei 2004a) was essentially based on two considerations. The first of those considerations was the lack of research interest about Turkish gamblers which may be related to the absence of relevant measurement instruments in Turkish to assess various gambling-related dimensions. Second and an associated consideration with the first one was the absence of gambling research contribution from Turkey to universal literature. The findings of the present study revealed important implications taking into account these implied major purpose and related inspiring considerations. First of all, to be used in future research, GRCS-T showed promising results in a different culture. Secondly, lack of gambling related problems possibility in relation to lack of relevant research interest in Turkey was eliminated in large by the findings of the present study which revealed that gambling is problematic for at least regular Turkish gamblers. Finally, augmented and intensified gambling cognitions of a non-Western sample was also found to be associated with increased gambling severity and gambling involvement in the present study supporting the idea that these cognitions are important in the development and maintenance of gambling problems (Raylu and Oei 2002).

Utilization of the GRCS-T in future research of Turkish gamblers and presentation of the findings to contribute to the literature are recommended since the scale showed compatible psychometric properties. To begin with the results of the CFA, five factor models of the scale including both the model with higher order factor of 'gambling cognitions' and the model without that higher order factor fitted the data equally well. The factor loadings of the items were satisfactory except for the loadings of items 3 and 19; thus the rest of the analyses were carried out with the remaining 21 items. When the importance of religious commitment in Turkey (Esmer 2012) and the intense gambling involvement of the present sample's participants are considered, it seems understandable why these two items showed relatively poor performance. Betting on horse-races and

sports is being promoted as “chance games” in Turkey by managing foundations instead of “gamble” which is an Islamic prohibition. GIB (2009) study conducted in Turkey which is a predominantly muslim country revealed that “sin” was the first reason for not gambling for almost half of those participants who indicated that they did not gamble in the previous year (32.7 % of the whole sample). Thus, the connotation of the words “God” and “gamble” enrolled together in item 3 (‘Praying helps me win.’) of GRCS-T might have irritated some of the participants impairing the psychometric adequacy of the item. On the other hand, the content of item 19 (‘There are times that I feel lucky and thus, gamble those times only.’) might have not fitted well to the majority of the participants of the present study who were frequent gamblers. Fifty-five percent and 63.5 % of the sample respectively reported that they gambled 5 and 4 days or more in a week. Presumably, infrequent gamblers whose rate was low in the present study may wait for the time to be lucky to gamble, however frequent and dependently probable problem and pathological gamblers may have other prior conditions or reasons to gamble such as craving to take back gambling losses as soon as possible or difficulty in stopping or controlling to gamble. Future research with similar sample features may give a chance to check the psychometric properties of items 3 and 19 and to enrich the present discussion.

The findings of the group comparisons between non-problem and problem gamblers on GRCS-T scores worth mentioning when we turn back to discussion about the promising psychometric properties of the GRCS-T. This finding of the present study indicated discriminative capability of the scale in relation to gambling problems. On the other hand, the subscales scores of the GRCS-T were significantly and positively correlated with each other suggesting that erroneous cognitions of gamblers on different domains of inability to stop gambling, gambling expectancy, interpretative control/bias, illusion of control, and predictive control increased and intensified together. Moreover, as expected, the total score for GRCS-T of the participants were found to be related to their negative affect, neuroticism, and gambling involvement indices scores. These relations supported the concurrent validity of the GRCS-T based on the previous associations that were found between gambling problems and neuroticism (e.g., Bagby et al. 2007; Blaszczynski et al. 1985; Kaare et al. 2009), negative affect (e.g., Matthews et al. 2009; Wiebe et al. 2003b), and gambling involvement (Chiu and Storm 2010; Clarke and Clarkson 2009; Faregh and Leth-Steenen 2011).

The lack of re-test reliability and the cross-sectional nature of the GRCS-T data that was completely collected from male participants were the major limitations of the present study. Future research especially including gambling females are required to generalize the findings of the present study. Furthermore, the internal reliability values of some of the GRCS-T subscales were rather low when compared to the GRCS (Raylu and Oei 2004a) and its adapted versions (Grall-Bronnec et al. 2012; Oei et al. 2007). Thus, using the total score of the GRCS-T will be more favourable taking into consideration the relatively low internal consistency values for especially GRCS-IC and GRCS-GE subscales in addition to the high internal consistency value for the GRCS-T total score. Here it is important to note that Raylu and Oei (2004a) and Oei et al. (2007) suggested the utilization of the whole scale score rather than the subscale scores to predict problem gambling due to the complex contribution of some subscale scores according to the results of multiple regression analyses conducted to check the predictive validity of the scale.

The present adaptation and validation study of the GRCS-T was basically designed in accordance with the original GRCS (Raylu and Oei 2004a) development study. Additionally, the findings and implications of the present study were approached essentially again referring to the original study. However, it is necessary to attract attention to the

sample make-up differences including higher gambling involvement and in relation more prevalent problematic gambling pattern of the present study's participants in comparison to Raylu and Oei's (2004a) sample. These differences deserve care in approaching the self-report pattern of the participants and dependent psychometric properties of the GRCS-T such as the individual factor loadings of the items or those items' homogeneity within the given subscales and the whole scale in comparison to GRCS (Raylu and Oei 2004a). To illustrate those differences, the percent of probable pathological gamblers measured by SOGS with a conservative cut-off value of 8 in the present study was twice of that percent in GRCS's original study measured by the same instrument with a cut-off value of 5, whereas the rate of the non-problem gamblers (SOGS = 0) of the present study was quarter of that rate found in the original study's sample. Moreover the sample of the present study was composed of completely males whereas approximately only one third of Raylu and Oei's (2004a) sample was composed of males whose GRCS and SOGS scores were found higher as compared to the females. Additionally the participants of the present study were composed of a rather homogeneous group in respect to their gambling preferences since the data was collected from specific betting settings. This cited difference may have also influenced the response pattern of the participants mediated by their gambling problems since research findings suggest an association of gambling severity and related gambling problems with preferred specific gambling activity (e.g., Bonnaire et al. 2009; Kessler et al. 2008; Petry 2003).

In conclusion, using GRCS-T to assess gambling-related cognitions of non-clinical gambling individuals in Turkey will be appropriate considering the findings of the present study. Relatively poor psychometric performances of the two items and low internal consistency values for especially two subscales of GRCS-T as mentioned were remarkable. To approach these cited differences as minor variations within the scope of the present study taking into consideration the possible influence of the sample make-up and cultural texture will be plausible instead of concluding them as a total deviation from the factor structure of the original scale. This appreciation will probably further improve our understanding of the strengths and limits of the GRCS and in connection contribute more on the understanding of the gambling cognitions as important and probable etiological component of gambling problems. Future research of the GRCS with different samples varying in the participants' gambling involvement levels, gambling type and environment preferences and also concentrating on gender differences will further give the chance to check the findings of the present study in connection to sample composition and to discuss the validity of the scale dependently.

**Conflict of interest** The authors declare that they have no conflict of interest.

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