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Psychometric Properties of the Italian Versions of the Gambling Urge Scale (GUS) and the Gambling Refusal Self-Efficacy Questionnaire (GRSEQ)

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Abstract

Gambling urges and gambling refusal self-efficacy beliefs play a major role in the development and maintenance of problem gambling. This study aimed to translate the Gambling Urge Scale (GUS) and the Gambling Refusal Self-Efficacy Questionnaire (GRSEQ) from English to Italian (GUS-I, GRSEQ-I) and to test their factor structure, internal consistency, construct validity, concurrent validity, and gender differences in 513 individuals from the Italian community. Factor structure and construct validity were tested through Confirmatory Factor Analysis, internal consistency through Cronbach's alpha, concurrent validity through correlations with gambling-related cognitions (GRCS-I), probable pathological gambling (SOGS-I), and gambling functioning (GFA-R-I). Results confirmed that the 6 items of the GUS-I load highly on one dimension of Gambling Urge, and each of the 26 items of the GRSEQ-I load highly on their relevant sub-dimension, among the following: situations/thoughts, drugs, positive emotions, negative emotions. Both scales are internally consistent and show concurrent validity with gambling-related cognitions, probable pathological gambling, and gambling functioning. Males score higher than females at the GUS-I; females score higher than males at the GRSEQ-I. The findings from the present study suggest that the GUS-I and the GRSEQ-I are internally consistent and valid scales for the assessment of gambling urges and gambling refusal self-efficacy in Italian individuals from the community, with significant repercussions in terms of assessment, prevention, and intervention.

Keywords Gambling · Urge · Self-efficacy · Community · Gender

Problem gambling represents a significant health care issue in the Italian community. The latest national survey on gambling consumption published by the National Research Council of Italy (Cerrai et al. 2017) indicates that 17 million individuals from the Italian community had gambled at least once in the last year. The trend seems to be systematically increasing, with an increment of about 15% since 2013. Latest reports indicate the prevalence of problem

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gamblers in the country in the order of 3–3.8% (767,000 to 2296.000 adults) (Department for Antidrug Policies–Presidency of the Council of Ministers of Italy 2015). A study by Iori (2012) reports the financial burden of gambling in Italy being about 6.5 billion euros, including both direct health care and indirect social costs. de Felice and Martucci (2017) identify one possible, major determinant of the phenomenon in the attractivity of an easy income exerted by gambling in the period of economic recession that the country is undergoing.

The phenomenon has significant repercussions onto national health care. The 2017 report on the characteristics and functioning of health care services in the treatment of pathological gambling by the National Institute of Health of Italy highlights a significant increase in the demand for updated policies and effective services for the assessment and treatment of pathological gambling. The validation of reliable scales to measure key factors in the development and maintenance of problem gambling in the Italian context is therefore warranted, potentially playing an important role in improving assessment policies at the national level, helping a number of individuals from the community finding adequate screening and treatment.

Cognitive theories suggest that the onset, development, and maintenance of problem gambling are mainly attributable to a number of erroneous perceptions (Ladouceur and Walker 1996) triggered by specific risk situations (Marlatt 1985) also known as "gambling-related cognitions" (Coulombe et al. 1992; Gaboury and Ladouceur 1989; Griffiths 1994; Raylu and Oei 2004a). Raylu and Oei (2004a) defined such cognitions as a general set of beliefs that concur to shape the illusion that one could control gambling. They classified these cognitions into five types, namely interpretative control/bias, illusion of control, predictive control, gambling-related expectancies, and perceived inability to stop gambling. The authors developed and validated the Gambling-Related Cognitions Scale (GRCS) to measure gambling-related cognitions. The scale has very good psychometric properties and has been translated and validated in a number of languages and cultural contexts, including Italy (Iliceto et al. 2015). A number of studies found that problem gamblers are more likely to activate gambling-related cognitions than non-problem players and non-gamblers Joukhador et al. 2003; Toneatto 1999; Walker 1992).

Gender differences are known in the literature, with males usually presenting higher levels of gambling-related cognitions and behaviors than females (Ronzitti et al. 2016). McNeilly and Burke (2001) hypothesized that those differences may be due to the fact that males tend to be more affected by social anxiety than females, ultimately determining an increase in attractivity of gambling-related activities. A study by Wong et al. (2012) found that risk-taking and social anxiety are significant mediators for gender differences in problem gambling. The authors observed in their study that male participants were more likely to take risks and to show social anxiety than female participants, and they concluded that because "greater risk-taking and more socially anxious individuals tended to have more problems with gambling" (p. 171), males might be more likely than females to develop problem gambling.

Gambling urges and gambling refusal self-efficacy beliefs play a major role in the development and maintenance of problem gambling (Casey et al. 2008; Raylu and Oei 2004b; Sharpe 2002).

Gambling urges are defined as strong desires or impulses to gamble, leading to serious personal and social consequences (Raylu and Oei 2004b). They can cause problem gamblers to perceive themselves as unable to resist to the desire and impulse to gamble, with dramatic impact to the development of problem gambling behavior. Gambling refusal self-efficacy stems from Bandura's (1982) construct of self-efficacy, originating within

Social Cognitive Theory. It is defined as a specific conviction in how well one can execute courses of action required to refuse prospective gambling (Casey et al. 2008). Such beliefs can generate the feeling of being able to control one's own gambling behavior, avoiding the temptation to gamble.

The urge to gamble can be overwhelming and contribute to develop problem gambling behavior, as well as relapse in in-treatment and support-seeking gamblers (Smith et al. 2015b). However, recent literature points out a lack of definition and general confusion with regard to the use of terms such as craving, urge, and desire in gambling research (Canale et al. 2019; Cornil et al. 2018). Advanced cognitive models such as the Elaborated Intrusion Theory of desire (EIT; Kavanagh et al. 2005; May, Andrade, Panabokke, & Kavanagh 2004) have more recently attempted to define and differentiate these concepts, ultimately contributing to shed a light on the etiology of gambling urges as theorized in previous theoretical models (see Tiffany and Conklin 2000). This perspective clarifies that craving constitutes a higher order experience compared with urges, combining cognition and multisensorial imagery processing, while urges represent "the immediate perspective of positive and/or negative reinforcement", playing a key role "in the broader craving experience" but not constituting "the craving experience per se" (Canale et al. 2019, p. 2).

Recent research has also showed neural correlates of self-reported urges and their impact to the mental health of individuals (Balodis et al. 2012). In particular, the authors studied a group of men with problem gambling and a group of controls in their responses to video material displaying happy, sad, or gambling-related content. They found that the problem gambling group had in all cases higher emotional response and higher brain activation than controls. Moreover, participants from the problem gambling group self-reported higher gambling urges than controls, and those urges were negatively correlated with medial prefrontal cortex activation and positively correlated with middle temporal gyrus and temporal pole activations. The authors commented that possible alterations in "neural correlates underlying experiential aspects of affective processing" (p. 493) may exist in problem gamblers.

With regard to assessment, Canale et al. (2019) argued that validating scales measuring gambling urges is challenging, due to the fact that available evidence suggests that urges shall be conceptualized in terms of state rather than trait. The authors explored the psychometric properties of the French version of the Gambling Craving Scale (GACS; Young and Wohl 2009), finding that two dimensions, namely intention and desire to gamble and relief, fit the data well. Nevertheless, the authors concluded that the issue of the concurrent validity of the scale needs to be addressed by future research, particularly with regard to the relation between the GACS and the Gambling Urge Scale (GUS; Raylu and Oei (2004b).

Raylu and Oei (2004b) developed and validated the GUS in community and university student populations, based on the 8-item Alcohol Urge Questionnaire (Bohn et al. 1995). The scale underlies the assumption that gambling urges are more likely "states", namely experiences that are transitory and context-related (Canale et al. 2019), rather than stable traits. Raylu and Oei (2004b) found that the GUS is internally consistent and valid, measuring a single factor of gambling urges. The GUS was later translated in Chinese and validated in a sample of Chinese individuals from the community, including Australian and Taiwanese residents, showing excellent psychometric properties (Oei et al. 2007). In 2010, Wilkes, Gonsalvez, and Blaszczynski utilized the GUS as an outcome measure in a study on the psychophysiology of gambling. Ashrafioun et al. 2011) used the GUS to investigate the relation between cue exposure and urges to gamble. Oei et al. (2010) performed a randomized control

trial and highlighted the positive effect of cognitive-behavioral treatments on reducing gambling urges, among a wide set of outcome measures of problem gambling. Interestingly, Smith et al. 2015a, p. 17) found that males score significantly higher than females at the GUS, and the authors highlighted that "differential gender effect is important as urge and erroneous cognitions are antecedents to lapse or relapse in gambling disorder". Oei and Goh (2015) showed that gambling urges significantly predict problem gambling, along with gambling cognitions and psychological distress. Ashrafioun et al. (2013) showed that gambling urges represent a risk factor for developing and maintaining behaviors associated to harmful gambling, with self-reported urges significantly increasing after exposure to gambling cues.

Evidence shows that gambling refusal self-efficacy is a significant protective factor of problem gambling in adults, preventing individuals from engaging in problem gambling behaviors (Casey et al. 2008). Self-efficacy represents the main focus of Bandura's (1982, 1997) Social Cognitive Theory. According to Bandura (1994), perceived self-efficacy can be defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives". This definition was later refined in terms of "perceived operative capability" (Bandura 2007, p. 646), focusing on the individuals' potential to act within a set of resources they have available. Research in the last decades has shown that self-efficacy represents a major determinant of individuals' choices, efforts, motivation, perseverance, and causal attribution of one's own successes and failures (Barbaranelli et al. 2017).

In the context of addictive behaviors, previous studies showed that individuals with high self-efficacy are more likely to effectively control problem behaviors than those with less high self-efficacy, for example smoking (Annis and Davis 1988; Rounds-Bryant et al. 1997), problem drinking (Allsop et al. 2000; Oei et al. 2005), and problem gambling (Casey et al. 2008; Hodgins et al. 2004; May et al. 2003).

Despite such evidence, Lai et al. 2015, p. 243) stressed that "only in the recent decade did researchers attempt to develop valid and reliable measures of gambling-related self-efficacy." In fact, three main instruments measuring self-efficacy in resisting problem gambling have been most commonly utilized in research so far, namely the Gambling Self-Efficacy Questionnaire (GSEQ; May et al. 2003), the Gambling Abstinence Self-efficacy Scale (GASS; Hodgins et al. 2004), and the Gambling Refusal Self-Efficacy Questionnaire (GRSEQ; Casey et al. 2008). In particular, the development of the GRSEQ represents an attempt to overcome some of the limitations of the GSEQ and the GASS, namely the limited sample in which the GSEQ had been validated in, and the extent to which the items of the GSEQ and GASS are capable of measuring self-efficacy in controlling problem gambling in risk situations (Casey et al. 2008; DiClemente et al. 1995; Marlatt 1985).

The GRSEQ was originally validated it in both community and clinical populations. The scale measures four sub-dimensions of gambling refusal self-efficacy, namely situations and thoughts associated with gambling, influence of drugs on gambling, positive emotions associated with gambling, and negative emotions associated with gambling. The results of the validation study by Casey et al. (2008) showed that the GRSEQ has very good psychometric properties and it represents a valid measure of gambling refusal self-efficacy in both community and clinical populations. In 2015, Lai, Wu, and Tong translated the GRSEQ in Chinese and validated the scale in a sample of Chinese undergraduate students, finding excellent psychometric properties. Oei and Goh (2015) showed that gambling refusal self-efficacy, as measured through the GRSEQ, has a significant protective effect to the risk of

developing problem gambling in a number of risk situations. Notably, Casey et al. (2008) reported gender differences in all four GRSEQ factors, with females scoring higher than males, suggesting that problem gambling assessment and treatment strategies should account for gender differences in targeting gambling refusal self-efficacy beliefs.

Although previous studies showed that the GUS and the GRSEQ are valid scales to assess gambling urges and self-efficacy beliefs in different populations, it is not legitimate to assume that the scales would necessarily show the same psychometric properties and validity in other cultural contexts. In fact, the occasions in which individuals gamble may vary across cultures, and so may the role and functioning of urges and self-efficacy beliefs. In this regard, Raylu and Oei (2004c, p. 1087) commented that "although studies investigating prevalence rates of gambling and problem gambling among different cultures are not plentiful, evidence does suggest certain cultural groups are more vulnerable to begin gambling and to develop problem gambling". However, a clear view over the role of cultural differences in gambling urges and gambling refusal self-efficacy is not yet available. Weatherly et al. 2014, p. 337) emphasized that "if a particular measure retains sound psychometric characteristics when used in different cultures, then that measure has several things to recommend it. First, it would provide a single measure that was potentially useful to practitioners and researchers in multiple cultures. Second, such a measure could be used to identify differences at a cultural level as it relates to gambling. Third, if similar relationships are found between the contingencies maintaining gambling behavior and measures of disordered gambling across multiple cultures, then it could be argued that one of the important factors underlying gambling problems had been identified."

In the same vein, we identified a number of benefits deriving from the translation and validation of the GUS and the GRSEQ in another cultural context. First, they will provide local practitioners and educators in the field of problem gambling and mental health with reliable and valid scales to assess and screen individuals from the community, particularly those who are at risk to develop problem gambling. Second, they will allow policy makers to prepare and implement targeted early interventions, with great impact to public health and the financial burden generated by the diffusion of this condition in the adult population (Casey et al. 2008; Raylu and Oei 2004b). Third, they will help researchers shedding a light onto the functioning of crucial factors underlying the development and maintenance of problem gambling across different cultural contexts, increasing knowledge and understanding of the phenomenon and allowing the international research community to compare results cross-culturally.

In the light of such reasons, the aims of the present study were to translate the GUS and the GRSEQ from English to Italian (GUS-I, GRSEQ-I), test their factor structures, internal consistency, construct validity, concurrent validity, and gender differences in a sample of Italian adults from the community, with potential, significant implications for a context characterized by a dramatically increase of problem and pathological gambling in the adult population, with significant impact on public health (Iliceto et al. 2018; Cerrai et al. 2017).

In particular, we hypothesized that: (1) the factor structures of the GUS-I and the GRSEQ-I are consistent with their relevant, theoretical models (Casey et al. 2008; Raylu and Oei 2004b), confirming their original constructs' formulation; (2) the scales are internally consistent; (3) both scales are correlated with established and validated self-report scales for the assessment of problem gambling, showing concurrent validity; (4) males score higher than females at the GUS-I, and females score higher than males at the GRSEQ-I, in line with previous studies (Casey et al. 2008; Smith et al. 2015a).

Methods

Participants

Participants were 513 adults volunteers from the community, 276 males (53.8%) and 237 females (46.2%), aged 18–55 ($M = 30.9$, $SD = 8.1$), recruited from January to April 2018. They were recruited at universities, markets, supermarkets, shops, banks, public parks, and post offices in different districts of three non-randomly selected regions in the Mid and North of Italy, i.e. Abruzzo, Piemonte and Veneto. Although the sample cannot be deemed as entirely representative of the Italian population, its demographic composition such as the level of educational attainment of its participants makes it a very good approximation, as per the indicators from the Italian National Institute of Statistics' annual report titled *Human Capital* (2019).

The subjects came from different socio-economic backgrounds and they all provided informed consent prior to participate to the study. The study was approved by an internal ethical committee, composed of a psychometrician and a clinical psychologist, and two external reviewers with expertise in the field of psychometric research and gambling. The committee oversaw compliance of the study with ethical protocols on data from human participants, ensuring that all participants signed and approved informed consent prior to any study procedure, and that all participants were adequately debriefed following their involvement in the study.

Procedure

Participants were asked to complete a set of paper-and-pencil questionnaires in their validated Italian versions, while the English versions of GUS and GRSEQ were translated into Italian by the authors of this paper. The adequacy of the translations was assessed independently through a back-translation process performed by a native speaker, professional translator. This process allowed to achieve a final consensus on the Italian versions of the instruments. The administration was designed to be completed in 25 to 30 min, and the criterion for inclusion in the study was gambling at least sometimes during the past 6 months even just occasionally.

Instruments

The Gambling Urge Scale (GUS: Raylu and Oei 2004b) is a six-item scale measuring individuals' gambling urges. Participants rate the six items using a scale ranging from 0 ("strongly disagree") to 7 ("strongly agree"); scoring consists in adding up the values, so that higher scores indicate stronger gambling urges. The authors observed good psychometric properties of the scale in 968 community-based participants to their validation studys. The observed Cronbach's alpha coefficient was 0.81.With regard to concurrent validity, observed Pearson's product-moment correlation coefficient was 0.43 between the GUS and the SOGS total score, and between the GUS and each GRCS sub-scale it was, respectively, 0.37 (interpretative bias/control), 0.25 (illusion of control), 0.29 (predictive control), 0.29 (perceived inability to stop), and 0.35 (expectations of gambling). Smith et al. (2013) found a Pearson's product-moment correlation coefficient of 0.49 between GUS scores and GRCS total scores in a clinical population of problem gamblers.

The Gambling Refusal Self-Efficacy Questionnaire (GRSEQ: Casey et al. 2008) is a 26-item scale assessing individuals' self-efficacy in gambling refusal self-efficacy. The scale is based on a four-factor model assessing, respectively, (1) situations and thoughts associated with gambling, (2) the influence of drugs on gambling behavior, (3) positive emotions associated with gambling, and (4) negative emotions associated with gambling. Items are rated on a scale from 0 ("no confidence, I cannot refuse") to 10 ("extreme confidence, I can certainly refuse"), with higher scores indicating stronger confidence to resist gambling in different occasions. The authors originally validated the scale in a sample of 297 gamblers from normal and clinical populations, and found Cronbach's alpha for the overall scale of 0.98 and high, negative correlation coefficients between the GRSEQ total and the SOGS ($r = −$ 0.83), the GRCS total ($r = − 0.80$), and the GUS ($r = − 0.74$).

The South Oaks Gambling Screen (SOGS: Lesieur and Blume 1987) is a 20-item questionnaire assessing probable pathological gambling through its associated outcomes such as negative interpersonal and occupational consequences, difficulty in controlling gambling, hiding, and/or lying about gambling. The SOGS displays very good reliability (Cronbach's alpha in the original validation study was 0.97) and validity in community and clinical samples (Lesieur and Blume 1987). Based on the criteria for pathological gambling from the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association 1980) and following revisions (1987, 1994, 2000, 2013), scores at the SOGS discriminate probable pathological gamblers and non-pathological gamblers (pathological ≥ 5). Participants mark the SOGS items indicating either "yes" or "no", whereas affirmative responses are summed up to yield a total score. Higher total scores indicate higher probability that the individual is a pathological gambler. The scale has been widely used in a number of studies and both clinical and community-based populations, showing good psychometric properties. We used the Italian of version the scale reported by Capitanucci and Carlevaro (2004). In the current study, no gender differences in SOGS scores were found ($t_{(511)} = 0.66$; $p = 0.50$).

The Gambling-Related Cognitions Scale (GRCS: Raylu and Oei 2004a) is a 23-item self-report scale designed to assess individuals' gambling-related cognitions. Items are rated from 1 ("strongly disagree") to 7 ("strongly agree"), to measure five sub-dimensions: (1) gambling-related expectancies, (2) illusion of control, (3) predictive control, (4) perceived inability to stop gambling, and (5) interpretative bias. The total score is obtained by adding up individual items' scores, with higher scores indicating higher gambling-related cognitions. The scale was originally validated in 968 volunteers from a community-based population. The authors found Cronbach's alpha for the overall scale of 0.93, and for the five sub-scales of 0.87, 0.87, 0.77, 0.89, and 0.91, respectively. With regard to the concurrent validity of the scale, the authors found significant correlations between GRCS total scores and the SOGS ($r = 0.43$). Recent research showed good psychometric properties of the Italian version of the GRCS (GRCS-I) in a sample of 511 adults from the Italian community, including reliability (Cronbach's alpha = 0.85) and concurrent validity with respect to the SOGS (Pearson's product-moment correlation coefficients were 0.56 for the GRCS total and 0.51, 0.38, 0.42, 0.50, and 0.49 for the five sub-scales, respectively) (Iliceto et al. 2015).

The Gambling Functional Assessment–Revised (GFA-R: Weatherly et al. 2012a; Weatherly et al. 2012b; Weatherly et al. 2011 is a scale designed to assess gambling maintained by positive reinforcement vs. escape (Weatherly et al. 2014, p. 336). The GFA-R consists of 16 items that respondents answer from 0 ("never") to 6 ("always"). Each of the two sub-scales (positive reinforcement and escape) includes eight items, and responses are summed up to provide a score for that particular sub-scale, indicating higher use of gambling as a positive

reinforcement and as an escape, respectively for the two sub-scales. Weatherly et al. (2011) originally validated the scale in a sample of undergraduate students. In a subsequent study, Weatherly, et al. (2011) administered the GFA-R to a sample of 1060 undergraduate students twice, dividing them into two groups (one group received the second administration after 4 weeks from the first administration, another group received the second administration after 12 weeks from the first administration). The authors found an overall Cronbach's alpha of 0.91. Across all administrations, Pearson's product-moment correlation coefficient between GFA-R total scores and SOGS total scores ranged between 0.47 and 0.63. The Italian version of the instrument (GFA-R-I), validated in a sample of 667 adults from the Italian community, shows good reliability (Cronbach's alpha for the total scale is 0.86) and validity (Pearson's product-moment correlation between the GFA-R-I total and the SOGS-I is 0.43, and between the GFA-R-I total and the GRCS-I total is 0.46) (Iliceto et al. 2018).

Statistical Analyses

Two-tailed t tests and Pearson's product-moment correlation coefficient were used for continuous variables, and χ^2 tests with Yates's correction where appropriate for categorical variables. Internal consistency was assessed by Cronbach's alpha, aiming at investigating the internal consistency of the GUS-I and the GRSEQ-I. CFA was performed to assess the factor structure of each scale. CFA is a statistical technique which allows the researcher to test specific hypotheses regarding the relation between observed variables and their underlying latent constructs, and it is commonly used in the validation of psychometric measures. CFA implies the formal specification of the measurement instrument in terms of a factor model, the statistical fitting of the factor model to the observed data, the assessment of fit, and the interpretation of the model consistency with the data (Bollen 1989). The following criteria were used to evaluate the overall goodness of fit: The χ^2 value close to zero indicates a small difference between expected and observed covariance matrices, with the probability level > 0.05, evidencing the absence of meaningful unexplained variance. However, because χ^2 is sensitive to sample size, the ratio of χ^2 to degrees of freedom was also calculated, in order to produce a better estimate of the goodness of fit, that should be < 3 to consider the data-model fit as acceptable (Kline 2011). In addition, the Goodness-of-fit Index (GFI; Jöreskog and Sörbom 1996), the Comparative Fit Index (CFI; Bentler 1990), the Tucker-Lewis Index (TLI; Tucker and Lewis 1973, the Root Mean Square Error of Approximation (RMSEA; Steiger 1990), and the Standardized Root Mean Square Residual (SRMR; Jöreskog and Sörbom 1996) were utilized. Indicators of a well-fitting model are evidenced by GFI > 0.90, CFI and TLI > 0.95, RMSEA < 0.06, and SRMR < 0.08 (Browne and Cudeck 1993; Hu and Bentler 1998, 1999).

All analyses were performed using SPSS 19.0 (SPSS Inc., Chicago, IL, USA), and CFA was performed using AMOS 20.0 (AMOS: Analysis of Moment Structures), with maximum likelihood estimation (Arbuckle 2011).

Results

Demographic Characteristics of Participants

The characteristics of participants are shown in Table 1, respectively for men and for women. No differences were found between the age of men and women ($t_{(511)} = 0.64$; $p = 0.53$) and no

gender differences were found in years of education ($\chi^2_{(2)} = 1.2$; $p = 0.54$). Regarding working status, two groups of participants were considered: (1) non-occupied (housewives, university students, and unemployed); and (2) occupied (industry workers, employees, retailers, professionals, entrepreneurs, and teachers); statistically significant differences were found in working status ($\chi^2_{(1)} = 38.3$; $p < 0.001$); participants were occupied, respectively for men and for women, 75.0% and 52.7%. Statistically significant differences were also found in marital status ($\chi^2_{(1)} = 6.9$; $p < 0.008$); participants were married, respectively for men and for women, 33.0% and 44.3%.

Analysis of the Reliability and Validity of the GUS-I and the GRSEQ-I

A first study regarded the GUS-I. Before proceeding with CFA, the normality of the shape of the distribution of data was assessed, assuming that values of skewness and kurtosis should be comprised within -1.5 and $+1.5$ in normally distributed data. Table 2 shows a summary of the descriptive statistics relevant to the items of the GUS-I. The results suggest that the distributions of items fit the normality assumptions (Tabachnick and Fidell 2007).

CFA was conducted by using the sample covariance matrix and estimating the parameters using the maximum likelihood method. A CFA model tested the hypothesis that the six items designed to measure gambling urge (items 1, 2, 3, 4, 5, 6) load strongly onto one factor, consistent with the original theoretical model (Raylu and Oei 2004b). CFA results were satisfactory ($\chi^2_{(9)} = 17.64$; $p = 0.04$; $\chi^2/df = 1.96$; GFI = 0.98; CFI = 0.99; TLI = 0.98; RMSEA = 0.04; SRMR = 0.03), with all the factor loadings being high and statistically significant (gus1 = 0.650; gus2 = 0.664; gus3 = 0.685; gus4 = 0.673; gus5 = 0.687; gus6 = 0.669), suggesting that this model represents a good fit to the data. Cronbach's alpha computed on the GUS-I total score—obtained by summing up the scores from the six items—was 0.821, indicating very good internal consistency.

Table 1 Characteristics of the participants

		Males	Females	Statistics	p
Age	Mean (SD)	31.0 (8.9)	30.5 (8.8)	$t_{(511)} = 0.64$	0.53
Working status	Housewives	0	30 (12.7)	$\chi^2_{(8)} = 75.5$	< 0.001***
N (%)	University students	46 (16.7)	29 (12.2)		
	Unemployed	23 (8.3)	53 (22.4)		
	Industry workers	35 (12.7)	19 (8.0)		
	Employees	105 (38.0)	74 (31.2)		
	Retailers	30 (10.9)	7 (3.0)		
	Professionals	2 (0.7)	1 (0.4)		
	Entrepreneurs	32 (11.6)	16 (6.8)		
	Teachers	3 (1.1)	8 (3.4)		
Working status, occupied	Non-occupied	69 (25.0)	112 (47.3)	$\chi^2_{(1)} = 27.6$	< 0.001***
N (%)	Occupied	207 (75.0)	125 (52.7)		
Education	< = 8 years	6 (2.2)	9 (3.8)	$\chi^2_{(2)} = 1.2$	0.54
N (%)	< = 13 years	123 (44.6)	106 (44.7)		
	= 18 years	147 (53.3)	122 (51.5)		
Marital status	Unmarried	185 (67.0)	132 (55.7)	$\chi^2_{(1)} = 6.9$	< 0.008**
N (%)	Married	91 (33.0)	105 (44.3)		

***Statistically significant at $\alpha = 0.001$

**Statistically significant at $\alpha = 0.01$

Table 2 Descriptive statistics of GUS-I

GUS-I Items	Mean	SD	Skewness	Kurtosis
1. All I want to do now is to gamble	1.44	0.83	1.11	− 0.136
2. It would be difficult to turn down a gamble this minute	1.80	0.96	0.886	− 0.523
3. Having a gamble now would make things seem just perfect	1.37	0.64	1.17	0.124
4. I want to gamble so bad that I can almost feel it	1.96	0.54	0.773	− 0.798
5. Nothing would be better than having a gamble right now	1.84	0.95	0.793	− 0.789
6. I crave a gamble right now	1.50	0.86	1.10	− 0.104

A second study regarded the GRSEQ-I. Table 3 reports the descriptive statistics relevant to the items of the GRSEQ-I. Results evidenced no violation of the normality assumption, suggesting that the use of CFA was appropriate.

Following the procedure reported by Casey et al. (2008) in their original validation study, two factor models were tested through CFA. First, we tested a one-factor model with all 26 GRSEQ-I items loading on a single factor of "Gambling Refusal Self-Efficacy". The fit of the model to the data was unsatisfactory ($\chi^2_{(299)} = 4122.34$; $p < 0.001$; $\chi^2/df = 13.78$; GFI = 0.51; CFI = 0.61; TLI = 0.57; RMSEA = 0.15; SRMR = 0.14) and all fit indices were outside the accepted values, leading to its rejection. Second, we tested a four-factor model including the following sub-dimensions: (1) situations/thoughts (12 items), (2) drugs (5 items), (3) positive emotions (5 items), and (4) negative emotions (4 items). The four factors were allowed to inter-correlate, and all indicator cross-loadings were pre-specified to be equal to zero. Although the

Table 3 Descriptive statistics of GRSEQ-I

GRSEQ-I items	Mean	SD	Skewness	Kurtosis
1. When I'm in places where I usually gamble	43.04	20.17	0.721	− 0.048
2. When my friends were gambling	48.83	18.59	− 0.118	0.758
3. When I saw other people gambling	54.00	21.13	− 0.535	0.326
4. When someone offered me the chance to gamble	40.00	21.20	0.611	0.282
5. When I was thinking that it is likely that I would win	48.28	18.86	− 0.068	0.615
6. When I was having money problems	53.53	21.37	− 0.498	0.185
7. When I was by myself and had the chance to gamble	43.41	21.49	0.757	− 0.063
8. When I was remembering wins I have had in the past	50.23	18.27	0.422	0.387
9. When I was thinking of how I have good luck when I gamble	53.02	22.30	− 0.431	0.075
10. When I was thinking of ways to solve my money problems	40.37	22.51	0.691	0.230
11. When I was thinking how much money I have lost	49.69	18.59	0.437	0.309
12. When I was thinking of things I could do to help me win	52.55	22.51	− 0.394	− 0.037
13. When I had been smoking marijuana	41.91	19.55	0.865	0.399
14. When I had been taking speed	48.79	18.55	− 0.114	0.784
15. When I had been taking antianxiety drugs	53.86	19.92	− 0.579	0.540
16. When I had been smoking tobacco	41.05	18.39	0.646	0.391
17. When I had been drinking coffee	48.01	17.44	− 0.243	0.787
18. When I was feeling happy	52.85	18.12	− 0.267	0.356
19. When I was feeling interested	43.59	18.45	0.561	− 0.114
20. When I was feeling relieved	47.27	18.73	− 0.455	0.762
21. When I was feeling excited	54.99	17.38	− 0.126	0.038
22. When I was feeling satisfied	44.19	18.28	0.520	-0.114
23. When I was feeling ashamed	47.35	15.92	− 0.539	0.714
24. When I was feeling fearful	54.62	18.19	− 0.347	0.452
25. When I was feeling guilty	51.01	15.08	0.238	0.151
26. When I was feeling disgusted	54.46	18.86	− 0.473	0.560

Table 4 Goodness-of-fit Statistics of GRSEQ-I

Models	$\chi^2_{(df)}$	p	χ^2/df	GFI	CFI	TLI	RMSEA	SRMR
1) Hypothesized one-factor model	$4122.34_{(299)}$	< 0.001	13.78	0.51	0.61	0.57	0.15	0.14
3) Hypothesized four-factor model	$491.14_{(293)}$	< 0.001	1.67	0.93	0.98	0.97	0.03	0.02

analysis yielded a statistically significant χ^2 statistic, the inspection of comparative fit indices showed that there is a good fit between the hypothesized model and the data (Brown 2006).

In summary, the second model produced fit indices as follows: ($\chi^2_{(293)} = 491.14$; $p < 0.001$; $\chi^2/df = 1.67$; GFI = 0.93; CFI = 0.98; TLI = 0.97; RMSEA = 0.03; SRMR = 0.02). The inspection of the model parameters indicated that all the variables significantly load on their relevant factor, with all loadings being high and statistically significant, ranging from 0.776 to 0.845. The inter-correlations among factors are moderate but all statistically significant, particularly for drugs/positive emotions ($r = 0.395$), drugs/negative emotions ($r = 0.374$), drugs/situations thoughts ($r = 0.364$), situations thoughts/positive emotions ($r = 0.369$), situations thoughts/negative emotions ($r = 0.377$), and Negative emotions/positive emotions ($r = 0.300$). Results suggest that the four-factor model with correlated factors represents a good fit to the empirical data. Table 4 summarizes all fit indices and Fig. 1 represents the four-factor model.

The GRSEQ-I sub-scales' scores were computed by averaging the scores at the items endorsed on each sub-dimension, and the GRSEQ-I total score by averaging the four sub-scales' scores. Results from the analysis of Cronbach's alpha showed that both the sub-scales and the GRSEQ-I total score are internally consistent: situations/thoughts = 0.812, drugs = 0.789, positive emotions = 0.821, negative emotions = 0.799, and GRSEQ total score = 0.804.

The concurrent validity of the measures is a complex issue because it is based on associations between measures of different, but related constructs. In line with previous literature on the GUS-I and the GRSEQ-I, we expected Pearson's product-moment correlation coefficients between each of the two scales and other validated measures of problem gambling (particularly, the SOGS-I, GRCS-I total, and the GFA-R-I total), to be at least or higher than
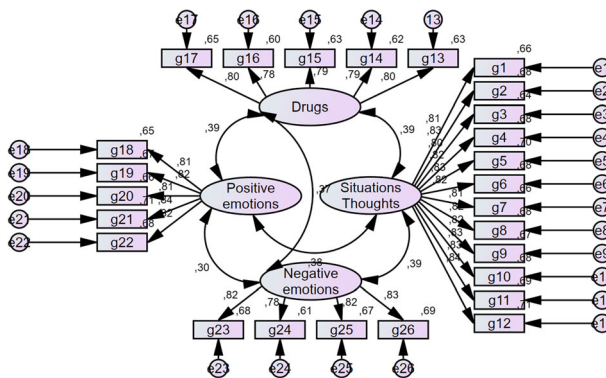

Fig. 1 Path coefficients and standardized parameter estimates of the four-factor CFA model. Factors: I, situations/thoughts; II, drugs; III, positive emotions; IV, negative emotions. Observed variables: g1 to g26 = 26 items of the Gambling Refusal Self-Efficacy Questionnaire

0.40 (positively in the case of the GUS-I, negatively in the case of the GRSEQ-I) and statistically significant.

The concurrent validity of GUS-I was assessed by estimating its correlations with gambling-related cognitions (GRCS-I), probable pathological gambling (SOGS-I), and gambling functioning (GFA-R-I), respectively. Results showed that all the those scales significantly and positively correlate with the GUS-I, and significantly and negatively correlate with the GRSEQ-I total and the GRSEQ-I sub-scales, confirming our hypotheses. We concluded that both the GUS-I and the GRSEQ-I demonstrate a significant level of association with other, validated scales measuring problem gambling in the Italian community. Descriptives, internal consistency, and correlations are reported in Table 5.

Results of *t* tests conducted on the GUS-I total score and the GRSEQ-I total score and GRSEQ-I sub-scales outline statistically significant gender differences. In fact, males score higher than females at the GUS-I. Females score higher than males at the GRSEQ-I total scores and the GRSEQ-I sub-scales (Table 6).

Discussion

This study aimed to translate the GUS and the GRSEQ from English into Italian (GUS-I, GRSEQ-I) and to test their factor structure, internal consistency, construct validity, concurrent validity, and gender differences in 513 individuals from the Italian community. In particular, we hypothesized that (1) the factor structures of the GUS-I and the GRSEQ-I are consistent with their relevant, original theoretical models (Casey et al. 2008; Raylu and Oei 2004b), respectively; (2) the scales are internally consistent; (3) both scales correlate with established and validated scales assessing problem gambling; (4) males score higher than females at the GUS-I, and females score higher than males at the GRSEQ-I, in line with previous studies (Casey et al. 2008; Smith et al. 2015a.

Results confirmed the hypothesis that the GUS-I has a factor structure consistent with the original theoretical model observed by Raylu and Oei (2004b), whereas all its six items load highly on one dimension of gambling urge, with satisfactory model fit from CFA and good internal consistency as evidenced by high Cronbach's alpha values. The hypothesis that each of the 26 observed variable of the GRSEQ-I load highly on its relevant latent dimension was also confirmed. The scale has good internal consistency as evidenced by high Cronbach's alpha values observed both at the overall scale and sub-scale level.

The hypotheses that the GUS-I and the GRSEQ-I correlate with established measures of problem gambling were also confirmed. With regard to the GUS-I, we observed that it significantly and positively correlates with gambling-related cognitions (measured through the GRCS-I), probable pathological gambling (SOGS-I), and gambling functioning (GFA-R-I). With regard to the GRSEQ-I, we observed significant negative correlations with the GRCS-I, the SOGS-I, and the GFA-R-I.

These results seem to confirm recent findings based on the theorization of gambling urge as state. In fact, Raylu and Oei (2004b) showed the causal role of state urges in the development of problem gambling, and that urges are likely to increase in times of psychological distress. In their study on the reliability of the GUS, Smith et al. (2013) discussed possible triggers for the state of gambling urge, distinguishing between internal triggers (e.g., mental health conditions) and external triggers (e.g., cues), both likely to elicit gambling-related cognitions. A lower degree of individual predisposition and the authors hypothesize that exposure to such triggers

Table 5 Descriptives, internal consistency, and Pearson's correlations between the scales ($N = 513$) (**$p < 0.01$)

	Mean	SD	Cronbach's alpha	2	3	4	5	6	7	8	9
1. GRSEQ-I total score	48.49	13.07	0.804	0.952**	0.944**	0.916**	0.863**	− 0.496***	− 0.398***	− 0.518***	− 0.604***
2. I. Situations/thoughts	48.07	14.02	0.812	-	0.857**	0.776**	0.714**	− 0.502***	− 0.403***	− 0.576***	− 0.592***
3. II. Drugs	46.72	14.26	0.789	-	-	0.875**	0.790***	− 0.485***	− 0.431***	− 0.488***	− 0.534***
4. III. Positive emotions	48.57	13.68	0.821	-	-	-	0.864***	− 0.512***	− 0.387***	− 0.491***	− 0.565***
5. IV Negative emotions	51.86	14.41	0.799	-	-	-	-	− 0.490***	− 0.366***	− 0.513***	− 0.507***
6. GUS-I total score	9.93	7.08	0.821	-	-	-	-	-	0.447***	0.456***	0.506***
7. GRCS-I	46.08	10.78	0.877	-	-	-	-	-	-	0.512***	0.534***
8. GFA-R-I	47.76	12.57	0.861	-	-	-	-	-	-	-	0.438**
9. SOGS-I	2.48	1.54	-	-	-	-	-	-	-	-	-

Table 6 Comparisons between males and females

	Males		Females		t	p
	Mean	SD	Mean	SD		
GUS-I total score	11.93	6.85	7.60	6.63	7.23	< 0.001
GRSEQ-I total score	46.85	11.05	49.90	14.45	2.65	0.008
I. Situations/thoughts	46.39	12.12	49.52	15.34	2.52	0.01
II. Drugs	44.39	12.80	48.72	15.15	3.46	0.001
III. Positive emotions	47.40	12.13	49.57	14.82	1.79	0.07
IV Negative emotions	50.59	13.85	52.95	14.81	1.85	0.06

may represent one of the mechanisms potentially underlying the observed correlation between the GUS-I and other validated scales measuring gambling-related cognitions (GRCS-I) and problem gambling behavior (SOGS-I, GFA-R-I). However, research will need to clarify the specific impact of different types of triggers onto gambling urges. Moreover, this study considered only one, unidimensional scale of gambling urges. Recent research shows the possible multidimensional nature of the construct, and further investigation on the theory underlying gambling urges is required (Canale et al. 2019).

With regard to gambling refusal self-efficacy, the results from the present study seem to confirm prior evidence from Social Cognitive Theory (Bandura 1977), according to which self-efficacy represents a key determinant of individual functioning in several domains, including addictive behaviors (Casey et al. 2008; DiClemente et al. 1995; May et al. 2003). Although the results from the present study do not allow to allow conclusion on the mechanism underlying the role of self-efficacy in problem gambling, the authors hypothesize that self-efficacy may act through processes of regulation and avoidance of the problem behavior, in line with evidence from recent studies (Barbaranelli et al. 2017). Future research shall work towards clarifying this hypothesis by means of causal models.

Results from classic literature in self-efficacy and addictive behavior shows a strong correlation between increase in self-efficacy and long-term maintenance of cessation of the addictive behavior. May et al. (2003) indicated self-efficacy as a powerful protector for relapses during treatment, holding a specific power in preventing relapses. Although the results from the present studies cannot be used to confirm such causal relationships, due to its methodology and scope, they contribute to provide evidence on the negative correlation between gambling refusal self-efficacy and problem gambling, in line with a Social Cognitive theoretical framework. Assessing individuals' perceived level of control over their gambling behavior may therefore play an important role in preventing the development and maintenance of problem and pathological gambling, especially in individuals who are at higher risk to develop gambling-related cognitions and urge to gamble. Building on the regulatory function of self-efficacy in refusing to gamble, effective interventions may be planned and implemented, helping individuals develop higher resistance to pressure, avoidance of dysfunctional beliefs and cognitions, awareness of the possible impact of drugs and emotions on their gambling behavior, ultimately improving their mental health.

Nevertheless, it is the authors' opinion that one important trajectory of future research shall be the analysis of the construct validity of self-efficacy in refusing to gamble in relation to another multidimensional model that has recently been proposed in the literature by Barbaranelli et al. (2017), distinguishing between the role of self-efficacy in regulating gambling behavior and self-efficacy in avoiding risky gambling behavior. Furthermore,

clinical applications based on increasing self-efficacy in pathological gamblers shall be further investigated, and future research may play a crucial role in this regard.

The correlations found in the present study between the GUS-I and the GFA-R-I and between the GUS-I and the GRSEQ-I represent a novel research result. In the light of the fact that clinical interventions are based on modifying and restructuring gambling-related behavior by accounting for functions of gambling (Ladouceur et al. 2002, they have important implications. In fact, researchers and practitioners might benefit from such evidence, being enabled to develop and administer more targeted interventions to prevent gambling urges and helping individuals developing gambling refusal self-efficacy, especially in those individuals whose gambling behavior is maintained under specific contingencies. Further research on the relation between gambling urges and gambling refusal self-efficacy under different contingencies will clarify the specific nature and intensity of such association, determining an advancement in the understanding of their interplay, with important implications for assessment and intervention.

Gender differences found in the two scales deserve further discussion. In fact, such differences confirm what found in previous studies (Casey et al. 2008; Dunsmuir et al. 2018; Raylu and Oei 2004b; Ronzitti et al. 2016; Smith et al. 2015a), namely that males tend to score higher than females at the GUS, and females tend to score higher than males at the GRSEQ. These results seem to support evidence that male adults are more likely to develop and maintain problem gambling behavior than female adults, possibly due to higher risk-taking and social anxiety, as discussed in recent literature (Wong et al. 2016). It is also possible that such differences reflect the higher rates of gambling and problem gambling observed in Italian males compared to Italian females, as reported in recent official reports. In fact, according to the results from a recent national survey (Cerrai et al. 2017) Italian males seem to be more attracted to gambling than Italian females. This is of extreme importance because gender-targeted prevention, screening, and assessment of some of the major determinants of problem gambling may help reduce the phenomenon in both groups. As suggested by Smith et al. 2015a, b, p. 17), a key benefit deriving from such evidence is that gender represents a "readily identifiable demographic", facilitating screening and policy-making. However, in the present study we found no gender differences in SOGS scores. Further research is needed to confirm gender differences in problem and pathological gambling in the Italian community.

Conclusions

The results from the present study suggest that the GUS-I and the GRSEQ-I are reliable and valid scales in assessing gambling urges and self-efficacy to refuse gambling, respectively, in individuals from the Italian community. These results have a great potential in terms of screening and assessing individuals from the community who are at risk of developing problem gambling. In the light of evidence from previous literature (Niaura 2000; Sharpe 2002; Smith et al. 2013; Tiffany and Conklin 2000) that urges "can be mediated by the expectation that engaging in the addictive behavior can help improve an existing negative mood state" (Raylu and Oei 2004b, p. 104), and that gambling refusal self-efficacy is negatively associated with gambling behavior (Casey et al. 2004; May et al. 2003), policymakers will benefit from the availability of these two measures in the Italian context, allowing them to design, prepare and implement targeted screening and assessment campaigns, with significant repercussions in terms of public health and prevention.

There are other implications from the presented results. First, two valid scales will be available in the Italian context, and this is especially important in the light of the dramatic rise of the phenomenon (Iliceto et al. 2016). Second, having found that the same factors are associated to problem gambling in multiple cultural contexts contributes to evidence that these constructs are general determinant of gambling behavior cross-culturally, and that they should be monitored and assessed in the effort to establish and consolidate effective assessment policies in multiple cultural contexts. Third, in the light of the overlap of concepts among theories of gambling urges and gambling refusal self-efficacy, the results from the present study corroborate existing evidence from research and the validity of cognitive theories in addressing the phenomenon of problem gambling (Ladouceur et al. 1998). Nevertheless, it must be stressed that this was a validation study, the speculations presented in the current discussion are beyond its main aim.

The study has limitations. First, test-retest reliability of the GUS-I and the GRSEQ-I were not assessed. Second, it would be important to further investigate the validity of the GUS-I and the GRSEQ-I in larger samples and possibly clinical samples, testing the validity of the scale in assessing severity and maintenance of urges of and levels of gambling refusal self-efficacy in problem and pathological gamblers, attempting to identify diagnostic cutoffs. Third, because this study is based on self-reported measures, it is not possible to exclude that known flaws such as social desirability and memory recall bias might have affected participants' responses. Fourth, regarding urges, an important limit of the present study is not having explicitly used the GUS-I to measure gambling urge as state. This is particularly important in the light of recent literature (Canale et al. 2019) discussing urges as a distinctive, transitory and fluctuant experience rather than a trait. Future research shall attempt to address this issue, and with regard to assessment, to test the concurrent validity of the GUS-I with other validated measures of gambling urges as state in the Italian population (e.g. the GACS; Young and Wohl 2009). Fifth, the study would have benefitted from testing the concurrent validity of the GUS-I and the GRSEQ-I in relation to other scales assessing problem gambling and common mental health correlates (e.g. depression, anxiety, hopelessness), and in the specific case of the GRSEQ-I, scales measuring self-efficacy in refusing gambling (Barbaranelli et al. 2017; Hodgins et al. 2004; May et al. 2003). Nevertheless, one advantage of the study is to have used the SOGS-I, the GRCS-I, and the GFA-R-I, three validated, reliable scales based on solid theoretical foundations (Raylu and Oei 2004a, b; Casey et al. 2008) and that had been previously validated in other contexts. Finally, it must be acknowledged that the findings of the present study cannot be interpreted in terms of causal effects, considered the cross-sectional nature of data. More research is needed to clarify the role of gambling urges and gambling refusal self-efficacy and possible repercussions to the development and maintenance of problem gambling in adult individuals.

Compliance with Ethical Standards

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

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

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