The Generalized Problematic Internet Use Scale-2 in a French

sample: Psychometric evaluation of the theoretical model

Stephanie M. A. Laconi, Katarzyna Kaliszewska-Czeremska, Nathalie Tricard, Henri

Chabrol, & Daria J. Kuss

Abstract

Objectives: The Generalized Problematic Internet Use Scale-2 (GPIUS-2) is a short self-report questionnaire assessing Internet addiction based on a cognitive behavioral model. Our main goal was to evaluate the psychometric properties of its French version among a sample of students and to appraise the relevance of the generalized problematic Internet use model. **Methods:** A sample of 563 university students aged between 18 and 35 years (M = 20.8; SD = 2.7) completed several online self-report questionnaires including the GPIUS-2, the Internet Addiction Test (IAT) and the Center for Epidemiologic Study-Depression scale (CES-D). **Results:** Confirmatory Factorial Analyses revealed a poor but acceptable overall fit for the original five-factor model and the original four-factor model. Path analyses, testing Structural Equation Modeling provided showed a poor fit to the data, suggesting insufficient construct validity. Convergent and concurrent validities analyzed through correlational analyses revealed significant relationships between the GPIUS-2, its factors, the IAT, time spent online and the CES-D. **Conclusions:** This research highlights the insufficient psychometric properties of the GPIUS-2 in a French sample, similar to previous results. However, this French version appears to be a useful multidimensional tool for assessing problematic Internet use among students, and reveals promise for future research and clinical applications of the measure, given its solid theoretical basis and despite the results of this psychometric study.

Keywords: Internet; Addictive Behavior; Psychometrics; GPIUS-2.

Résumé

Objectifs: Internet est devenu un outil essentiel dans la vie de millions d'utilisateurs, notamment en France. Cependant encore peu d'études ont été réalisées au sein de cette population, par conséquent peu d'outils d'évaluation ont été validés. La Generalized Problematic Internet Use Scale-2 (GPIUS-2) est un questionnaire court d'auto-évaluation de l'addiction à Internet, basée sur un modèle cognitivo-comportemental. Utilisée et validée dans plusieurs pays à travers le monde, aucune version française n'a jusque-là été proposée et étudiée. Notre objectif principal était d'évaluer les propriétés psychométriques de la version française de la GPIUS-2 dans un échantillon d'étudiants ainsi que d'estimer la pertinence du modèle d'utilisation problématique d'Internet. **Méthodes:** Un échantillon de 563 étudiants universitaires âgés de 18 à 35 ans ($M = 20,8$; $SD = 2,7$) a été recruté via Internet. Il a complété plusieurs questionnaires en ligne comprenant la GPIUS-2, une autre échelle évaluant l'addiction à Internet : l'Internet Addiction Test (IAT), et la Center for Epidemiologic Study-Depression scale (CES-D). **Résultats:** Les analyses factorielles confirmatoires ont révélé un ajustement global faible mais acceptable pour le modèle original à cinq facteurs (χ^2/df (530.25/80) = 6.6, $p < .001$; RMSEA = .09, SRMR = .076; CFI = .88; GFI = .88; AGFI = .83 and NFI .87) ainsi que pour le modèle original à quatre facteurs (χ^2/df (694.38/84) = 8.2, RMSEA = .12, p close to fit $< .001$; SRMR = .063; CFI = .85; GFI = .85; AGFI = .79, and NFI = .83). La modélisation en équations structurelles a montré un ajustement faible du modèle à quatre facteurs aux données (χ^2/df (12.43/2) = 6.2, $p < .05$; RMSEA = .096, SRMR = .037; CFI = .98, GFI = .99, AGFI = .95), ce qui suggère une validité de construit insuffisante pour ce modèle. La consistance interne de l'échelle et de ses sous échelles était également bonne ($\alpha \geq 0,73$. La bonne validité convergente a été observée au travers des analyses de corrélation, qui démontraient des relations significatives entre la GPIUS-2, ses facteurs, l'IAT, le temps passé en ligne et la CES-D. **Conclusions:** Les qualités

psychométriques de la version française de la GPIUS-2 étaient insuffisantes bien que meilleures pour la version à quatre facteurs. Cette recherche souligne ainsi les propriétés psychométriques insuffisantes de la version française, en adéquation avec les résultats d'études précédentes. Malgré tout la GPIUS-2 semble être un outil multidimensionnel simple et utile pour évaluer l'utilisation problématique de l'Internet, et plus généralement un outil prometteur pour les recherches futures et les applications cliniques, compte tenu de sa base théorique solide et ce, malgré les résultats de la présente étude.

Mots clés: Internet; Addiction; Psychométrie; GPIUS-2.

Introduction

Internet addiction has become a growing concern in many countries [1,2]. However, internet addiction has been subject to numerous debates, such as controversies concerning terminology [3,4], and a consensual definition of internet addiction is still lacking [3,5]. Several terms exist for the same phenomenon, such as problematic use, pathological use, excessive or compulsive internet use [6]. Given nosological ambiguity, in this paper, the term Problematic Internet Use (PIU) will be used. Definitions mainly involve problematic, excessive or disproportionate internet use which is time-consuming, causes distress, impairs functioning in important life domains, and which is pursued despite negative outcomes [7].

Debates also concern its construct validity [8]. Even if researchers mainly agree on the existence of PIU or internet addiction [3,5], many aspects of its conceptualization have been questioned, leading to two main conceptual approaches [9], which view PIU either as an impulse control disorder or a behavioral addiction similar to substance use disorders [3]. Recently, *Internet Gaming Disorder* (IGD) was included in section 3 of the DSM-5 as a disorder that requires further research, and was described as an addictive behavior, triggering similar neurological responses as drug addiction [10]. The large overlap between PIU and online gaming addiction (i.e., IGD) [11] suggests that PIU shares addictive properties with IGD, even if they appear as distinct disorders [12-14].

Nevertheless, this point of view has been criticized. First, the internet is a medium to engage in addictive behaviors and is not addictive per se [8]. Moreover, PIU is frequently associated with psychiatric disorders [3], leading some researchers to suggest PIU is a symptom of the latter [9,15,16]. A different theoretical framework was proposed by Davis, namely the cognitive behavioral model, suggesting PIU is the result of maladaptive cognitions and behaviors and is exacerbated by preexisting psychopathological conditions, such as loneliness or depression [17,18]. PIU "attempts to explain and understand both generalized

5

and specific internet addiction" [19]. Therefore, this conceptualization of PIU has been considered a major theoretical advance [7,20], and thus has been used for the development of a number of PIU measurement tools. The Generalized Problematic Internet Use Scale (GPIUS) [21] was one of the first scales developed in order to measure cognitive and behavioral symptoms associated with PIU from a multidimensional perspective [22]. Its second version, the GPIUS-2 [18], refined into 15 items shortening administration and scoring times, revealed good psychometric properties [7,9,22-25].

The GPIUS-2 is one of the few theory-based measures of internet addiction [9] and one of the most promising scales in terms of its good psychometric properties [26]. Indeed, the five validating studies of the GPIUS-2 [7,9,22-24] and one additional paper on its reliability and validity [25] revealed good psychometric properties. The scale is based on four first-order factors consistently retrieved in validating studies [7,9, 18, 22-24]. Caplan's original cognitive behavioral model of Generalized Problematic Internet use (GPIU) was made up of the latent variables Preference for Online Social Interaction (POSI), mood regulation, deficient self-regulation and negative outcomes. Indeed, the communicative context of the internet is a particularly relevant factor for internet addiction according to this cognitive behavioral model [9]. Thus, POSI reflects how much a person prefers to communicate online rather than face-to-face, and appears particularly related to internet addiction [5,6]. Mood regulation defines how much the internet is used in order to escape from negative affective states. The factor negative outcome evaluates negative consequences associated with internet use. Deficient self-regulation contains cognitive preoccupation and compulsive internet use, which measure obsessive thinking about internet use, and the inability to control the amount of time spent online. It describes a decrease in self-control regarding internet-related behaviors, and appears as a key component of GPIU [17,18,23,25]. This model suggests individuals with a high POSI are mainly using online communication for

mood regulation by looking for social support. Besides, this motive is more likely to lead to deficient self-regulation, and negative outcomes, as well as cognitive preoccupation and compulsive use. Caplan found the relationship between POSI and deficient self-regulation was mediated by mood regulation, which in turn led to direct effects on cognitive preoccupation, compulsive use, and negative outcomes. Relationships between each PIU factor were hypothesized, tested, and confirmed [18,22,23], suggesting the solidity of this scale for GPIU.

The few PIU measurements that have been validated in French samples are based on DSM criteria for pathological gambling and substance dependence. Available French scales do not reflect PIU scales created worldwide and do not permit the exploration of other solid theoretical frameworks. Yet, in a large cross-cultural study using a randomized controlled trial, PIU seemed as prevalent in France as in other European countries with 13.8% of adolescents affected [27]. Another cross-cultural study showed that 29.3% of university students present a high risk for PIU [28]. In countries neighboring France, 8.8% of adolescents were at risk for PIU in Italy, 13.3% in Spain, 14.5% in Germany [27], and 3.7% in the Netherlands [29]. Cultural differences in prevalence rates [9,27] emphasize the need to assess the instruments' psychometric properties. The validation of a French version of the GPIUS-2 appears as a necessary step for further reliable studies on PIU.

More studies on the cognitive behavioral model are needed in order to increase our knowledge about internet addiction. Therefore, the exploration of the psychometric properties of a French version of the GPIUS-2 appears as a necessary step for further reliable studies on internet addiction, particularly by using path model analysis which provides a theoretical backing for the proposed relationships between the GPIU factors. Specifically, the objectives of the present study were therefore to explore the psychometric properties of the French version of the GPIUS-2 in a sample of French university students. Reliability, concurrent,

convergent and factorial validity were evaluated. The next objective was to assess the relevance of the generalized problematic Internet use model proposed by Caplan (2010). Indirect-effect analyses were used in order to confirm the relationships between the constructs of the model, similar to the original study [18] and one previous validating study [22]. Therefore, it was hypothesized that (H1) POSI will be a direct positive predictor of deficient self-regulation and mood regulation; (H2) mood regulation will be a direct positive predictor of deficient self-regulation; (H3) deficient self-regulation will be a direct positive predictor of negative outcomes. Moreover, it was hypothesized that (H4) there will be a positive indirect relationship between POSI and deficient self-regulation mediated by mood regulation, (H5) a positive indirect relationship between POSI and negative outcomes mediated by deficient self-regulation, and (H6) a positive indirect relationship between mood regulation and negative outcomes mediated by deficient self-regulation. To the authors' knowledge, this is the first study that examines the psychometric properties of a French version of the GPIUS-2.

Methods

Participants and Procedure

A sample of 563 university students from 27 French universities took part in the study (mean age ± SD = 20.8 ± 2.7: age range 18-35; 64.5% [n = 363] females and 35.5% [n = 200] males). Regarding academic disciplines, 10.2% of participants were studying towards degrees in the Humanities, 10.5% in the Natural and Formal Sciences, 39.6% in Social Sciences, and 39.6% in Applied Sciences.

The GPIUS-2 was initially independently translated into French by two English-speaking members of the research team. Back-translation methods were used to ensure compatibility between the English and French versions. Participants were recruited online through Facebook university groups and websites of French universities with a self-selection procedure. All participants were informed of the confidentiality and the anonymity of their

responses, and agreed to give their free and informed consent. This study has been performed in accordance with the 1964 Declaration of Helsinki and its later amendments. The total sample was recruited between May 2013 and January 2014 ($n = 832$). Only participants aged over 18 years and who were students at a French university between their first and fifth year and who completed all the scales were included in the study ($n = 563$).

Measures

The GPIUS-2 [18] consists of 15 items rated on an 8-point scale ranging from 1 (strongly disagree) to 8 (strongly agree), with higher scores indicating a greater level of PIU. Results of GPIUS-2 validating studies are presented in **Table 1**. In these studies, psychometric properties were not always/only partially provided, but when possible, characteristics of the tested samples, the internal consistency, and concurrent, convergent and factorial validities of the 4-factor model were reported. Given the large amount of variables used to assess convergent validity, only those that appear at least in two studies were reported.

The Internet Addiction Test (IAT; $\alpha = .87$) [30,31] is one of the most widely used tests for PIU assessment. Its psychometric properties have been widely explored and thus the IAT is often used in evaluating the psychometric properties of other PIU scales [26]. It contains 20 items rated on a 5-point scale ranging from 1 (rarely) to 5 (always), with the original proposed cut-off scores: 20-39 for normal, 40-69 for maladaptive and 70-100 for PIU, despite previous criticisms and inconsistencies in use [26,32].

The French version of the Center for Epidemiologic Studies Depression Scale (CES-D-20; $\alpha = .91$) [33] was used to assess depressive symptoms over the previous seven days. It includes 20 items rated on a 4-point scale ranging from 0 (rarely or never) to 3 (most of the time or all the time). Scores range from 0 to 60, with higher scores indicating the presence of more significant depressive symptoms. Cut-off scores used for descriptive analyses were 17 for males and 23 for females [34].

Participants also completed a set of demographic questions (gender, age and academic disciplines) and questions related to their internet use to assess time spent online per day during the week and at the weekend, similar to previous studies [35]. Response modalities were: less than 1 hour, between 1 and 2 hours, between 3 and 4 hours, between 5 and 6 hours, between 7 and 8 hours, and more than 8 hours.

Data analysis

To test the hypotheses, a two-step analysis procedure proposed by Anderson and Gerbing [36] and used by Caplan [18] for the development and testing of theoretical models [37] was performed. According to this procedure, Structural Equation Modeling (SEM) (i.e., Confirmatory Factor Analysis (CFA) and path analysis) was used to evaluate the psychometric properties of the GPIUS-2. The first step of our analysis involved CFA of the measurement model with the first and the second-order factors (**Figure 1**), whereas the second step included a confirmatory analysis of the relationships between the constructs of the original model (**Figure 2**). R-squares are presented in **Figure 2**. It is worth noting that this popular procedure was used by Caplan in his initial study, and other researchers who adapted the GPIUS-2 [9,22,23]. A four and a five-factor model have been tested; deficient self-regulation as a second-order factor and cognitive preoccupation and compulsive internet use as two first-order factors [9, 18,22,23].

Results of the Kolmogorov-Smirnov tests (K-S tests) and skewness and kurtosis indicated significant departures from normality for all scales and items (**Table 2**), therefore non-parametric statistics were used. The models tested by SEM (with computed scores entered in the model) were evaluated using the following practical fit measures: Chi-square test (X^2/df), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), Bentler's comparative fit index (CFI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI) and Normed Fit Index (NFI). It was assumed that the

model can be considered satisfactory when the X²/df is lower than 2, RMSEA and SRMR lower than .08, NFI, CFI, GFI and AGFI higher than .90 [38,39]. Taking into account the asymmetric distribution of the variables, polychoric correlation coefficients were used in the process of building all models. Parameters estimations was performed using the maximum likelihood method (ML).

Convergent validity (i.e., the relationship with the scale and other validated measures of PIU) was assessed for the IAT, and concurrent validity (i.e., the relationship between the scale and variables frequently related to PIU) was evaluated using time spent online and depressive symptoms, which have been particularly recommended for the evaluation of the psychometric properties of the GPIUS-2 [9] and which are the two most frequently used variables for assessing convergent validity of PIU scales [26]. Spearman correlation coefficients between the total scores of the GPIUS-2, its factors and the IAT, the CES-D and time spent online were reported (**Table 3**). The internal consistency for each subscale of the GPIUS-2 was measured with Cronbach's alpha (**Table 4**). The data were analyzed using SPSS 21.0 and LISREL 8.51 [40].

Results

Descriptive statistics

According to the IAT, 0.4% participants were problematic internet users ($n = 2$), 25.2% maladaptive internet users ($n = 142$) and 74.4% normal internet users ($n = 419$). Problematic internet users were represented by both genders, while maladaptive users were mostly women ($p < .01$) and normal users mostly men ($p < .01$).

Factorial validity

CFA revealed a poor overall fit for the original five-factor model (χ^2/df (530.25/80) = 6.6, $p < .001$; RMSEA = .09 (90% C.I.: .09- .10), p close to fit < .001; SRMR = .076; CFI = .88; GFI = .88; AGFI = .83 and NFI .87), and the original four-factor model (χ^2/df (694.38/84)

= 8.2, $p < .001$; RMSEA = .12 (90% C.I.: .11- .13), p close to fit $< .001$; SRMR = .063; CFI = .85; GFI = .85; AGFI = .79, and NFI = .83). The four-factor solution using one overall dimension for deficient self-regulation instead of the two subscales has been retained. The decision to choose this model has been based on the strong correlation ($\rho = .51$; $p < .05$) between two subscales of the variable Deficient Self-Regulation in the French sample (Cognitive preoccupation and Compulsive Internet use).

In order to confirm the relevance of the PIU model and the validity of the French adaptation, a path analysis was conducted. This analysis revealed that the four-factor model provided an acceptable fit to the data (χ^2/df (12.43/2) = 6.21, $p < .05$; RMSEA = .096 (90% C.I.: .049 - .15), p close to fit $< .001$; SRMR = .037; CFI = .98, GFI = .99, AGFI = .95). Moreover, path analysis revealed that taking into account mutual interactions between the basic dimensions of the main factors, improved parameters were received for the model. Direct effect analysis revealed positive relationships between factors (H1-H3), a positive indirect relationship between POSI and deficient self-regulation (H4), mediated by mood regulation (with indirect effect = .16; $p < .05$), a positive indirect relationship between POSI and negative outcomes (H5), mediated by deficient self-regulation (with indirect effect = .19; $p < .05$), and between mood regulation and negative outcomes (H6), mediated by deficient self-regulation (with indirect effect = .21; $p < .05$). The variables accounted for 23% of the variance in participants' mood regulation scores, 30% of the variance in deficient self-regulation scores, and 39% of the variance in negative outcome scores (see **Figure 2**).

Reliability and convergent validity

Examination of Cronbach's alpha highlighted good internal consistency for the whole scale ($\alpha = .88$) and for each factor: POSI ($\alpha = .83$), mood regulation ($\alpha = .82$), negative outcomes ($\alpha = .73$), and deficient self-regulation ($\alpha = .81$). Cronbach's alphas of Cognitive

preoccupation and of Compulsive Internet use (5-factor model) were $\alpha = .66$ and $\alpha = .79$, respectively.

Spearman's correlation coefficients were high between the GPIUS-2 and the IAT as well as depressive symptoms ($> .50$), and moderate with time spent online (from $\rho = .28$ to $\rho = .38$). Coefficients were also moderate between the GPIUS-2 subscales and depressive symptoms (from $\rho = .37$ to $\rho = .42$). Regarding time spent online and the IAT scores, the coefficients' effect sizes varied for each subscale (please see **Table 3**).

Discussion

The main goal of this study was to explore the psychometric properties of the GPIUS-2 in a French sample of university students by replicating the analysis of the original author [18]. CFA and path analysis revealed that with respect to the original structure of the GPIUS-2, the 4-factor model provided acceptable fit to the data, in accordance with previous results [9, 22-24]. Contrary to Caplan's proposition, the 4-factor model without the second-order factor fits the data best. Previous authors suggest this result theoretically highlights a "strong interplay between obsessive thoughts about the internet and compulsive internet use, thus reflecting a unique manifestation of a diminished self-regulation capability" [9]. Similarly, previous research [41,42] has shown that salience (i.e., cognitive, emotional and behavioral preoccupation with using the internet) is a strong predictor of compulsive and addictive internet use in university students, supporting the present findings.

It is noteworthy that the psychometric properties of the GPIUS-2 were not ideal, but also comparable with those obtained in other research [9, 22-24]. The four-factor solution had the best properties, similar to previous studies. It could be explained by several factors, such as a change in the construct during the past 7 years, the cross-cultural differences or the specificity of the sample. Importantly, all four factors were significantly and strongly correlated, suggesting the presence of more sophisticated mutual interactions between the

basic dimensions of the GPIUS-2. This could explain the problematic results of the model revealed in the basic CFA. It is worth emphasizing the value of the individual factor loadings obtained in the tested model exceeded the value of .5 despite the strong correlation between individual dimensions. Theoretically, these results agree with previous findings, providing considerable evidence for the consistency of the factorial structure and the accuracy of Caplan's model. The solution revealed relationships between some dimensions of the model and supported all direct-effect relationships and two of the three indirect-effect ones, consistent with Caplan's predictions. These results should be taken with caution given the general poor fit to the data.

All the GPIUS-2 factors obtained satisfactory internal consistency, and convergent and concurrent validity, similar to those found in other validating studies [7,22,24,25,43], and highlighted the good construct validity of this scale. The significant relationship retrieved between the CES-D-20 and mood regulation indicated good convergent validity. Moreover, a strong association between the IAT and deficient self-regulation and a lower association between the IAT and POSI have been retrieved, similar to previous research [9]. These results are difficult to interpret given the large construct differences between the two scales, but could highlight that the GPIUS-2 takes into account one particular online preference (i.e., for social interaction), while the IAT evaluates more general use with no distinction between specific online behaviors [44]. The relationship between total time spent online (for academic and non-academic purposes), the GPIUS-2 and its factors highlighted the good construct validity of this scale and is in accordance with other results [9,22,24]. Moreover, even if time online (during the week and at the weekend) was correlated with the CES-D-20, low coefficients were retrieved suggesting a small relationship between these variables, at least in the present sample.

Limitations include the cross-sectional design of this study which precludes inferring causal relationships. It could also have been worthwhile balancing gender in the statistical analyses to receive a gender-neutral picture. Online recruitment, common method bias and self-selection may also result in sample bias. In our study, the prevalence of problematic internet users was low. However, the IAT is used for testing concurrent validity and appears as gold standard in the area, but has received much criticism [26; 45]. Besides, some authors recommend distinguishing professional and private use of the internet, even if there appears to be a fine line between the two. Further studies should be conducted, particularly on larger, homogenous and different samples (gender, age and culture). Moreover, the test-retest reliability of the GPIUS-2 has only been explored in one study, and although its coefficient was excellent ($r = .85$) [7], more studies should focus on this reliability indicator. In clinical settings, particular attention should be paid to each specific maladaptive cognition and behavior revealed by the GPIUS-2 scores and subscales. Identification of these characteristics could enhance efficiency of cognitive-behavioral therapy, which is commonly used in the treatment of PIU [9,22].

Conclusion

SEM showed that in general, the original problematic Internet use model provided a good fit to the data, consistent with cognitive behavioral theory for a conceptualization of Internet addiction. To conclude, this research highlights the acceptable but poor psychometric properties of the GPIUS-2 in a sample of French university students and confirms its usefulness as based on the short administration and scoring times, and the solid theoretical basis using a multidimensional perspective. Reliability, concurrent and convergent validities, and factorial analyses confirmed previous findings in various samples, including European participants. The GPIUS-2 reveals promise for future research and clinical applications of the

measure, given its solid theoretical basis and despite the mitigated results of this psychometric study.

References

[1]   Kuss DJ, Griffiths MD, Binder JF. Internet addiction in students: Prevalence and risk factors. Comput Hum Behav. 2013;29(3):959-66.

[2]   Kuss DJ, Griffiths MD, Karila L et al. Internet addiction: A systematic review of epidemiological research for the last decade. Current Pharmaceutical Design 2014;20(25):4026-52.

[3]   Spada MM. An overview of problematic Internet use. Addict Behav. 2014;39:3-6.

[4]   Widyanto L, Griffiths MD. Internet addiction": A critical review. Int J Ment Health Addict. 2006;4:31-51.

[5]   Lortie CL, Guitton MJ. Internet addiction assessment tools: Dimensional structure and methodological status. Addict Rev. 2013;108(7):1207-16.

[6]   Adièle I, Olatokun W. Prevalence and determinants of Internet addiction among adolescents. Comput Hum Behav. 2014;31:100-10.

[7]   Barke A, Nyenhuis N, Kröner-Herwig B. The German version of the Generalized Problematic Internet Use Scale 2: A validation study. Cyberpsychol Behav Soc Netw. 2014;17(7):474-82.

[8]   King DL, Delfabbro PH. Issues for DSM-5: Video-gaming disorder? Aust N Z J Psychiatr. 2013;47(1):20-2.

[9]   Fioravanti G, Primi C, Casale S. Psychometric evaluation of the Generalized Problematic Internet Use Scale 2 in an Italian sample. Cyberpsychol Behav Soc Netw. 2013;16(10):761-6.

[10]   Association AP. Fact Sheet. Diagnostic and statistical manual of mental disorders (5th Ed). Arlington, VA: American Psychiatric Publishing; 2013.

[11]   Rehbein F, Mößle T. Video game and Internet addiction: Is there a need for differentiation? Sucht. 2013;59:129-42.

[12]   Griffiths MD, Pontes HM. Internet addiction disorder and Internet Gaming Disorder are not the same. J Addict Res Ther 2014;5(4):e124.

[13]   Kiraly O, Griffiths MD, Urban R et al. Problematic Internet use and problematic online gaming are not the same: Findings from a large nationally representative adolescent sample. Cyberpsychol Behav Soc Netw. 2014;17(12):749-54.

[14]   Montag C, Bey K, Sha P et al. Is it meaningful to distinguish between generalized and specific Internet addiction? Evidence from a cross-cultural study from Germany, Sweden, Taiwan and China. Asia Pacific Psychiatr. 2014.

[15]   Pies R. Should DSM-V designate "Internet addiction" a mental disorder? Psychiatr. 2009;6(2):31-7.

[16]   Thorsteinsson EB, Davey L. Adolescents' compulsive Internet use and depression: A longitudinal study. Open J Depress 2014;3(1):13-7.

[17]   Davis RA. A cognitive-behavioral model of pathological Internet use. Comput Hum Behav. 2001;17:187-95.

[18]   Caplan SE. Theory and measurement of generalized problematic Internet use: A two-step approach. Comput Hum Behav. 2010;26:1089-97.

[19]   Pontes HM, Griffiths MD. Assessment of Internet gaming disorder in clinical research: Past and present perspectives. Clin Res Regul Aff. 2014;31(2-4):1-14.

[20]   Kaliszewska-Czeremska K. Modelling excessive Internet use: Revision of R. Davis's cognitive-behavioural model of pathological Internet use. Pol Psychol Bull 2011;42(3):129-39.

[21]   Caplan SE. Problematic Internet use and psychosocial well-being: Development of a theory-based cognitive-behavioral measurement instrument. Comput Hum Behav. 2002;18:553-75.

[22]   Gamez-Guadix M, Villa-George FI, Calvete E. Measurement and analysis of the cognitive-behavioral model of generalized problematic Internet use among Mexican adolescents. J Adolesc. 2012;32:1581-91.

[23]   Gamez-Guadix M, Orue M, Calvete E. Evaluation of the cognitive-behavioral model of generalized and problematic Internet use in Spanish adolescents. Psicotherma. 2013;25(3):299-306.

[24]   Pontes HM, Caplan SE, Griffiths MD. Psychometric validation of the Generalized Problematic Internet Use Scale 2 in a Portuguese sample. Comput Hum Behav. 2016;63:823-33.

[25]   Yong KF. The reliability and validity of three Internet addiction instruments in the Japanese population [thesis]. Japan: University of Tokyo; 2013.

[26]   Laconi S, Rodgers RF, Chabrol H. The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. Comput Hum Behav. 2014;41:190-202.

[27]   Durkee T, Kaess M, Carli V et al. Prevalence of pathological Internet use among adolescents in Europe: Demographic and social factors. Addiction. 2012;107:2210-22.

[28]   Ladner J, Lukacs A, Boussouf N et al. The relationships between mental stress, risk of eating disorders and Internet addiction among university students in Algeria, France and Hungary, 2010-2012. Eur J Public Health. 2013;23(1):165-6.

[29]   Kuss DJ, van Rooij AJ, Shorter GW et al. Internet addiction in adolescents: Prevalence and risk factors. Comput Hum Behav. 2013;29(5): 1987–1996.

[30]   Khazaal Y, Billieux J, Thorens et al. French validation of the Internet Addiction Test. Cyberpsychol Behav Soc Netw. 2008;11(6):703-6.

[31]   Young KS. Caught in the Net: How to recognize the signs of Internet addiction and a winning strategy for recovery. New York: Wiley; 1998.

[32]   Pontes HM, Patrão IM, Griffiths MD. Portuguese validation of the Internet Addiction Test: An empirical study. J Behav Addict. 2014;3(2):107-14.

[33]   Furher R, Rouillon F. La version française de l'échelle CES-D (Center for Epidemiologic Studies-Depression Scale). Description et traduction de l'échelle d'auto-évaluation. Psychiatr Psychobiol. 1989;4:163-6.

[34]   Husaini BA, Neff JA. Characteristics of life events and psychiatric impairment in rural communities. J Nerv Ment Dis. 1980;168(3):159-66.

[35]   Laconi S, Tricard N, Chabrol H. Differences between specific and generalized problematic Internet uses according to gender, age, time spent online and psychopathological symptoms. Comput Hum Behav. 2015;48:236-44.

[36]   Anderson J, Gerbing W. Structural equation modelling in practice: A review and recommended two stage approach. Psychol Bull. 1988;27(1):411-23.

[37]   Dwivedi YK, Lal B, Williams MD, Schneberger SL et al. Handbook of research on contemporary theoretical models in information systems. New York: Hershey; 2009.

[38]   Tabachnick BG, Fidell LS. Using multivariate statistics (4th Ed.). Boston MA: Allyn and Bacon; 2001.

[39]   Thompson B. Ten commandments of structural equation modeling. In: Grimm LG, Yarnold PR, editors. Reading and understanding multivariate statistics. Washington DC: American Psychological Association; 2000.

[40]   Jöreskog KG, Sörborn D. LISREL 8: User's reference guide (2nd Ed.). Chicago: Scientific Software International; 1999.

[41]   Kuss DJ, Shorter GW, van Rooij AJ et al. The Internet addiction components model and personality: Establishing construct validity via a nomological network. Comput Hum Behav. 2014;39(10):312-21.

[42]   Kuss DJ, Shorter GW, van Rooij AJ et al. Assessing Internet addiction using the parsimonious Internet addiction components model. Int J Ment Health Addict. 2014;12(3):351-66.

[43]   Barke A, Nyenhuis N, Kröner-Herwig B. The German version of the Internet Addiction Test: A validation study. Cyberpsychol Behav Soc Netw. 2012;15(10):534-42.

[44]   Carli V, Durkee T, Wasserman D et al. The association between pathological Internet use and comorbid psychopathology: A systematic review. Psychopathol. 2013;46(1):1-13.

[45] Khazaal Y, Achab S, Billieux J et al. Factor structure of the Internet Addiction Test in online gamers and poker players. JMIR Ment Health. 2015;2(2):e12.