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PSYCHOMETRIC VALIDATION OF THE GENERALIZED PROBLEMATIC INTERNET USE SCALE 2 IN A ROMANIAN SAMPLE

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Abstract: *The aim of this study is to test and conduct a psychometric validation of this scale on a Romanian version of The Generalized Problematic Internet Use Scale (GPIUS2). To realize this objective, dimensionality, reliability and theoretical relevance of the scale under study were analysed. The sample consisted of 347 people (M=27.52 years, SD=9.82). In addition, the Internet Addiction Scale (IAT) and the Depression, Anxiety and Stress Scale (DASS) questionnaires were also used in the study. The conducted research indicates that the Romanian version of GPIUS2 is characterized by satisfactory indicators of reliability and theoretical accuracy, as well as scale structure.*

Key words: *problematic internet use, psychometric validation, reliability, validity, Romanian sample*

1. Introduction

Since the invention of the Internet and its spread, how people use it has become a subject of research. As the Internet continues to evolve with technology, researchers indicate that the human-Internet relationship is also changing. A growing body of research points to the complex interplay of multiple psychological constructs linked to the ways in which people use the Internet. As a phenomenon, the Internet is a technological phenomenon whose ubiquity is almost tangible. The need to use it in professional and private life has made life without the Internet almost impossible for many people. However, the way we use the web is not indifferent to the user. Researchers point to a number of negative consequences and also positive aspects that can be attributed to Internet use. It is worth mentioning here that this study takes up the subject of the problematic internet use (PIU) phenomenon, which is not the only construct related to the Internet. Apart from it, the existence of Internet Addiction, Compulsive Use of Internet or other constructs is indicated. Also, many researchers do not take up the subject of the study of Internet use as a whole, referring only to its

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selected possibilities. This manifests itself in scales allowing for the study of social media use or the phenomenon of binge-watching. Despite this multiplicity of constructs and their range, researchers agree that the relationship between man and the Internet is an important subject of research, not only in terms of measurement and analysis, but also in the context of education and prevention. PIU originates from Pathological Internet Use and is based on a cognitive-behavioural paradigm, which argues that a range of cognitive, emotional and behavioural factors are necessary for PIU to occur. According to the constructed theoretical model, the scale validated in this article was also created. This means that it has remarkable potential, not only in terms of being able to determine PIU, but also in terms of embedding it in a theoretical framework. Such embedding has a chance for further development in the form of prevention programmes, i.e. prevention of the negative effects of human-Internet relations and strengthening of those behaviours that allow for appropriate use of the Internet.

2. Research Background

2.1. Internet use and associated psychological constructs

Internet penetration in Romania is 91.6% of the total population as reported in February 2024 (Kemp, 2024). A survey conducted by Save the Children Romania in 2018 mentioned that 61% of respondents (aged 11 to 17) claimed to access the internet for the first time at an age between 6 and 10 years of age and 27% of them use the internet more than 6 hours a day in a school day, reaching almost 50% of users staying connected more than 6 hours in a free day (Save the Children, 2018). The reports indicate an increase in internet use simultaneously with a decrease in the age of first-time users. Giving this data, it is important to have a better understanding of the psychological effects of internet use and to have appropriate tools to measure the phenomenon.

Problematic internet use can be described as a person's inability to control the need to browse various internet platforms, leading to feelings of discomfort and affecting daily activities. While the above description is widely accepted, there is less consensus on the naming and classification of the behaviour. Numerous concepts are in use, with the most well-known being Internet addiction (Young, 1996, 1998), pathological internet use (Davis, 2001), and problematic internet use (Caplan, 2010) and there are attempts to clarify the terms (Yellowless & Marks, 2007). Young (1998) advocates for the recognition of this behaviour as a medical condition. She defines pathological internet use as an impulse control disorder that does not involve use of a substance, as addicts rely on the feelings and emotions obtained from the internet and become psychologically attached. Thus, pathological internet use is more of a mind addiction than a body addiction. Young's ACE model explains how Accessibility, Control, and Emotion/Excitement play an important role in internet addiction.

From a psychological perspective, problematic internet use can occur when an individual develops compulsive behaviour towards using internet platforms, significantly interfering with normal functioning and quality of life. In some cases, individuals use internet platforms as a coping mechanism, leading to the perpetuation of problematic behaviours and subsequently addiction (Yellowlees & Marks, 2007).

Problematic internet use can generate psychological and social problems, most often manifesting as relational difficulties, but also personal problems, both in academic and professional environments. Block (2008, cited in Spada, 2014) proposes four criteria for diagnosing problematic internet use: the association of spending time browsing the internet with neglecting other activities; the presence of symptoms of irritability, anger, and anxiety when the internet network is unavailable; low tolerance for frustration, manifested through the need to acquire more efficient equipment and use diverse programs to spend as much time as possible on the internet; the presence of negative consequences, including interpersonal conflicts, poor academic or professional performance, tendencies towards self-isolation, and fatigue.

Studies on problematic internet use have determined a correlation between this behaviour and the manifestation of social anxiety among young adults, with social anxiety symptoms acting as predictors for problematic internet use (Saikia et al., 2019). Managing negative emotions through internet browsing favours an unhealthy lifestyle, where symptoms of depression and anxiety are present (Derbyshire et al., 2013; Feng, et al., 2019; Kormas et al., 2011). Moreno et al. (2019) mention that there is a critical period when young people are more prone to problematic internet use compared to other age categories. They report that during college years, young people are more susceptible to dependent internet use. It was also found that males present higher levels of problematic internet use compared to females. It was established that age and gender variables are closely related to difficulties in understanding and managing one's emotions. Thus, problematic internet use can serve as a maladaptive coping mechanism for individuals who have difficulties with emotional self-regulation. This mechanism provides a way to avoid feelings such as loneliness, stress, and fear of certain situations (Gioia et al., 2021).

2.2. Problematic Internet use – the scale

Davis (2001) distinguishes between specific pathological internet use (for particular purposes such as online gambling or online use of sexual materials) and generalized pathological internet use (browsing online and overuse of the internet without clear purpose), both emerging from a cognitive behavioural framework. As such, pathological internet use is linked to a distal preexisting psychopathological condition, that favours maladaptive cognition when external negative situation interfere, generating affective and behavioural symptoms. Caplan (2010) consider problematic internet use as a behaviour common for large population, consisting in emotional, cognitive and behavioural components. One cognitive component that is linked with problematic internet use is preference for online social interaction instead of face to face ones. This behaviour predicts poor mood regulation skills that translates in compulsive use of the computer and obsessive thoughts about getting online which negatively impact a person’s life. Caplan (2010) argues that the five dimensions of The Generalized Problematic Internet Use Scale (GPIUS2) covers in a satisfactory manner problematic internet use, offering perspective on areas that are affected and intervention possibilities to reduce negative outcomes. The scale was validated in different

population such as Portughese (Pontes et al., 2016), Polish, (Probierz et al., 2020), Indonesian (Adlina et al., 2021).

The aim of this study is to test and conduct a psychometric validation of this scale on a Romanian version of GPIUS2. To realize this objective, both dimensionality, reliability and theoretical relevance of the scale under study were analyzed. To check theoretical relevance, the Internet Addiction Scale (IAT) and the Depression, Anxiety and Stress Scale (DASS 21) questionnaires were also used in the study. In order to check scale dimensionality, a Confirmatory Factor Analysis (CFA) was carried out, which examined two types of models including first and second order factor analysis.

3. Methods

3.1. Participants and procedure

The research sample consisted of 347 people, Romanian Internet users, (165 men and 182 women). They were aged between 18 and 50 (M=27.52 years, SD=9.82). The research was conducted in November – December 2021. Data were collected through an online survey. Data were both collected and analysed fully anonymously. The use of the online platform allowed for an increased subjective sense of anonymity of the respondents, which reduces the occurrence of many social effects, such as trying to create one's own image in the survey or to please the researcher.

The study was carried out with the prior consent of the Ethics Committee, at the Department of Pedagogy and Psychology (now the Department of Social Sciences), Institute of Psychology (Opinion No. 1/2018, of 21.01.2018), University of Silesia.

In order to prepare Romanian version of GPIUS2 a several translation methods were applied. Firstly, the text was under English to Romanian translation, then the back translation process - from Romanian to English version. After these steps the original version was compared to translated version, to obtain the most similar items. The final version of the scale was agreed after examining the compatibility of the two versions.

3.2. Measures

GPIUS2 - Generalized Problematic Internet Use Scale 2 (Caplan, 2010) contains 15 items, with each subscale having three items, measuring the following constructs:

- “Preference for Online Interaction” which represents the belief that online interaction is safer, more effective, and more comfortable than face-to-face interaction,
- “Mood Regulation” which determines the extent to which individuals use the internet to combat various negative emotions,
- “Cognitive Concerns” refers to patterns of obsessive thoughts that include internet use,
- “Compulsive Internet Use” refers to the time spent using the internet and the activities conducted online,
- “Negative Outcomes” which determines the extent to which problematic internet use affects the individual's daily life.

Participants were asked to evaluate the statements on an 8-point self-report Likert scale (1 = strongly disagree, ... 8 = strongly agree).
In the present research, for the whole scale, the internal consistency value was .89.

IAT - Internet Addiction Test (Tudorel et al., 2018; Young, 1998) It is a self-report tool for adolescents and adults. The scale includes 20 statements that measure personal, professional, and social functioning associated with compulsive internet use such as cognitive and emotional preoccupations, interference with daily duties, loss of control. Respondents answer each statement with a number between 0 and 5, indicating the extent to which they recognize that behavior in themselves. For the present study the internal consistency value was .93.

DASS-21 (Zanon et al., 2020) is a self-report questionnaire used in adults that allows to identify both clinical and non-clinical subjects the level of emotional states related to depression, anxiety, and stress. Each scale consists of 7 items that describe feelings of hopelessness, dysphoria or self-depreciation (for depression dimension), physiological arousal signs, restlessness and discomfort regarding social events (for anxiety), difficulty in feeling relaxed and obtaining a relaxation state, impatient, over-reactive or easily irritated for stress response. The answers were selected on 4 points scale from 1 (did not apply to me at all) to 4 (applied to me very much, or most of the time). Alpha Cronbach was equal to 0.94.

Socio-demographic information was also collected regarding age, gender, education, relational status, and professional status. Data were also collected for estimated time spent online during weekdays and weekends in purposes nonrelated with professional tasks and type of apps mostly used. Total number of apps was also indicated.

4. Results

4.1. Descriptive statistics

A number of 347 people participated in the study. Their distribution regarding age, gender, level of education, relational and professional status are presented in table 1.
Information about the number of hours of internet use during weekdays and weekends for browsing not related with professional tasks was also collected. A balanced number of male and female participated in the study, most of them being in a relationship or married. Almost half of the sample was represented by students which explain high school level of education as the majority of educational status chosen by them.
Facebook, Instagram, WhatsApp and YouTube are the main application used by respondents, followed by video game sites and shopping sites.

Time spent online is mostly between 1 to 3 hours, but there is a tendency of the increasing in number of hours during weekends compared with weekdays.

Table 1

Socio-demographic characteristics of the participant

N	**347**
Age (mean, standard deviation)	M = 27.52; SD = 9.82
Gender (female %; male %)	52.4%; 47.6%
Relationship status (%)	
Single	34.9%
In a relationship	39.2%
Married	22.5%
Divorced/ widow/er	1.7%
Another situation	1.7%
Education (%)	
Gymnasium	.3%
Highschool	42.9%
Bachelor	35.7%
Master/PhD	19.4%
Another situation	1.7%
Professional status (%)	
Student	45%
Full time employed	29.1%
Part-time employed	.3%
Both employed and student	19.3%
No occupation/no student status	.9%
Another situation	5.4%
Number of apps used (YouTube, Insta, WhatsApp, Facebook, shopping sites, X)	
1	3.2%
2	7.5%
3	14.7%
4	28.2%
5	23.3%
6	15.6%
7	6.1%
8	1.4%
Nonprofessional related time online weekday	
Not at all	1.4%
Less than 1 hour	21.9%
1-3 hours	42.4%
4-5 hours	23.3%
6-7 hours	6.9%
More than 8 hours	4.1%
Nonprofessional related time online weekend	
Not at all	.6%
Less than 1 hour	12.1%
1-3 hours	36%
4-5 hours	29.1%
6-7 hours	15%
More than 8 hours	7.2%

4.2. Confirmatory factor analysis

In order to check the dimensionality of the scale the confirmatory factor analysis was applied. Based on the literature analysis concerning validation of GPIUS2 scale in other countries, it was decided to test 2 models. The first model assumed an equal structure of all five subscales (Model 1), while the second model assumed the presence of a second-order structure, which consisted of 4 parent scales (Model 2), within which, however, the scale: deficient self-regulation consists of two subscales: cognitive preoccupation and compulsive Internet use. The analysis was performed using the diagonally weighted least squares (DWLS) method, due to the recommendation to use this method for non-linear or skewed data. Both proposed models were found to fit the data very well, with better results obtained from the model in which each scale is equivalent and has no subordinate structure (Model 1). The full results of the analyses obtained are presented in Table 2, figure 1 and figure 2.

Table 2

Model fitting parameters for Confirmatory factor analysis

Indicator name	**Value for Model 1**	**Value for Model 2**	**Cut off for good fit**
chi2/df	1.27	1.52	<3.0
Comparative Fit Index (CFI)	0.99	0.99	>0.90
Tucker-Lewis Index (TLI)	0.99	0.98	>0.95
Bentler-Bonett Non-normed Fit Index (NNFI)	0.99	0.99	>0.90
Bentler-Bonett Normed Fit Index (NFI)	0.97	0.97	>0.90
Parsimony Normed Fit Index (PNFI)	0.74	0.76	>0.50
Bollen's Relative Fit Index (RFI)	0.97	0.96	>0.90
Bollen's Incremental Fit Index (IFI)	0.99	0.99	>0.90
Relative Noncentrality Index (RNI)	0.99	0.99	>0.95
Root mean square error of approximation (RMSEA)	0.03	0.04	>0.05
RMSEA 90% CI lower bound	0.00	0.02	
RMSEA 90% CI upper bound	0.04	0.05	
RMSEA p-value	0.99	0.92	
Standardized root mean square residual (SRMR)	0.06	0.06	>0.05
Hoelter's critical N (α = .05)	346.05	290.54	
Hoelter's critical N (α = .01)	381.44	319.89	
Goodness of fit index (GFI)	0.99	0.99	>0.95
McDonald fit index (MFI)	0.97	0.94	>0.90

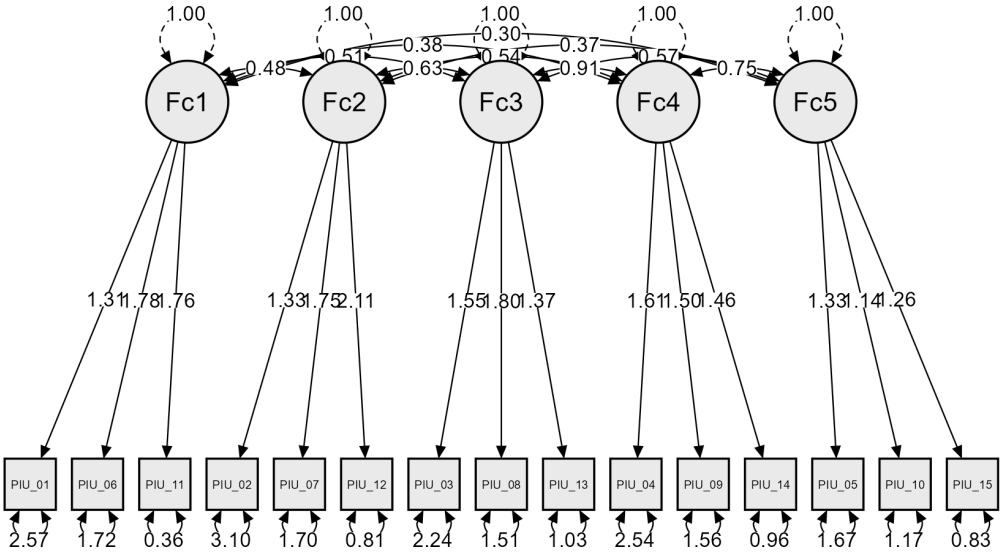

Fig. 1. *Model plot for model 1*

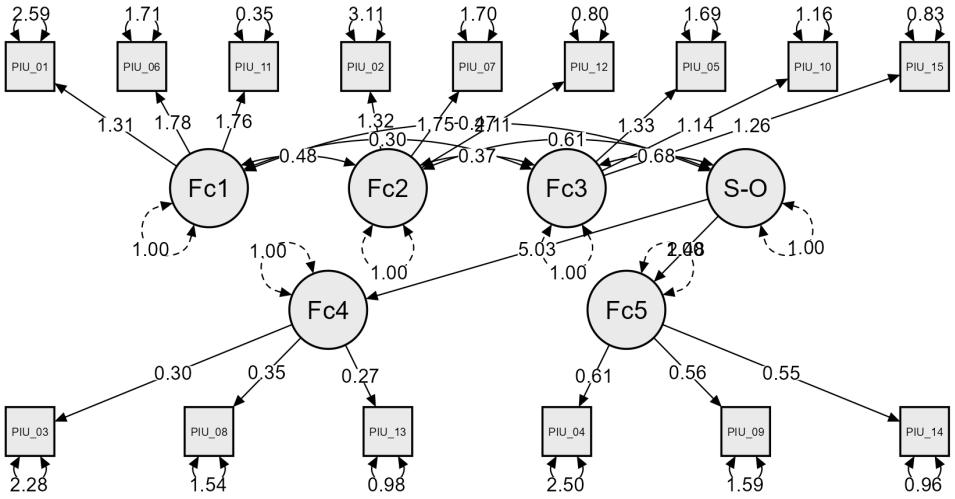

Fig. 2. *Model plot for model 2*

4.3. Reliability analysis

Two analyses were conducted to examine the reliability of the scales: standardised Cronbach alpha and McDonalds omega. The results obtained indicate satisfactory reliability of both the specified subscales and the total scale. For the subscales, scale reliability ranged from 0.8 to 0.84, while the reliability of the overall scale was 0.89 for

McDonalds omega and 0.90 for Cronbach's alpha. A full summary of the results obtained is given in Table 3.

Table 3

Reliability of subscales and general scale of GPIUS2

	McDonald's ω	Cronbach's α
Preference for online social interaction (Items: 1, 6, 11)	0.84	0.83
Mood regulation (Items: 2, 7, 12)	0.83	0.80
Cognitive preoccupation (Items: 3, 8, 13)	0.82	0.82
Compulsive Internet use (Items: 4, 9, 14)	0.82	0.81
Negative outcomes (Items: 5, 10, 15)	0.80	0.80
GPIUS2 score (sum of all items)	0.89	0.90

4.4. Validity analysis

As literature mentioned a positive relation between problematic internet use and internet addiction and also possible emotional difficulties (Caplan, 2010; Derbyshire et al., 2013; Gioia, 2021; Kormas et al., 2011) association with these variables were tested (table 4). There were positive and moderate to week correlation with IAT and all three components of DASS21 questionnaire, meaning that a high problematic internet use is related with internet addiction, and feelings od anxiety, depression and stress.

Table 4

Correlation between GPIUS2 and other relevant variables

Variables	**IAT**	**DASS21**	**DASS_ anx**	**DASS_ depres**	**DASS_ stress**	**Time online Weekdays**	**Time online weekends**	**No of apps**
GPIUS 2 total	.66**	.57**	.51**	.52**	.51**	.37**	.46**	.29**
GPIUS2_online interaction	.32**	.25**	.22**	.24**	.21**	.16**	.36**	.12**
GPIUS2_mood	.42**	.40**	.34**	.39**	.34**	.36**	.38**	.30**
GPIUS2_preocup	.56**	.43**	.39**	.37**	.41**	.32**	.36**	.26**
GPIUS2_compuls	.63**	.57**	.51**	.51**	.51**	.32**	.37**	.24**
GPIUS2_negative conseq	.52**	.51**	.46**	.44**	.46**	.19**	.24**	.13**

N = 120. ∗p <.05. ∗∗p <.01.

The results also showed moderate correlation between GPIUS2 and time spent online, with stronger association with the number of hours spent online during weekends.

We also examined the capacity of GPIUS2 to differentiate between groups in scores related to internet addiction, anxiety, depression and stress and number of hours spent online. In order to compare the groups, we choose to organize the respondents in 3 categories – low risks (those below a standard deviation from average in scores at GPIUS2), high risks (those a standard deviation or more above average at GPIUS2 scores) and medium risks (those less than 1 standard deviation below or above the mean). The mean scores for GPIUS2 was 51.31 and standard deviation 19.07, normal distribution. The three classes formed consisted in 19 % users with low risk (mean points 27.78, standard deviation 5.30), 65% users with medium risk (mean points 51.58, standard deviation 9.87) and 16% users with high risks (mean points 82.37, standard deviation 12.23). One way ANOVA demonstrated significant differences among groups for all relevant variable (see table 5).

Table 5

Differences among group risks in problematic internet use regarding relevant variables

Variables	**Group differences**	**Mean differences (Bonferoni)**	**F values**
IAT	LR-MR	-.88*	85.67***
	MR-HR	-.94*	
	LR-HR	-1.82*	
DASS21	LR-MR	.-47*	52.95***
	MR-HR	-.61*	
	LR-HR	-1.08*	
DASS_anx	LR-MR	-.43*	36.03***
	MR-HR	.-52*	
	LR-HR	-.96*	
DASS_depress	LR-MR	-.46*	40.31***
	MR-HR	-.63*	
	LR-HR	-1.10*	
DASS_stress	LR-MR	-.51*	44.20***
	MR-HR	-.68*	
	LR-HR	-1.20*	
Time online Weekdays	LR-MR	-.74*	35.13***
	MR-HR	-.72*	
	LR-HR	-1.47*	
Time online Weekends	LR-HR	-.77*	20.81***
	MR-HR	-.41*	
	LR-HR	-1.18*	

*The mean difference is significant at the 0.05 level.
*** The mean difference is significant at the 0.001 level
LR – low risk, MR – medium risk, HR – high risk

The level of internet addiction, anxiety, depression and stress as well as number of hours spent online are increasing and the category of risk increase.

5. Conclusions

The main purpose of the study was to validate the GPIUS2 scale in Romanian population due to the increased interest in looking at internet use and how it affects the functioning in different areas. Similar to results in other countries (Adlina et al., 2021; Pontes et al., 2016; Probierz et al., 2020), the scale demonstrated very good internal consistency. The confirmatory factor analysis supported a five-factor structure, comparable with the theoretical background of the scale (Caplan, 2010). Significant association was also demonstrated when problematic internet use was liked to internet addiction, feelings of anxiety, depression or stress. The scale proved to be useful also in discriminating among the level of risks in internet use, those included in high risk group having the higher level of internet addiction, anxiety, depression, stress and internet consumption. In conclusion, the scale presents reliability and validity with good psychometric values and the theoretical structure that was proposed in the literature.

Nevertheless, the study has some limitations. Firstly, the respondents are rather young people, which are known to be at higher risks of problematic use and also more involved in using the technology for a variety of purposes, including professional ones, in the present research more than half of the sample being students (Moreno et al., 2019). Second, the data was collected using online survey, a method that do not control for voluntary or involuntary errors regarding answers. The capacity to remember time periods might not be accurate or the respondents could choose an answer that felt most desirable. On the other hand, one strength is that the sample included a balanced group of male and females and young age is also a plus because represents the population targeted by issues covered in the study.

As such, the GPIUS2 Romanian version represent an instrument useful to identify risks in overusing the internet and suitable as a measure to initiate prevention programs or to determine the efficacy of intervention programs (Romero-Lopez et al., 2021).

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