



Evaluation of psychometric properties of the Arabic version of the Internet Disorder Scale (IDS-15)

Fares Zine El Abiddine^a, Md. Saiful Islam^{b,c,*}, Chung-Ying Lin^d, Djamel Berbiche^e, Mark D. Griffiths^f

^a Psychological and Educational Research Lab, Department of Psychology, University Djillali Liabes of Sidi Bel Abbes, Algeria

^b Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka 1342, Bangladesh

^c Centre for Advanced Research Excellence in Public Health, Savar, Dhaka 1342, Bangladesh

^d Institute of Allied Health Sciences, College of Medicine, National Cheng Kung University, Tainan, Taiwan

^e Faculty of Medicine and Health Sciences, Université de Sherbrooke, Campus de Longueuil, 150 Place Charles-Le Moyne, Bureau 200, Longueuil, Québec J4K 0A8, Canada

^f International Gaming Research Unit, Psychology Department, Nottingham Trent University, 50 Shakespeare Street, Nottingham NG1 4FQ, UK

ARTICLE INFO

Keywords:

Internet use
Internet addiction
Internet use disorder
Internet Disorder Scale
Arabic IDS-15

ABSTRACT

The internet in modern society has impacted individuals of all ages, especially youth. Over the past 25 years, internet has become increasingly accessible, affordable, and available to a large proportion of individuals worldwide. Despite the clear advantages the internet has brought, adverse effects including potential disordered internet use have been noted among a minority of users. This has led to an increase in the development of screening instruments and numerous validation studies in many countries. Although Arabic is spoken in 25 countries worldwide, little research has been carried out, probably because there is a lack of Arabic instruments assessing problematic internet use. The present study evaluated the psychometric properties of the Arabic version of the 15-item Internet Disorder Scale (IDS-15). A cross-sectional study was conducted among 327 active internet users (35.5 % male; mean age = 21.49 years [SD = 3.06]) using a pen-and-paper-based survey. All participants completed the IDS-15, Bergen Social Media Addiction Scale (BSMAS), and Satisfaction with Life Scale (SWLS). The concurrent validity of the Arabic IDS-15 was satisfactory as its total score was significantly correlated with scores on the BSMAS (standardized coefficient [β] = 0.382), time spent online (β = 0.310), time spent on social media (β = 0.368), time spent on sleep (β = -0.176), and SWLS score (β = -0.281). The internal consistency indicated good internal reliability. Confirmatory factor analysis supported the factor structure of the IDS-15. The Arabic version IDS-15 is a psychometrically sound and robust instrument for assessing internet disorder due to its excellent concurrent validity, good reliability, and satisfactory construct validity.

1. Introduction

In the modern era, advanced technologies have contributed to worldwide internet accessibility and a constant increase in its users. Despite the clear benefits of the internet, a minority of users report problematic aspects including – in extreme cases – reports of addictive use – reports that first surfaced in the mid-1990s (Griffiths, 1996; Young, 1996). Problematic internet use (PIU) and in its most extreme form – internet addiction (IA) – has traditionally been defined as “excessive or poorly controlled preoccupations, urges or behaviors regarding computer use and internet access that lead to impairment or distress” (Shaw & Black,

2008, p. 353). Despite ongoing debates as to whether ‘internet addiction’ even exists (Griffiths, Pontes, et al., 2016), most scholars in the behavioral addiction field agree that addictions can occur on the internet (e.g., online gaming addiction, online gambling addiction, online sex addiction, etc.) even if few individuals are actually addicted to the internet (Griffiths, 2020). Most scholarly credence has been given to an alleged subtype of IA – ‘internet gaming disorder’ (IGD; Griffiths, Van Rooij, et al., 2016; Petry et al., 2014) – which was included in the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as a tentative disorder (American Psychiatric Association, 2013), and more legitimately in the latest (eleventh) revision of the

* Corresponding author at: Department of Public Health and Informatics, Jahangirnagar University, Savar, Dhaka 1342, Bangladesh.

E-mail addresses: zineelabiddine.fares@univ-sba.dz (F.Z. El Abiddine), islam.msaiful@outlook.com (Md.S. Islam), djamel.berbiche@usherbrooke.ca (D. Berbiche), mark.griffiths@ntu.ac.uk (M.D. Griffiths).

<https://doi.org/10.1016/j.actpsy.2022.103750>

Received 14 July 2022; Received in revised form 2 September 2022; Accepted 15 September 2022

0001-6918/© 2022 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

International Classification of Diseases (ICD-11) as 'gaming disorder' with both online and offline sub-types (World Health Organization, 2019). Some scholars have also conceptualized problematic internet use as being either generalized (where the problematic behavior is associated with constant use of a variety of different online applications) or specific (where the problematic behavior is associated with one specific application such as gambling, gaming, social media use, etc.) (Griffiths, 2020).

Over the past decade – and often using Griffiths' (2005) six core criteria of addiction (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse) – empirical studies have been carried out in the area of technological addictions. Likewise, IA has also received much interest and attention from healthcare professionals, clinicians and academic scholars (Kuss et al., 2014; Pontes et al., 2015). Several studies provide evidence that generalized IA can lead to a wide range of negative detrimental effects including psychiatric comorbidities (i.e., alcohol abuse, attention deficit and hyperactivity, depression and anxiety) (Ho et al., 2014); lowered life satisfaction, impaired family functioning, and problematic family interaction (Wartberg et al., 2015); physical problems (e.g., neck, shoulder, and back pain, regular headaches, dry eyes, numbness pain in the thumb, index, and middle fingers) (Bener, Griffiths, et al., 2019; Bener, Yildirim, et al., 2019; Park et al., 2013); social anxiety (Weinstein et al., 2015); attention deficit/hyperactivity disorder and depression (Sariyska et al., 2015); decreased academic performance and poor emotional wellbeing (Rücker et al., 2015); increased academic stress (Jun & Choi, 2015); lower levels of family functioning, life satisfaction, and problems in family interactions (Wartberg et al., 2015); impulsive behaviors, and higher incidence of substance use (Reed et al., 2015); alexithymia, higher levels of loneliness, and suicide (Alpaslan et al., 2015); and poorer levels of self-control and lower life satisfaction (Macur & Pontes, 2018).

Many psychometric studies have investigated generalized IA and there are over 20 various assessment tools that have resulted in difficulties in assessing and evaluating IA prevalence rates across nations or regions (Kuss et al., 2014). One meta-analysis analyzed 164 prevalence figures derived from 80 studies ($n = 89,281$) from 31 countries across seven regions of the world (Cheng & Li, 2014). Based on the published studies, global prevalence estimate for generalized IA was reported to be 6.0 %. The highest prevalence was 10.9 % in the Middle East and the lowest was 2.6 % in Northern and Western Europe. However, as aforementioned, there are several ongoing debates concerning the diagnostic criteria of IA (Griffiths, Pontes, et al., 2016; Griffiths, Van Rooij, et al., 2016; Kuss et al., 2017).

As noted above, there are over 20 screening instruments that have been developed for assessing generalized IA, a number of which have been validated into different languages. Scholars have also proposed the appropriateness of applying the IGD criteria in the DSM-5 to the psychometric assessment of IA. Lin, Ganji, et al. (2018) reported only two instruments that had been developed to assess problematic internet use based on the DSM-5 IGD criteria (i.e., Internet Addiction Scale [IAS; Cho et al., 2014], and the 15-item Internet Disorder Scale [IDS-15; Pontes and Griffiths [2017]]). The IAS does not appear to be widely used, probably because (i) it has 41 items, which is less than optimal for time-limited studies, and (ii) it has relatively poor psychometric properties. The IDS-15 has only 15 items with much stronger psychometric properties ($\alpha = 0.79-0.85$). Consequently, in recent years, the IDS-15 has become increasingly used in epidemiological surveys, as well as through translation and validation in different languages, such as English, Persian, and Italian (Lin, Ganji, et al., 2018; Monacis et al., 2018; Pontes & Griffiths, 2017).

Arabic is one of the most spoken languages in the world. It is used as the first and second language in 25 different countries amounting to over 447 million people. At present, there are approximately 237.4 million internet users in the Arab world, representing 53 % of the total 447 million Arab speakers (Internet World Stats, 2020). Between 2000 and

2020, the growth of internet use in Arab countries was the highest among the top 10 internet users by language (Internet World Stats, 2020). Only one study in an Arab-speaking country (i.e., Algeria) has been carried out to date, and this reported the 'risk of internet addiction' using a non-psychometrically validated scale among just over 500 Algerian students was 59.3 % (Ladner et al., 2015). One of the reasons for a lack of research in Arab-speaking countries may be due to the lack of available psychometric instruments. To the best of the authors' knowledge, there is no psychometrically sound and robust instrument for assessing problematic internet use in the Arabic language. Consequently, the IDS-15 was selected as the instrument to translate and validate into the Arabic language.

2. Methods

2.1. Participants and procedure

A cross-sectional survey was carried out comprising 327 undergraduate students (35.5 % male; mean age = 21.49 years [SD = 3.06]) conducted at the University of Sidi Bel Abbes, Algeria. Data were collected utilizing a 'pen-and-paper' survey. The participants were recruited from university classrooms (i.e., convenience sampling). The inclusion criteria of participants included being internet users, Arabic speakers, and university students. The incomplete surveys were excluded from the final analysis. The IDS-15 was translated from English to Arabic language using one of the most standardized 'back translation' techniques (i.e., Brislin, 1980) conducted with an expert panel having sound knowledge in English and Arabic languages as well as a psychology background. Bilingual individuals who were unaffiliated with the present study translated the scale from English to Arabic. Subsequently, other members translated the version back to English. Any problematic items were reviewed, discussed, and modified. Minor discrepancies were settled through consensus.

2.2. Measures

A self-report survey was developed comprising socio-demographics and internet-related questions, as well as three psychometric scales (see below). With regard to socio-demographics, the participants' data included gender, age, and academic specialization. Data concerning the average number of days spent online per week, hours spent on social media per day, and number of hours slept per day were also collected.

2.2.1. Bergen Social Media Addiction Scale (BSMAS)

Participants' social media addiction was assessed using a translated version of the Arabic BSMAS. The original (English) version was developed by Andreassen et al. (2016), adapted from the Bergen Facebook Addiction Scale (Andreassen et al., 2012). The original BSMAS was translated from English to Arabic language using the standardized back translation technique outlined above (Brislin, 1980). This scale is based on the six core components of behavioral addictions (i.e., salience, mood, modification, tolerance, withdrawal conflict, and relapse; Griffiths, 2005). The BSMAS comprises six items regarding problems related to social media use over the past year (e.g., "How often during the last year have spent a lot of time thinking about social media or planned use of social media?") with a five-point Likert scale ranging from 1 ('very rarely') to 5 ('very often'). The total score is obtained by summing the raw score from each item ranging from 6 to 30, with a higher score indicating the greater likelihood of addiction to social media (Andreassen et al., 2016). In the present study, the Cronbach's α of the BSMAS was 0.75.

2.2.2. Satisfaction with Life Scale (SWLS)

Participants' satisfaction with life was assessed using the Arabic version of the SWLS (Abdel-Khalek, 2008; original version, Diener et al., 1985). It comprises five statements regarding life satisfaction (e.g., "I am satisfied with my life") and rated a seven-point Likert scale ranging from 1

(‘strongly disagree’) to 7 (‘strongly agree’). The total score is obtained by summing the raw score from each item ranging from 5 to 35, with a higher score indicating greater satisfaction with life (Diener et al., 1985). In the present study, the Cronbach’s α of the SWLS was 0.74.

2.2.3. Internet Disorder Scale-15 (IDS-15)

The Arabic version of IDS-15 was translated and validated in the present study. The original English version (Pontes & Griffiths, 2017) is a self-report psychometric instrument for assessing the severity of problematic internet use and the impact of its effects focusing on participants’ online leisure activities. It comprises 15 items regarding problems related to internet use over the past year (e.g., “I think that being online can greatly change my mood for the better”). Items are rated on a five-point Likert scale ranging from 1 (‘strongly disagree’) to 5 (‘strongly agree’). The total score is obtained by the summing the raw score from each item ranging from 15 to 75, with a higher score indicating the greater problematic internet use. In the present study, the Cronbach’s α of the IDS-15 was 0.82. The resulting Arabic version of the IDS-15 was subjected to a pilot study with a sample of 30 participants to assess the content and face validity of the items.

2.3. Ethics

The present study followed the highest possible ethical standards in line with the Helsinki declaration and institutional research ethics. Formal ethics approval was granted by the research committee of the Faculty of Humanities and Social Sciences of the University of Djillali Liabes Sidi Bel Abbes, Algeria [UDL/Lab RPE02/2021]. Formal written informed consent was obtained from each participant prior to data collection. In the informed consent sheet, the aims, objectives, procedures, risk-benefit and option to participate in the study were clearly documented. Anonymity and confidentiality of data collected were assured to all participants.

2.4. Data analysis

Through descriptive statistics of means (standard deviations) and frequencies (percentages), the participants’ characteristics were analyzed. Independent *t*-tests were used to compare gender differences in Arabic IDS-15 scores. Five regression models were constructed to illustrate the concurrent validity of the Arabic IDS-15. More specifically, the five regression models each used one external criterion (i.e., BSMAS score, average days spent online, average hours spent on social media per day, average number of hours sleep per day, and SWLS score) as the dependent variable; the Arabic IDS-15 score as independent variable; and age and gender as controlled variables. Additionally, Pearson correlation coefficients were used to examine the associations between age and Arabic IDS-15 scores (including subscale and total scores). Item properties of the Arabic IDS-15 were also examined using corrected item to total correlation and the distribution of the item response in each item. Furthermore, the following statistics were used to understand the psychometric properties of the IDS-15 at scale level: ceiling/floor effects (a percentage of <3 % suggests negligible and < 20 % suggests acceptable; Jette et al., 2005; Lin et al., 2013), internal consistency (ordinal $\alpha > 0.7$ indicates acceptable; Lin, Pakpour, et al., 2018), corrected item-total correlation (a value of >0.4 is acceptable; Wang et al., 2007), CR (a value of >0.6 represents satisfactory), AVE (a value of >0.5 represents satisfactory), and construct validity via confirmatory factor analysis (CFA).

The CFA tested whether the Arabic IDS-15 fitted in a second-order structure with four first-order factors (i.e., escapism and dysfunctional emotional coping [EDEC], withdrawal symptoms [WS], impairments and dysfunctional self-regulation [IDSR], and dysfunctional internet-related self-control [DISC]) and one second-order factor (IDS) using diagonally-weighted least squares (DWLS) estimator. The use of DWLS estimator was supported by prior studies when the tested instrument

utilizes Likert-type scales (Lin, Burri, et al., 2017; Lin, Oveisi, et al., 2017), such as the IDS-15. Furthermore, the second-order structure of the IDS-15 was examined using the following fit indices: both comparative fit index (CFI) and Tucker-Lewis index (TLI) are >0.9; and both root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) are <0.08 (Hu et al., 2013; Lin et al., 2012). All the statistics were performed using IBM SPSS 24.0 (IBM Corp., Armonk, NY) or the lavaan package (Rosseel et al., 2017) in R software.

3. Results

Table 1 presents the characteristics of the participants. The mean age of the participants was 21.49 years ($SD = 3.06$), days spent online per week was 6.12 days ($SD = 1.71$), hours spent on social media per day was 3.46 h ($SD = 1.18$), and hours spent sleeping per day was 5.61 h ($SD = 1.11$). Additionally, the self-rated mean scores were 14.59 (out of 30) ($SD = 4.83$) for BSMAS, 24.17 (out of 35) ($SD = 6.00$) for SWLS, and 42.84 (out of 75) ($SD = 9.43$) for Arabic IDS-15. Approximately one-third of the participants ($n = 116$; 35.5 %) were males and the top three participants’ study majors comprised medicine ($n = 64$; 19.6 %), law ($n = 58$; 17.7 %), and languages ($n = 50$; 15.3 %). There were no significant gender differences in scores on the IDS-15, EDEC subscale, WS subscale, and IDSR subscale. However, males had a significantly higher score on the DISC subscale compared to females ($p = 0.02$) (Table 1).

Several regression models presented in Table 2 further demonstrate how the Arabic IDS-15 correlated to other external criteria. More

Table 1
Participants characteristics ($N = 327$).

Variables	Mean \pm SD or n (%)			p-value
	Total sample ($n = 327$)	Male sample ($n = 116$)	Female sample ($n = 211$)	
Age (Year)	21.49 \pm 3.06	22.66 \pm 4.05	20.84 \pm 2.08	<0.001
Gender (Male)	116 (35.5)	–	–	–
Average days spent online per week	6.12 \pm 1.71	6.11 \pm 1.66	6.12 \pm 1.74	0.97
Average hours spent on social media per day	3.46 \pm 1.18	3.52 \pm 1.21	3.44 \pm 1.17	0.55
Average sleep hours per day	5.61 \pm 1.11	5.56 \pm 1.22	5.64 \pm 1.04	0.54
Score on Bergen Social Media Addiction Scale	14.59 \pm 4.83	15.14 \pm 4.71	14.29 \pm 4.88	0.13
Score on Satisfaction with Life Scale	24.17 \pm 6.00	23.40 \pm 6.14	24.60 \pm 5.89	0.08
Score on Internet Disorder Scale-15 (IDS-15)	42.84 \pm 9.43	43.30 \pm 9.28	42.59 \pm 9.53	0.52
Score on IDS-15, EDEC subscale	12.54 \pm 3.24	12.48 \pm 3.22	12.56 \pm 3.26	0.83
Score on IDS-15, WS subscale	10.54 \pm 3.77	10.74 \pm 3.82	10.43 \pm 3.75	0.47
Score on IDS-15, IDSR subscale	11.97 \pm 3.43	11.74 \pm 3.69	12.09 \pm 3.28	0.38
Score on IDS-15, DISC subscale	7.80 \pm 2.99	8.34 \pm 3.04	7.51 \pm 2.93	0.02
Study major				<0.001
Economic sciences	37 (11.3)	13 (11.2)	24 (11.4)	
Literature	8 (2.4)	0 (0.0)	8 (3.8)	
Languages	50 (15.3)	28 (24.1)	22 (10.4)	
Social sciences	21 (6.4)	16 (13.8)	21 (10.0)	
College of Law	58 (17.7)	14 (12.1)	50 (23.7)	
Medicine	64 (19.6)	10 (8.6)	11 (5.2)	
Biology	32 (9.8)	22 (19.0)	36 (17.1)	
Civil engineering	37 (11.3)	0 (0.0)	32 (15.2)	
Electronic	20 (6.1)	13 (11.2)	7 (3.3)	

Note: EDEC = escapism and dysfunctional emotional coping; WS = withdrawal symptoms; IDSR = impairments and dysfunctional self-regulation; DISC = dysfunction Internet-related self-control.

Table 2
Concurrent validity of the Arabic Internet Disorder Scale (IDS-15) using regression models with adjustment for age and gender.

Criterion	β of age (p-value)	β of gender (p-value)	β of IDS-15 (p-value)	ΔR^2	Overall R^2 (adjusted R^2)
BSMAS	-0.031 (0.42)	-0.066 (0.08)	0.382 (<0.001)	0.55	0.569 (0.565)
Online days ^a	-0.113 (0.04)	-0.019 (0.72)	0.310 (<0.001)	0.10	0.115 (0.107)
Social media hours ^b	-0.013 (0.81)	-0.023 (0.67)	0.368 (<0.001)	0.13	0.137 (0.134)
Sleep hours ^c	-0.007 (0.91)	0.026 (0.65)	-0.176 (0.002)	0.03	0.032 (0.023)
SWLS	-0.079 (0.16)	0.064 (0.25)	-0.281 (<0.001)	0.08	0.089 (0.081)

Note: β = standardized coefficient.
 ΔR^2 = overall R^2 – the R^2 derived from age and gender; that is, indicating the explained variance of the criterion.
 BSMAS = Bergen Social Media Addiction Scale.
 SWLS = Satisfaction With Life Scale.
^a Average days spent online per week.
^b Average hours spent on social media per day.
^c Average sleep hours per day.

specifically, the Arabic IDS-15 score was significantly correlated with the BSMAS score (standardized coefficient [β] = 0.382; $p < 0.001$), number of days spent online ($\beta = 0.310$; $p < 0.001$), daily time spent on social media ($\beta = 0.368$; $p < 0.001$), time spent sleeping daily ($\beta = -0.176$; $p = 0.002$), and SWLS score ($\beta = -0.281$; $p < 0.001$) after controlling the age effects ($\beta = -0.113$ to -0.007 ; $p = 0.04$ to 0.91) and gender effects ($\beta = -0.066$ to 0.064 ; $p = 0.08$ to 0.72). Therefore, the concurrent validity of the Arabic IDS-15 was satisfactory. Moreover, age was not associated with the Arabic IDS-15 total score or any of the subscales (total score: $r = -0.095$ [$p < 0.09$]; EDEC subscale: $r = -0.093$ [$p < 0.09$]; WS subscale: $r = -0.010$ [$p < 0.85$]; IDSR subscale = -0.090 [$p < 0.10$]; and DISC subscale: $r = -0.083$ [$p < 0.14$]).

Table 3 additionally illustrates the item properties of the Arabic IDS-15 and Table 4 demonstrates the psychometric properties of the Arabic IDS-15 at scale level. More specifically, Table 3 shows that all the items, except for item EDEC1 (item-total correlation = 0.17), had good item-total correlation (range between 0.39 and 0.77) with nearly normal distribution in responses. Table 4 shows that all the IDS-15 domains and the entire IDS-15 scale had acceptable CRs (range between 0.64 and 0.84), fair to good AVE (range between 0.34 and 0.65), negligible to acceptable ceiling and floor effects (0.0 % to 7.6 %), and fair to good internal consistency (ordinal $\alpha = 0.64$ to 0.87).

The proposed factor structure of the IDS-15 was supported by the CFA results (Fig. 1). More specifically, all the fit indices were satisfactory (CFI = 0.97, TLI = 0.97, RMSEA = 0.048, and SRMR = 0.064) and all the factor loadings were strong (range between 0.41 and 0.85), except for the loading of EDEC1 (0.21).

4. Discussion

The present study evaluated the psychometric properties of the Arabic version IDS-15, using an updated theoretical framework based on the modified criteria for IGD in the DSM-5 (American Psychiatric Association, 2013). The IDS-15 is a psychometric tool that was developed by Pontes and Griffiths (2017), and modified the nine IGD criteria outlined in the DSM-5 and adapted to reflect problematic internet use. The IDS-15 assesses the severity of problematic internet use by focusing only upon users' online leisure activity. A CFA was used to assess the factor structure of the Arabic IDS-15. Concurrent validity of the Arabic IDS-15 was examined utilizing five regression models with adjustment for age and gender. The associations between all the variables were highly correlated, and which concurs with prior research (e.g., Lin, Ganji, et al.,

Table 3
Item properties of the Internet Disorder Scale (IDS-15).

Item #	Item-total correlation	Response; n (%)				
		1	2	3	4	5
EDEC1	0.17	16 (4.9)	82 (25.1)	66 (20.2)	93 (28.4)	70 (21.4)
EDEC2	0.41	22 (6.7)	63 (19.3)	62 (19.0)	143 (43.7)	37 (11.3)
EDEC3	0.51	50 (15.3)	90 (27.5)	56 (17.1)	112 (34.3)	19 (5.8)
EDEC4	0.49	45 (13.8)	96 (29.4)	45 (13.8)	110 (33.6)	31 (9.5)
WS1	0.66	63 (19.3)	114 (34.9)	61 (18.7)	72 (22.0)	17 (5.2)
WS2	0.74	70 (21.4)	120 (36.7)	58 (17.7)	68 (20.8)	11 (3.4)
WS3	0.52	59 (18.0)	109 (33.3)	62 (19.0)	80 (24.5)	17 (5.2)
WS4	0.65	50 (15.3)	102 (31.2)	48 (14.7)	113 (34.6)	14 (4.3)
IDSR1	0.39	61 (18.7)	133 (40.7)	46 (14.1)	60 (18.3)	27 (8.3)
IDSR2	0.53	27 (8.3)	87 (26.6)	67 (20.5)	104 (31.8)	42 (12.8)
IDSR3	0.54	25 (7.6)	78 (23.9)	65 (19.9)	117 (35.8)	42 (12.8)
IDSR4	0.47	33 (10.1)	94 (28.7)	51 (15.6)	128 (39.1)	21 (6.4)
DISC1	0.68	44 (13.5)	112 (34.3)	52 (15.9)	92 (28.1)	27 (8.3)
DISC2	0.77	50 (15.3)	157 (48.0)	40 (12.2)	66 (20.2)	14 (4.3)
DISC3	0.68	54 (16.5)	153 (46.8)	52 (15.9)	49 (15.0)	19 (5.8)

EDEC = escapism and dysfunctional emotional coping, WS = withdrawal symptoms, IDSR = impairments and dysfunctional self-regulation, DISC = dysfunctional internet-related self-control.
 Response 1 = Strongly disagree, except for EDEC1, DISC1, DISC2, and DISC3, of which are Strongly agree.
 Response 2 = Disagree, except for EDEC1, DISC1, DISC2, and DISC3, of which are Agree.
 Response 3 = Neither agree or disagree.
 Response 4 = Agree, except for EDEC1, DISC1, DISC2, and DISC3, of which are Disagree.
 Response 5 = Strongly Agree, except for EDEC1, DISC1, DISC2, and DISC3, of which are Strongly disagree.

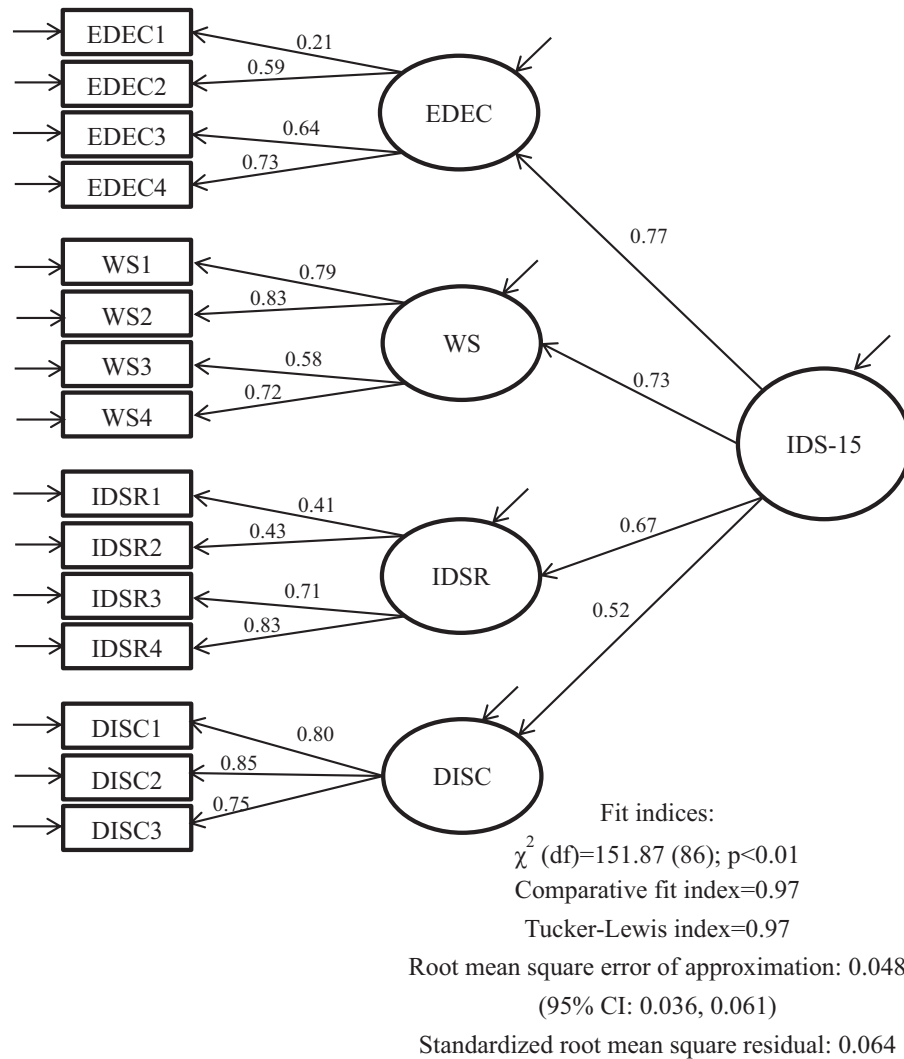
Table 4
Psychometric properties of the Internet Disorder Scale (IDS-15) at the scale level.

Psychometric testing	EDEC	WS	IDSR	DISC	IDS-15
Composite Reliability	0.64	0.82	0.70	0.84	0.77
Average Variance Extracted	0.34	0.54	0.39	0.65	0.46
Ceiling effects (%)	1.2	0.6	0.6	2.8	0.0
Floor effects (%)	0.0	5.2	1.8	7.6	0.0
Internal consistency (Ordinal α)	0.64	0.84	0.74	0.87	0.84

Note: EDEC = escapism and dysfunctional emotional coping, WS = withdrawal symptoms, IDSR = impairments and dysfunctional self-regulation, DISC = dysfunctional internet-related self-control.

2018).

In the present study, there was no significant gender difference in the IDS-15 scores between males and females, which is consistent with prior findings regarding generalized internet addiction (Chiu et al., 2013). Because the IDS-15 assesses generalized internet addiction rather than specific internet addiction, it is possible to have no significant differences overall between gender even though there may be significant gender differences regarding specific online activities. For instance, a recent meta-analysis showed that males have significantly higher levels of gaming disorder than females (Stevens et al., 2021), while females often have significantly higher levels of problematic social media use



Note: EDEC = escapism and dysfunctional emotional coping; WS = withdrawal symptoms; IDSR = impairments and dysfunctional self-regulation; DISC = dysfunctional Internet-related self-control; IDS-15 = Internet Disorder Scale.

Fig. 1. Second-order confirmatory factor analysis with standardized factor loadings.

Note: EDEC = escapism and dysfunctional emotional coping; WS = withdrawal symptoms; IDSR = impairments and dysfunctional self-regulation; DISC = dysfunctional Internet-related self-control; IDS-15 = Internet Disorder Scale.

than males (Andreassen et al., 2016; Griffiths et al., 2014; Stănculescu & Griffiths, 2022). Therefore, it is possible that specific internet addictions balanced out each other resulting in no difference in terms of generalized internet addiction. Moreover, age was not associated with IDS-15 score. The non-significant results may be due to the homogeneity in the studied sample (i.e., the participants were all young adults and could have had similar levels of internet addiction).

The proposed factor structure of the Arabic IDS-15 was supported by the CFA results and all the fit indices were satisfactory and all the factor loadings were strong (range between 0.41 and 0.85), except for the loading of EDEC1. CFA showed that the fit statistics of the IDS-15 were excellent (Lin, Ganji, et al., 2018). Moreover, the internal consistency of the scale was very good, and close to what has been reported in previous validations of the IDS-15 (Monacis et al., 2018). Additionally, the Arab IDS-15 showed the same theory-driven factor structures reported in previous IDS-15 validation studies comprised four distinct latent domains (Lin, Ganji, et al., 2018; Monacis et al., 2018; Pontes & Griffiths,

2017). Overall, the results of the present study showed that the Arabic IDS-15 has adequate psychometric properties that are similar to those found in studies concerning other linguistic validations of the scale (Lin, Ganji, et al., 2018; Monacis et al., 2018; Pontes & Griffiths, 2017).

4.1. Limitations

There are some limitations in the study. First, the study only recruited university students in one country (i.e., Algeria). Therefore, the representativeness of the present sample to all Arab-speaking countries and other age cohorts is relatively poor. Future studies using other populations (e.g., children and older people) and residents in other Arab-speaking countries with community samples are therefore needed. Second, the data were self-report and subject to several common methods biases, including social desirability bias, recall bias, and single rater bias. Third, the study did not examine the test-retest reliability of the Arabic IDS-15. Given that reproducibility is an important property

for a good instrument, future studies are therefore warranted in examining the test-retest reliability of the Arabic IDS-15.

Despite these limitations, the evaluation of the psychometric properties of the Arabic IDS-15 deserves closer scrutiny in that it will shed some light on the nature of the basic components of the scale in indicating the universality and applicability of the scale's factors. Using the IDS-15 among adolescents is also recommended given that problematic internet use appears to be higher during adolescence (Al-hantoushi & Alabdullateef, 2014; Hawi, 2012). Also, replication of the present study in other Arab countries is needed as well as utilizing clinical samples.

5. Conclusions

In conclusion, the Arabic IDS-15 evaluated in the present study using undergraduate students at an Algerian university showed good psychometric properties. With good psychometric properties, healthcare providers in Algeria may consider using the Arabic IDS-15 to assess the IA problems in both community and health settings. Therefore, healthcare providers can identify individuals (especially undergraduate students) who are at risk of developing problematic internet use. Consequently, early intervention may be provided in time to prevent serious mental health problems caused by resulting problematic internet use.

CRedit authorship contribution statement

Conceptualization: FZE, CYL, and MDG.; Data curation: FZE.; Formal analysis: FZE, CYL, and DB; Writing - original draft: FZE, MSI, CYL, and MDG.; and Writing - review & editing: FZE, MSI, CYL, and MDG. All authors have approved the submission of this version.

Funding

The authors did not receive any financial support from any public/private organizations or other funding agencies for this study.

Declaration of competing interest

The authors declare that they have no potential conflict of interest for the publication of this article.

Acknowledgement

The authors are very grateful to respondents who participated in this study voluntarily.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.actpsy.2022.103750>.

References

- Abdel-Khalek, A. M. (2008). Satisfaction with life in kuwaiti samples. *Derasat Nafsiyah [Psychological Studies]*, 18, 121–135.
- Al-hantoushi, M., & Alabdullateef, S. (2014). Internet addiction among secondary school students in Riyadh city, its prevalence, correlates and relation to depression: A questionnaire survey. *International Journal of Medical Science and Public Health*, 3, 10–15. <https://doi.org/10.5455/ijmsph.2013.130920131>
- Alpaslan, A. H., Avci, K., Soylu, N., & Guzel, H. I. (2015). The association between problematic internet use, suicide probability, alexithymia and loneliness among Turkish medical students. *Journal of Psychiatry*, 18(1), Article 1000208. <https://doi.org/10.4172/2378-5756.1000208>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, 30(2), 252–262. <https://doi.org/10.1037/adb0000160>
- Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, 110(2), 501–517. <https://doi.org/10.2466/02.09.18.PRO.110.2.501-517>
- Bener, A., Griffiths, M. D., Baysoy, N. G., Catan, F., & Yurtseven, E. (2019). Internet addiction and the psychometric properties of the nine-item internet disorder scale-short form: An application of rasch analysis. *Addiction and Health*, 11(4), 234–242. <https://doi.org/10.22122/ahj.v11i4.247>
- Bener, A., Yildirim, E., Torun, P., Çatan, F., Bolat, E., Alic, S., Akyel, S., & Griffiths, M. D. (2019). Internet addiction, fatigue, and sleep problems among adolescent students: A large-scale study. *International Journal of Mental Health and Addiction*, 17(4), 959–969. <https://doi.org/10.1007/s11469-018-9937-1>
- Brislin, R. W. (1980). Translation and content analysis of oral and written materials. *Methodology*, 389–444.
- Cheng, C., & Li, A. Y. (2014). Internet addiction prevalence and quality of (real) life: A meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking*, 17(12), 755–760. <https://doi.org/10.1089/cyber.2014.0317>
- Chiu, S. I., Hong, F. Y., & Chiu, S. L. (2013). An analysis on the correlation and gender difference between college students' Internet addiction and mobile phone addiction in Taiwan. *ISRN Addiction*, Article 360607. <https://doi.org/10.1155/2013/360607>
- Cho, H., Kwon, M., Choi, J.-H., Lee, S.-K., Choi, J. S., Choi, S.-W., & Kim, D.-J. (2014). Development of the internet addiction scale based on the internet gaming disorder criteria suggested in DSM-5. *Addictive Behaviors*, 39(9), 1361–1366. <https://doi.org/10.1016/j.addbeh.2014.01.020>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13
- Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191–197. <https://doi.org/10.1080/14659890500114359>
- Griffiths, M. D. (1996a). Internet addiction: An issue for clinical psychology? *Clinical Psychology Forum*, 97, 32–36.
- Griffiths, M. D. (2020). Internet use disorders: What's new and what's not? *Journal of Behavioral Addictions*. <https://doi.org/10.1556/2006.2020.00072>. Advance online publication.
- Griffiths, M. D., Kuss, D. J., & Demetrovics, Z. (2014). Social networking addiction: An overview of preliminary findings. In K. P. Rosenberg, & L. Feder (Eds.), *Behavioral addictions: Criteria, evidence, and treatment* (pp. 119–141). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-12-407724-9.00006-9>.
- Griffiths, M. D., Pontes, H. M., & Kuss, D. J. (2016a). Online addictions: Conceptualizations, debates, and controversies. *Addicta: The Turkish Journal on Addictions*, 3(2), 1–14. <https://doi.org/10.15805/addicta.2016.3.0101>
- Griffiths, M. D., Van Rooij, A. J., Kardefelt-Winther, D., Starcevic, V., Király, O., & Demetrovics, Z. (2016). Working towards an international consensus on criteria for assessing Internet gaming disorder: A critical commentary on Petry et al. (2014). *Addiction*, 111(1), 167–175. <https://doi.org/10.1111/add.13057>
- Hawi, N. S. (2012). Internet addiction among adolescents in Lebanon. *Computers in Human Behavior*, 28(3), 1044–1053. <https://doi.org/10.1016/j.chb.2012.01.007>
- Ho, R. C., Zhang, M. W. B., Tsang, T. Y., Toh, A. H., Pan, F., Lu, Y., Cheng, C., Yip, P. S., Lam, L. T., Lai, C.-M., Watanabe, H., & Mak, K.-K. (2014). The association between internet addiction and psychiatric co-morbidity: A meta-analysis. *BMC Psychiatry*, 14(1), 183. <https://doi.org/10.1186/1471-244X-14-183>
- Hu, J., Jiang, L., Hong, S., Cheng, L., Kong, M., & Ye, Y. (2013). Reliability and validity of the chinese version of the pediatric quality of life inventoryTM (PedsQLTM) 3.0 neuromuscular module in children with duchenne muscular dystrophy. *Health and Quality of Life Outcomes*, 11, 47. <https://doi.org/10.1186/1477-7525-11-47>
- Internet World Stats. (2020). Internet world users by language. Retrieved February 23, 2020, from: <https://www.internetworldstats.com/stats7.htm>.
- Jette, D. U., Warren, R. L., & Wirtalla, C. (2005). Functional independence domains in patients receiving rehabilitation in skilled nursing facilities: Evaluation of psychometric properties. *Archives of Physical Medicine and Rehabilitation*, 86(6), 1089–1094. <https://doi.org/10.1016/j.apmr.2004.11.018>
- Jun, S., & Choi, E. (2015). Academic stress and internet addiction from general strain theory framework. *Computers in Human Behavior*, 49, 282–287. <https://doi.org/10.1016/j.chb.2015.03.001>
- Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, 20(25), 4026–4052. <https://doi.org/10.2174/13816128113199990617>
- Kuss, D. J., Griffiths, M. D., & Pontes, H. M. (2017). Chaos and confusion in DSM-5 diagnosis of internet gaming disorder: Issues, concerns, and recommendations for clarity in the field. *Journal of Behavioral Addictions*, 6(2), 103–109. <https://doi.org/10.1556/2006.5.2016.062>
- Ladner, J., Lukács, A., Boussouf, N., Deneche, I., Albane, A., Varga, B., Déchelotte, P., & Tavolacci, M. P. (2015). Prevalence of internet addiction risk in university students in Algeria, France and Hungary. *European Journal of Public Health*, 25(suppl_3). <https://doi.org/10.1093/eurpub/ckv170.005>
- Lin, C.-Y., Burri, A., Fridlund, B., & Pakpour, A. H. (2017). Female sexual function mediates the effects of medication adherence on quality of life in people with epilepsy. *Epilepsy & Behavior: E&B*, 67, 60–65. <https://doi.org/10.1016/j.yebeh.2016.12.012>
- Lin, C.-Y., Ganji, M., Pontes, H., Imani, V., Broström, A., Griffiths, M., & Pakpour, A. (2018a). Psychometric evaluation of the persian internet disorder scale among adolescents. *Journal of Behavioral Addictions*, 7, 1–11. <https://doi.org/10.1556/2006.7.2018.88>
- Lin, C.-Y., Luh, W.-M., Cheng, C.-P., Yang, A.-L., Su, C.-T., & Ma, H.-I. (2013). Measurement equivalence across child self-reports and parent-proxy reports in the

- chinese version of the pediatric quality of life inventory version 4.0. *Child Psychiatry and Human Development*, 44(5), 583–590. <https://doi.org/10.1007/s10578-012-0352-8>
- Lin, C.-Y., Luh, W.-M., Yang, A.-L., Su, C.-T., Wang, J.-D., & Ma, H.-I. (2012). Psychometric properties and gender invariance of the chinese version of the self-report pediatric quality of life inventory version 4.0: Short form is acceptable. *Quality of Life Research*, 21(1), 177–182. <https://doi.org/10.1007/s11136-011-9928-1>
- Lin, C.-Y., Oveysi, S., Burri, A., & Pakpour, A. H. (2017). Theory of planned behavior including self-stigma and perceived barriers explain help-seeking behavior for sexual problems in iranian women suffering from epilepsy. *Epilepsy & Behavior*, 68, 123–128. <https://doi.org/10.1016/j.yebeh.2017.01.010>
- Lin, C.-Y., Pakpour, A. H., Broström, A., Fridlund, B., Årestedt, K., Strömberg, A., Jaarsma, T., & Mårtensson, J. (2018b). Psychometric properties of the 9-item european heart failure self-care behavior scale using confirmatory factor analysis and rasch analysis among iranian patients. *Journal of Cardiovascular Nursing*, 33(3), 281–288. <https://doi.org/10.1097/JCN.0000000000000444>
- Macur, M., & Pontes, H. M. (2018). Individual differences and the development of internet addiction: A nationally representative study. In *Psychological, social, and cultural aspects of internet addiction* (pp. 399–413). IGI Global. <https://doi.org/10.4018/978-1-5225-3477-8.ch012>
- Monacis, L., Sinatra, M., Griffiths, M. D., & de Palo, V. (2018). Assessment of the italian version of the internet disorder scale (IDS-15). *International Journal of Mental Health and Addiction*, 16(3), 680–691. <https://doi.org/10.1007/s11469-017-9823-2>
- Park, S., Hong, K.-E. M., Park, E. J., Ha, K. S., & Yoo, H. J. (2013). The association between problematic internet use and depression, suicidal ideation and bipolar disorder symptoms in Korean adolescents. *Australian & New Zealand Journal of Psychiatry*, 47(2), 153–159. <https://doi.org/10.1177/0004867412463613>
- Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H.-J., Mölle, T., Bischof, G., Tao, R., Fung, D. S. S., Borges, G., Auriacombe, M., González Ibáñez, A., Tam, P., & O'Brien, C. P. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction*, 109(9), 1399–1406. <https://doi.org/10.1111/add.12457>
- Pontes, H. M., & Griffiths, M. D. (2017). The development and psychometric evaluation of the internet disorder scale (IDS-15). *Addictive Behaviors*, 64, 261–268. <https://doi.org/10.1016/j.addbeh.2015.09.003>
- Pontes, H. M., Kuss, D., & Griffiths. (2015). Clinical psychology of Internet addiction: A review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience and Neuroeconomics*, 4, 11–23. <https://doi.org/10.2147/NAN.S60982>
- Reed, P., Osborne, L. A., Romano, M., & Truzoli, R. (2015). Higher impulsivity after exposure to the internet for individuals with high but not low levels of self-reported problematic internet behaviours. *Computers in Human Behavior*, 49, 512–516. <https://doi.org/10.1016/j.chb.2015.03.064>
- Rossee, Y., Oberski, D., Byrnes, J., Vanbrabant, L., Savalei, V., Merkle, E., Hallquist, M., Rhemtulla, M., Katsikatsou, M., & Barendse, M. (2017). Package 'lavaan' (Vol. 17). <https://cran.r-project.org/web/packages/lavaan/lavaan.pdf>
- Rücker, J., Akre, C., Berchtold, A., & Suris, J. (2015). Problematic internet use is associated with substance use in young adolescents. *Acta Paediatrica*, 104(5), 504–507. <https://doi.org/10.1111/apa.12971>
- Sariyska, R., Reuter, M., Lachmann, B., & Montag, C. (2015). Attention deficit/hyperactivity disorder is a better predictor for problematic internet use than depression: Evidence from Germany. *Journal of Addiction Research & Therapy*, 6 (209), 1–6. <https://doi.org/10.4172/2155-6105.1000209>
- Shaw, M., & Black, D. W. (2008). Internet addiction: Definition, assessment, epidemiology and clinical management. *CNS Drugs*, 22(5), 353–365. <https://doi.org/10.2165/00023210-200822050-00001>
- Stănculescu, E., & Griffiths, M. D. (2022). Social media addiction profiles and their antecedents using latent profile analysis: The contribution of social anxiety, gender, and age. *Telematics and Informatics*, 74, Article 101879.
- Stevens, M. W., Dorstyn, D., Delfabbro, P. H., & King, D. L. (2021). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian & New Zealand Journal of Psychiatry*, 55(6), 553–568. <https://doi.org/10.1177/0004867420962851>
- Wang, Y.-S., Wang, H.-Y., & Shee, D. Y. (2007). Measuring e-learning systems success in an organizational context: Scale development and validation. *Computers in Human Behavior*, 23(4), 1792–1808. <https://doi.org/10.1016/j.chb.2005.10.006>
- Wartberg, L., Kriston, L., Kammerl, R., Petersen, K.-U., & Thomasius, R. (2015). Prevalence of pathological internet use in a representative german sample of adolescents: Results of a latent profile analysis. *Psychopathology*, 48(1), 25–30. <https://doi.org/10.1159/000365095>
- Weinstein, A., Dorani, D., Elhadif, R., Bukovza, Y., Yarmulnik, A., & Dannon, P. (2015). Internet addiction is associated with social anxiety in young adults. *Annals of Clinical Psychiatry*, 27(1), 4–9. <https://doi.org/10.1093/med/9780199380183.003.0001>
- World Health Organization. (2019). *International classification of diseases* (11th ed.). Geneva: World Health Organization.
- Young, K. (1996). Psychology of computer use: XI. Addictive use of the internet: A case that breaks the stereotype. *Psychological Reports*, 79, 899–902.