





Problematic Use of Internet Among Indonesia University Students: Psychometric Evaluation of Bergen Social Media Addiction Scale and Internet Gaming Disorder Scale-Short Form

Iqbal Pramukti^{1*}, Ira Nurmala^{2*}, Siti R. Nadhiroh³, Serene En Hui Tung⁴, Wan Ying Gan⁵, Yan-Li Siaw⁶, Yung-Ning Yang^{7,8} , Mark D. Griffiths⁹, Chung-Ying Lin^{2,10-13} , and Amir H. Pakpour¹⁴

¹Department of Community Health Nursing, Faculty of Nursing, Universitas Padjadjaran, West Java, Indonesia

²Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

³Department of Nutrition, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

⁴Division of Nutrition and Dietetics, School of Health Sciences, International Medical University, Kuala Lumpur, Malaysia

⁵Department of Nutrition, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia

⁶Department of Educational Psychology and Counselling, Faculty of Education, Universiti Malaya, Kuala Lumpur, Malaysia

⁷Department of Pediatrics, E-Da Hospital, I-Shou University, Kaohsiung, Taiwan

⁸School of Medicine, I-Shou University, Kaohsiung, Taiwan

⁹International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK

¹⁰Faculty of Social Sciences, Media and Communication, University of Religions and Denominations, Qom, Iran

¹¹Institute of Allied Health Sciences, College of Medicine, National Cheng Kung University, Tainan, Taiwan

¹²BioStatistics Consulting Center, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan

¹³Department of Occupational Therapy, College of Medicine, National Cheng Kung University, Tainan, Taiwan

¹⁴Department of Nursing, School of Health and Welfare, Jönköping University, Jönköping, Sweden

Objective Social media addiction and internet gaming disorder may cause mental health problems among a minority of university students. The Bergen Social Media Addiction Scale (BSMAS) and the 9-item Internet Gaming Disorder Scale-Short Form (IGDS9-SF) are commonly used worldwide. However, they have not been translated or validated into Indonesian. The present study aimed to translate and validate the BSMAS and IGDS9-SF in an Indonesian context among young adults.

Methods A multi-center, web-based cross-sectional study was conducted among 458 university students (74% female; mean age 22.5 years) in Indonesia from June to December 2021. The BSMAS and IGDS9-SF were translated into Indonesian. Internal consistency (using Cronbach's α and McDonald's ω) and factor structure (using confirmatory factor analysis) of the two instruments were examined. Concurrent validity of BSMAS and IGDS9-SF was examined using their correlations with two external concepts: nomophobia and psychological distress.

Results Internal consistency of the Indonesian BSMAS and IGDS9-SF were both acceptable (Cronbach's $\alpha=0.80$ and 0.90 ; McDonald's $\omega=0.86$ and 0.92). Both instruments were unidimensional with good factor loadings ($0.54-0.78$ for BSMAS; $0.63-0.79$ for IGDS9-SF). Moreover, BSMAS and IGDS9-SF had stronger associations with nomophobia ($r=0.58$ and 0.12 ; $p<0.001$) than with psychological distress ($r=0.43$ and 0.15 ; $p<0.001$).

Conclusion The Indonesian versions of the BSMAS and IGDS9-SF had good psychometric properties in terms of linguistic validity, unidimensionality, and reliability. The findings indicate the tools are appropriate for assessing the risk of social media addiction and internet gaming disorder among university students in Indonesia.

Psychiatry Investig 2023;20(12):1103-1111

Keywords Behavioral addiction; Internet gaming disorder; Online addictions; Gaming disorder; Social media addiction; Psychometrics.

Received: October 25, 2022 **Revised:** May 13, 2023 **Accepted:** August 11, 2023

 **Correspondence:** Yung-Ning Yang, MD, PhD

Department of Pediatrics, E-Da Hospital, School of Medicine, I-Shou University, No.1, Yida Road, Jiao-su Village, Yan-chao District, Kaohsiung 824, Taiwan

Tel: +886-7-6150011 (ext 5378), **Fax:** +886-7-6155352, **E-mail:** anycaly@yahoo.com.tw

 **Correspondence:** Chung-Ying Lin, OTR, PhD

Institute of Allied Health Sciences, Departments of Occupational Therapy and Public Health, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, 1 University Rd, Tainan 701, Taiwan

Tel: +886-6-2353535-5106, **Fax:** +886-6-2367981, **E-mail:** cylin36933@gmail.com

*These authors contributed equally to this work.

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INTRODUCTION

The internet is a well-known tool used for communication and providing access to information for individuals in their daily lives.¹ The internet has helped young generations to have experience of and explore global issues, such as identity and autonomy.² Recently, information and communication technology has expanded into various types of hardware and software including social media, smartphones, computers, and other electronic devices.² As a consequence, a minority of young adults are particularly vulnerable to developing internet addiction (IA).³ IA has been described as a prolonged, compulsive, and uncontrollable use of the internet affecting physical and mental health of users.⁴ Statista⁵ reported that more than five billion individuals worldwide use the internet, and nearly 205 million Indonesians (in a population of 270 million) were active internet users in 2022. IA has been found as a serious mental health issue in Asia, with relatively similar prevalence rates in South Korea (20%), China (16.4%), Philippines (21%), and Vietnam (21.2%).⁶ In Europe, and specifically among teenagers, it has been claimed that almost one in ten individuals are addicted to internet use.^{3,4} IA has also been reported among Indonesian university students. In one study, 61% of 715 respondents were identified as having problem with their internet use.⁷ Moreover, Indonesia has a large geographical spread with heterogenous populations. Consequently, the diverse populations in the Indonesia may differ in the prevalence of IA compared to other countries. Therefore, it is important to investigate the topic of IA among Indonesian populations.

The impact of IA has now been studied for decades, and IA is considered to be a psychological dependence on internet use with the characteristics of excessive use, tolerance, mood swings, craving, and withdrawal symptoms when quitting.⁸ Such characteristics may result in poor educational and/or occupational performance and cause social withdrawal.⁹ In other words, IA can have many negative impacts, such as making individuals spend more time playing online games and reducing offline social activities. There is also a lot of potentially unhealthy information on the internet, such as pornography and violence, which can negatively affect individuals' mental health, contribute to sleep deprivation, and lower occupational/educational productivity. Furthermore, adolescents and young adults who engage in long periods of screen time may engage in less physical exercise and sports which may result in physical problems to joints, muscles, and bones.⁷ Adolescence and young adulthood are characterized by a period of maturation and intense psychological changes, and are vulnerable to problematic internet use which may negatively impact on their quality of life.¹⁰ Therefore, research examining IA is important for healthcare providers to better understand and deal

with this issue.¹¹

Social media addiction (SMA) has been described as a subtype of IA (i.e., a specific IA as opposed to generalized IA) and has also become an important issue for research, prevention, and treatment.¹² Another type of specific IA that is much studied is online gaming addiction (also referred to by some as internet gaming disorder [IGD]) which can also cause problems in gamers' daily lives including sleep problems¹³ and various health problems.¹⁴ Early screening for IA including SMA and IGD is required to prevent individuals developing severe mental and physical health consequences. Consequently, researchers have developed various psychometric instruments to assess these disorders. Among the most widely used internationally are the Bergen Social Media Addiction Scale (BSMAS) and the 9-item Internet Gaming Disorder Scale-Short Form (IGDS9-SF) both of which have been used among various populations including young adults.¹⁵⁻¹⁸

The BSMAS has been shown to be an effective tool to assess the risk of SMA among Korean young adults with a good test-retest reliability at a three-week interval ($r=0.75$) and very good internal consistency (Cronbach's $\alpha=0.86$) as well as showing satisfactory convergent validity.¹⁵ It has also been shown to be a valid instrument for assessing SMA risk among Mongolian university students.¹⁶ Examples using IGDS9-SF include a large-scale study among 2,363 Iranian adolescents, which showed that the IGDS9-SF has robust psychometric properties as evidenced in its internal consistency, construct validity, criteria-related validity, concurrent validity, and minimum floor and ceiling effects.¹⁷ Another better example is a recently published systematic review on the psychometric properties of the IGDS9-SF showing its significant psychometric advantages.¹⁸

Both the BSMAS and IGDS9-SF have the benefits of 1) having a theoretical underpinning that assess the underlying constructs of SMA and IGD and 2) being brief and concise (i.e., BSMAS has six items and IGDS9-SF has nine items). The BSMAS was developed by utilizing the "components model of addiction" which comprises six criteria (salience, tolerance, mood modification, relapse, withdrawal symptoms, and conflict).¹⁹ The IGDS9-SF, was developed using the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria for IGD, which includes "preoccupation or obsession, withdrawal, tolerance, loss of control, loss of interest, continued overuse, deceiving, escape of negative feelings, and functional impairment."²⁰ The brevity of both BSMAS and IGDS9-SF is a benefit in a busy clinical setting and can help minimize survey fatigue if used in data collection. Both the BSMAS and IGDS9-SF have great potential in evaluating the severity of their respective disorders.

Although the two instruments have both been translated and validated in many languages, to the best of the present

authors' knowledge, no Indonesian versions of BSMAS and IGDS9-SF have been psychometrically validated. Given that online addictions are a growing health issue among Indonesians,²¹ the present study translated and validated both the BSMAS and IGDS9-SF in an Indonesian context among young adults.

METHODS

Participants and data collection

Participants enrolled in the present study were all Indonesian students from two public universities, one each in the Eastern and Western part of the Java region (i.e., the Universitas Padjadjaran in West Java and the Universitas Airlangga in East Java). The students were recruited through university databases from June 1 to December 1, 2021. The invitation for participation were sent through personal email. To obtain a sufficient sample size for confirmatory factor analysis (CFA), a total of 458 participants were recruited. According to the rule of thumb in CFA, a sample size of 50 is very poor, 100 is poor, 200 is fair, 300 is good, and 500 is very good.²² Therefore, the size of 458 participants in the present study is considered to be acceptable for the CFA. University students aged 18 years and above were eligible to be recruited. The institutional review board (IRB) approval was obtained from the Health Research Ethics Commission, Faculty of Nursing, Universitas Airlangga (registration number: 2318-KEPK) before the data collection was conducted. Participants were given informed about the study details using Google Forms. Once informed consent was obtained, the participants were asked to complete the survey. To avoid the duplication, each participant was asked to login using their personal email. In addition, the study was designed to ensure the participants could only the survey once.

Measures

Demographic data

The instruments addressed to students included a background information sheet assessing age, sex, university, grade, and study major.

BSMAS

The BSMAS²³ was used to assess SMA. It contains six items (e.g., "How often have you felt an urge to use social media more and more?") rated on a 5-point scale ranging from 1 (very rarely) to 5 (very often). The total score ranges from 6 to 30 and a higher score indicates a greater risk of addiction to social media.

IGDS9-SF

The IGDS9-SF²⁴ was used to assess IGD. It contains nine items (e.g., "Do you feel preoccupied with your gaming behavior?") rated on a 5-point scale ranging from 1 (never) to 5 (very often). The total score ranges from 9 to 45 and a higher score indicates a greater risk of IGD.

Nomophobia Questionnaire

The Nomophobia Questionnaire (NMPQ)²⁵ was used to assess the risk of fear of being without a mobile phone ("no mobile phobia"). It contains 20 items (e.g., "Running out of battery in my smartphone would scare me") comprising four factors (being able to communicate, losing connectedness, not being able to access information, and giving up convenience). Items are rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The total score ranges from 20 to 140 and a higher score indicates greater nomophobia. The internal consistency of this scale showed a very good reliability (Cronbach's $\alpha=0.92$; McDonald's $\omega=0.94$).

Depression, Anxiety, Stress Scale

The Depression, Anxiety, Stress Scale (DASS-21)²⁶ was used to assess the level of psychological distress, including depression, anxiety, and stress. It contains 21 items (e.g., "I found it hard to wind down") rated on a 4-point scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). The total score of the entire DASS-21 ranges from 0 to 63 for each subscale and higher scores indicate greater depression, anxiety, or stress. The internal consistency of this scale showed a very good reliability (Cronbach's $\alpha=0.94$; McDonald's $\omega=0.93$).

Translation procedure for BSMAS and IGDS9-SF

The translation procedure in the present study followed the existing guidelines and recommendation for health and medicine cross-cultural research.²⁷

Step 1: recruit translation team

The first step was the recruitment of a translation team. The team comprised four translators divided into mixed-pairs based on their expertise and educational background. The first pair (translation Team A), consisted of two translators (A1 and A2) from the East Java province. Translator A1 understood issues related to SMA and internet gaming addiction, and translator A2 was an expert in English translation. The second pair (translation Team B), also consisted of two translators (B1 and B2) from the West Java province. Translator B1 understood the related issues of SMA and internet gaming addiction, and translator B2 was also an expert in English translation.

Step 2: forward translation

In this stage, only Team A was involved. Each translator from the translation Team A, namely translator A1 (who understood the issue) and translator A2 (English expert) translated the two scales in the original English version, namely the original document (Document 0), into the Indonesian version. After one week, the translated documents from translator A1 (Document 1) and from translator A2 (Document 2) were completed. After that, a committee was used to evaluate the differences and an agreement was reached to produce a combined document (Document 3).

Step 3: back-translation

The back-translation was performed by Team B consisting of translator B1 and translator B2. The team translated the document back into English independently. One document was produced by translator B1 (Document 4), and another document produced by translator B2 (Document 5). The two translators were not given access to the original scale at this stage. Next, a comparison was made between the two documents (4 and 5) to identify differences and the evaluation to be carried out.

Step 4: committee consolidation

At this stage, a committee consisting of researchers and the entire translation team came together to examine similarities and differences between instrument sources and back-translation documents. The documents examined were Document 0 (English version), Documents 1, 2, and 3 (forward translations), and Documents 4 and 5 (back-translations). To overcome the differences in the back-translation stage, the researchers and all translators agreed to accept the translation and retained it according to the original concept of the scale. As a result, a consolidated document was produced which was used for the psychometric testing.

Step 5: pilot test and confirming Indonesian BSMAS and IGDS9-SF

Trials were carried out to correct errors in the scales and ensure that the final translations had maintained equivalence before the researchers deployed the instruments in the field. In the present study, trials were conducted with 33 students who were willing to be participants from selected universities in Indonesia on July 14, 2021, and which were distributed online using Google Forms. After distributing the scales online, the validity and reliability of the translated BSMAS and IGDS9-SF was tested using R software (version 4.2.1; R Core Team, Vienna, Austria). The internal consistencies of the Indonesian BSMAS and IGDS9-SF were acceptable, which means the scales are reliable. The scales were then sent out for formal psy-

chometric testing.

Statistical analysis

Aside from using descriptive statistics to understand the instruments and participants' characteristics, the present study examined the psychometric properties of the two scales (BSMAS and IGDS9-SF). More specifically, internal consistency, construct validity, and concurrent validity were examined for the two scales. Cronbach's α and McDonald's ω were used to examine the internal consistency reliability of the two instruments, with a recommended cutoff for good internal consistency is that both Cronbach's α and McDonald's ω should exceed 0.7.²⁸ CFA with a diagonally weighted least squares estimator was used to examine the construct validity of the two instruments. Prior research indicated that both instruments had a unidimensional factor structure.^{17,18,29-31} Therefore, two CFAs were used to examine whether the unidimensionality was supported for each scale. Fit indices were then adopted to evaluate whether the unidimensionality was supported: a nonsignificant χ^2 test, a comparative fit index (CFI) >0.9, a Tucker-Lewis index (TLI) >0.9, a root mean square error of approximation (RMSEA) <0.08, and a standardized root mean square residual (SRMR) <0.08.^{32,33} Additionally, the CFA factor loadings were used to examine whether the item is needed in each instrument, and a loading higher than 0.4 indicates necessary inclusion.³⁴ Structural equation modeling with a diagonally weighted least squares estimator was used to examine the concurrent validity of the two instruments. More specifically, each of the two instruments was proposed to be regressed on both nomophobia (assessed using NMPQ) and psychological distress (assessed using DASS-21). It was hypothesized that the NMPQ would have stronger associations with the two instruments than the DASS-21 given that the NMPQ assesses more internet-related psychological distress (i.e., being afraid of having no access to internet) than the DASS-21. However, given that prior evidence and theory (e.g., Interaction of Person-Affect-Cognition-Execution model)³⁵⁻³⁹ supports the associations between problematic use of internet and psychological distress, it was hypothesized to be associated with both SMA and IGD. R software workplace, psych package⁴⁰ and lavaan package⁴¹ were used to test all the statistical analyses.

RESULTS

The sample was relatively young (mean [M] age=22.46 years; standard deviation [SD]=8.07) with nearly three-quarters being female participants (n=339; 74.0%). Slightly over half of the participants were majoring in health-related academic programs (n=251; 54.8%) and the majority of the participants were undergraduate students (n=376; 82.1%). On average, their

daily social media use was 5.19 hours (SD=4.15), and daily gaming use was 0.87 hours (SD=1.42). Moreover, 456 participants were social media users and 211 were gamers. They showed relatively high levels of nomophobia (M=91.69 [out of 140]; SD=20.41) and low levels of psychological distress (M=18.90; SD=10.35) (Table 1).

Table 2 reports the item and total scores of the BSMAS and IGDS9-SF. The two instruments demonstrated relatively normal distributions as indicated by the skewness (range between -0.33 and 0.56 for BSMAS and between 0.42 and 2.26 for IGDS9-SF) and kurtosis (range between -0.84 and 0.02 for BSMAS and between -0.91 and 4.94 for IGDS9-SF). In addition, the two instruments had good internal consistency shown by both Cronbach's α (0.80 for BSMAS and 0.90 for IGDS9-SF) and McDonald's ω (0.86 for BSMAS and 0.92 for IGDS9-SF).

The unidimensional factor structure of the both two instruments was supported by the CFA results in terms of the good factor loadings (range between 0.54 and 0.78 for BSMAS and between 0.63 and 0.79 for IGDS9-SF) and satisfactory fit indices (p -values of χ^2 were both nonsignificant; CFI=1.000 for both BSMAS and IGDS9-SF; TLI=1.003 for BSMAS and 1.004 for IGDS9-SF; RMSEA=0.000 for both BSMAS and IGDS9-SF; and SRMR=0.031 for BSMAS and 0.050 for IGDS9-SF)

Table 1. Characteristics of the participants

Characteristic	Value (N=458)
Age (yr)	22.46±8.07
Sex	
Male	119 (26.0)
Female	339 (74.0)
Study major	
Health-related	251 (54.8)
Non-health-related	207 (45.2)
Study program	
Undergraduate	376 (82.1)
Postgraduate	82 (17.9)
Marital status	
Single	387 (84.6)
Married	68 (14.8)
Other	3 (0.6)
Daily hours on social media (h)	5.19±4.15
Daily hours on gaming (h)	0.87±1.42
NMPQ total score*	91.69±20.41
DASS-21 total score*	18.90±10.35

Values are presented as mean±standard deviation or number (%). *NMPQ score range between 20 and 140 (Cronbach's α =0.92; McDonald's ω =0.94), DASS-21 score range between 0 and 63 (Cronbach's α =0.94; McDonald's ω =0.93). NMPQ, Nomophobia Questionnaire; DASS-21, Depression, Anxiety, Stress Scale

(Table 3).

The concurrent validity of the two instruments was supported by the significant correlations with both nomophobia and psychological distress (Figure 1). The structural equation modeling showed that problematic social media use (assessed using BSMAS) and IGD (assessed using the IGDS9-SF) had stronger associations than with nomophobia (r =0.58 and 0.12; p <0.001) than with psychological distress (r =0.43 and 0.15; p <0.001). Although problematic gaming was significantly associated with both nomophobia and psychological distress, the magnitudes of the associations were somewhat weak (r =0.12 and 0.15; p <0.001).

DISCUSSION

Assessing the risk of SMA and IGD is important for healthcare providers to prevent at-risk individuals from further complication due to mental health issues caused by online addictions. Appropriate instruments with a local language (e.g., Bahasa Indonesian in the present study) are needed to help researchers and healthcare providers to assess health information appropriately.

In the present study, instrument translations of the BSMAS and IGDS9-SF were carried out using local cross-culture translational and validation procedures. The present study is the

Table 2. Score distributions and internal consistency for the internet-related instruments

	Mean (SD)	Skewness	Kurtosis	α^*	ω^\dagger
BSMAS	16.68 (4.50)	0.08	0.02	0.80	0.86
Item B1	3.04 (0.99)	-0.13	-0.56		
Item B2	3.31 (1.02)	-0.33	-0.34		
Item B3	3.02 (1.23)	-0.11	-0.84		
Item B4	2.78 (1.00)	0.11	-0.42		
Item B5	2.26 (1.06)	0.49	-0.46		
Item B6	2.27 (1.06)	0.56	-0.26		
IGDS9-SF	14.07 (5.49)	1.32	2.01	0.90	0.92
Item I1	1.62 (0.88)	1.42	1.64		
Item I2	1.49 (0.76)	1.67	2.87		
Item I3	1.65 (0.88)	1.22	0.70		
Item I4	1.52 (0.82)	1.66	2.44		
Item I5	1.48 (0.80)	1.81	3.20		
Item I6	1.36 (0.67)	2.00	4.04		
Item I7	1.34 (0.67)	2.17	5.13		
Item I8	2.25 (1.18)	0.42	-0.91		
Item I9	1.36 (0.73)	2.26	4.94		

*Cronbach's α ; \dagger McDonald's ω . SD, standard deviation; BSMAS, Bergen Social Media Addiction Scale; IGDS9-SF, 9-item Internet Gaming Disorder Scale-Short Form

first to be conducted in Indonesia related to the translation and validation of these two widely used psychometric scales. The participants were recruited from two public universities representing students in the Eastern and Western parts of Indonesia. A systematic translation method was applied during the translation process from English to Indonesian language and adapted to Indonesian culture.²⁷ This process required translators who were knowledgeable in SMA and IGD as well as the two languages. The translation method used here has been used to translate other similar psychometric scales such as Smartphone Application-Based Addiction Scale and has been shown to be a valid and reliable instrument for young

adults in Indonesia.²¹

A standardized cross-cultural approach⁴² was used during the linguistic validity of the Indonesian BSMAS and IGDS9-SF. The psychometric testing of the BSMAS demonstrated acceptable internal consistency values (Cronbach's $\alpha=0.80$ and McDonald's $\omega=0.86$). This is in line with an earlier study where each of the six BSMAS items significantly correlated with all other items in the scale (Cronbach's $\alpha=0.88$).²³ In the present study, SMA was significantly associated with both nomophobia and psychological distress. This is in line with a study in Türkiye showing that SMA was associated with nomophobia among college students.⁴³ The present study also in line with an earlier large population-based cohort study conducted among 15,398 Canadian university students showing that SMA was associated with psychological distress.⁴⁴ Furthermore, the present study demonstrated that BSMAS had a unidimensional structure which in line with other language versions including English used in Malaysia,⁴⁵ Italian,⁴⁶ Persian,⁴⁷ Hungarian,⁴⁸ Chinese,³¹ Romanian,⁴⁹ and American English.⁵⁰ Therefore, the BSMAS appears to be valid in assessing a single latent construct (i.e., addiction to social media) among university students from many different countries.

The IGDS9-SF demonstrated excellent internal consistency values (Cronbach's $\alpha=0.90$ and McDonald's $\omega=0.92$). This is in line with a recent systematic review, which reported that all psychometric testing papers on IGDS9-SF report excellent internal consistency.¹⁸ Moreover, a recent study among Malaysian students that was not included in the systematic review also showed excellent internal consistency of the IGDS9-SF (Cronbach's $\alpha=0.95$ and McDonald's $\omega=0.96$).⁴⁵ In the present study, IGD was significantly associated with both nomophobia and psychological distress (although much weaker than SMA). This finding is also in line with a study among 300 Chinese university students in Hong Kong showing that higher IGD scores were associated with greater psychological distress.⁵¹ Moreover, because many online games are played via smartphone, this may explain the association between IGD and nomophobia. That is, individuals having higher levels of IGD may worry about not having their smartphone to play online videogames.

Table 3. Psychometric results derived from confirmatory factor analysis on the BSMAS and IGDS9-SF

	BSMAS	IGDS9-SF
Factor loading		
Item 1	0.64	0.65
Item 2	0.78	0.72
Item 3	0.54	0.79
Item 4	0.67	0.75
Item 5	0.59	0.71
Item 6	0.59	0.74
Item 7	--	0.64
Item 8	--	0.63
Item 9	--	0.67
Fit indices		
χ^2 (df)	7.26 (9)	21.41 (27)
p	0.61	0.77
CFI	1.000	1.000
TLI	1.003	1.004
RMSEA	0.000	0.000
95% CI of RMSEA	0.000, 0.045	0.000, 0.026
SRMR	0.031	0.050

BSMAS, Bergen Social Media Addiction Scale; IGDS9-SF, 9-item Internet Gaming Disorder Scale-Short Form; CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation; CI, confidence interval; SRMR, standardized root mean square residual

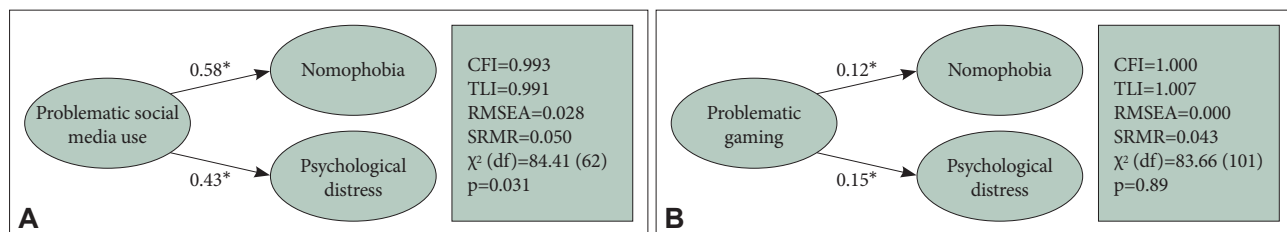


Figure 1. Concurrent validity of the two instruments with nomophobia and psychological distress via structural equation modeling; for Bergen Social Media Addiction Scale (A); for Internet Gaming Disorder Scale-Short Form (B). * $p<0.001$. CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Earlier studies have also found that SMA is associated with depression, anxiety, and stress.^{31,45,52-54} Furthermore, both IGDS9-SF and BSMAS were associated with nomophobia and psychological distress. The correlation between IGD and psychological distress indicated the potential problematic consequences of online gaming on mental health among university students. This is in line with the study conducted Italian young adults showing IGD may facilitate the development of mental health distress.⁵⁵

The present study has three key strengths. First, the translation procedure was conducted using a robust and standardized method that ensured the robustness of the linguistic validity. Second, advanced statistical analysis (i.e., CFA) was used in the present study to understand the factor structures for both BSMAS and IGDS9-SF. Third, relevant instruments (i.e., DASS-21, NMPQ) assessing concepts associated with online addictions (i.e., nomophobia and psychological distress) were used to examine the concurrent validity for both BSMAS and IGDS9-SF.

Limitations

There were several limitations in the present study. First, the convenience sampling technique used in the present study means the sample was not representative of all Indonesian university students. Moreover, due to convenience sampling, sampling bias was not controlled for because the sample was predominantly female with relatively small sample of gamers. Further study recruiting participants with heterogeneity across different features with sufficient sample size among the students is needed. More specifically, a large-scale study recruiting university students from different universities in Indonesia would be helpful in improving the external validity and resolving the problems of small sample sizes in males and gamers in the present study. Second, data for the present study were collected from university students from two regions of Indonesia (i.e., Eastern and Western Java). Considering the widespread nature of the Indonesia's geography (comprising over 17,000 islands), the present sample was not representative of the entire Indonesian population. Therefore, the generalizability of the present findings is restricted to specific regions and cohorts of the Indonesia. Third, all the instruments used in the present study (i.e., BSMAS, IGDS9-SF, NMPQ, and DASS-21) were self-report, and there is possibility that the responses may be biased due to social desirability. In addition, the self-report nature of the scales may result in single rater bias. Fourth, the present study did not examine the test-retest reliability of the Indonesian versions of the BSMAS and IGDS9-SF. Therefore, additional psychometric evidence is needed to ensure that Indonesian versions of the BSMAS and IGDS9-SF have good reproducibility.

Conclusion

Psychometric testing in the present study supported the linguistic validity, unidimensionality, and reliability for both Indonesian version of BSMAS and IGDS9-SF. However, additional different psychometric testing methods (e.g., Rasch analysis to get more in-depth information for each item; network analysis to visualize the relationships between the BSMAS/IGDS9-SF items) are needed to strengthen the validity and reliability of the Indonesian versions of the BSMAS and IGDS9-SF. Overall, the results showed that the Indonesian version of BSMAS and IGDS9-SF are valid and reliable. Therefore, these two scales can be confidently used for assessing the risk of SMA and IGD among university students in Indonesia.

Availability of Data and Material

The datasets generated or analyzed during the study are not publicly available due to the privacy concerns raised by the Health Research Ethics Commission, Faculty of Nursing, Universitas Airlangga but are available from the corresponding authors on reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Iqbal Pramukti, Ira Nurmala, Yung-Ning Yang, Chung-Ying Lin. Data curation: Iqbal Pramukti, Ira Nurmala, Siti R. Nadhiroh. Formal analysis: Chung-Ying Lin. Funding acquisition: Iqbal Pramukti, Ira Nurmala, Siti R. Nadhiroh, Serene En Hui Tung, Wan Ying Gan, Chung-Ying Lin. Investigation: Iqbal Pramukti, Ira Nurmala, Siti R. Nadhiroh, Yung-Ning Yang, Chung-Ying Lin. Methodology: Siti R. Nadhiroh, Serene En Hui Tung, Wan Ying Gan, Yan-Li Siaw, Yung-Ning Yang, Mark D. Griffiths, Chung-Ying Lin, Amir H. Pakpour. Project administration: Chung-Ying Lin. Resources: Iqbal Pramukti, Ira Nurmala, Siti R. Nadhiroh, Yung-Ning Yang, Chung-Ying Lin. Software: Chung-Ying Lin. Supervision: Mark D. Griffiths, Chung-Ying Lin, Amir H. Pakpour. Validation: Mark D. Griffiths, Chung-Ying Lin, Amir H. Pakpour. Visualization: Chung-Ying Lin. Writing—original draft: Iqbal Pramukti, Ira Nurmala, Chung-Ying Lin. Writing—review & editing: Siti R. Nadhiroh, Serene En Hui Tung, Wan Ying Gan, Yan-Li Siaw, Yung-Ning Yang, Mark D. Griffiths, Chung-Ying Lin, Amir H. Pakpour.

ORCID iDs

Iqbal Pramukti	https://orcid.org/0000-0002-0645-0534
Ira Nurmala	https://orcid.org/0000-0001-6930-8204
Siti R. Nadhiroh	https://orcid.org/0000-0002-2870-6094
Serene En Hui Tung	https://orcid.org/0000-0001-9122-7523
Wan Ying Gan	https://orcid.org/0000-0002-9016-3414
Yan-Li Siaw	https://orcid.org/0000-0002-2815-4867
Yung-Ning Yang	https://orcid.org/0000-0002-8533-1209
Mark D. Griffiths	https://orcid.org/0000-0001-8880-6524
Chung-Ying Lin	https://orcid.org/0000-0002-2129-4242
Amir H. Pakpour	https://orcid.org/0000-0002-8798-5345

Funding Statement

This project was funded by the National Science and Technology Council, Taiwan (NSTC 112-2410-H-006-089-SS2), the Higher Education Sprout Project, Ministry of Education to the Headquarters of University Advancement at National Cheng Kung University (NCKU).

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