Psychometric properties of the compulsive internet use scale among adolescents in India, Philippines and Turkey

Blossom Fernandes [a,*], Caner Aydin [b], Bilge Uzun [b], Roseann Tan-Mansukhani [c], Urmi Nanda Biswas [d]

[a] Durham University, UK
[b] Bahçeşehir University, Turkey
[c] De La Salle University, Manila, Philippines
[d] The M.S.University of Baroda, India

ARTICLE INFO

ABSTRACT

Research shows that internet addiction continues to grow globally, with wider access to the internet and changing use of smartphones. The compulsive internet use scale (CIUS) which has been found to be consistently associated with pathological internet use, is widely considered a measure for prolonged and problematic internet use. CIUS had been translated and adapted in several countries with reports of good reliability. However, to our knowledge this is the first study that examined the psychometric properties of the CIUS scale in three countries who share similar collectivistic attitudes and are a part of growing economies. This link was shared widely amongst young adults (aged 18–25 years), and a total of 837 participants completed the questionnaires. They completed the CIUS scale alongside a measure for escapism and self-esteem. These additional self-reports were added to assess the construct validity of the CIUS. The results from this study confirms the single factor structure of the CIUS as the best fit for this scale, this single factor solution was found for all the three countries. Similarly, high scores of internal reliability were observed for samples in India, Philippines and Turkey. We further found the CIUS to positively correlate with scores of escapism in the Turkish sample only. Taken together these results suggest that the CIUS is an effective measure regardless of country of residence, whilst highlighting the underlying differences in escapism that may need further attention.

1. Introduction

Internet addiction is an increasingly pervasive disorder and has been receiving substantial recognition over the past few years (Laconi, Rodgers, & Chabrol, 2014). Internet addiction is defined as a pathological pattern of internet use, which leads the individual to clinical distress, moreover individuals are often considered unable to control time spent online (Young, 1998). Likewise, compulsory internet use is related to escapism and self-esteem especially in young people (Kardefelt-Winther, 2014). A mental health problem considered in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, as internet gaming disorder, however more and more research suggests that internet addiction generally is a growing concern which merits clinical attention (Laconi et al., 2014; Pies, 2009). Moreover, this is a growing cross-cultural phenomena (Chen & Nath, 2016). To measure this phenomenon, there currently exists several psychometric scales that

have been developed to measure and evaluate the level of problematic internet use; however, the measure with the least number of items is the Compulsive Internet Use Scale (CIUS) (Laconi et al., 2014). The CIUS was initially developed to assess internet addiction in a brief and effective manner by Meerkerk, Van Den Eijnden, Vermulst, and Garretsen (2009).

The CIUS consists of 14 items measuring compulsive internet use, originally tested as a single factor scale, it addressed the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition's criteria for pathological gambling addiction. These include withdrawal of symptoms, loss of control, preoccupation/salience, conflict, coping and lying to hide internet use. Over the last years there have been several adaptations leading to shorter and longer versions of the CIUS (Dhir, Chen, & Nieminen, 2015; Ghazanfarpour, Tehrani, Khajeali, Keshtkar, & Babakhanian, 2020; Khazaal et al., 2011, 2012; Yong, Inoue, & Kawakami, 2017), utilised in eastern and western countries, and tested mainly in

adolescents and adults (Lopez-Fernandez et al., 2019), indicating that CIUS could be considered a cross-cultural measure for use in adolescents and adults (Laconi et al., 2014).

The initial study of the CIUS by Meerkerk et al. (2009) found a single dimension structure for the scale. In Taiwan, the Chinese adaptation of the CIUS further supported a single factor model (Dhir et al., 2015). Additional support for a single factor was found in the Arabic and French version of the CIUS, with consistent reliability among adolescents and adults (Khazaal et al., 2011, 2012). Similarly a study conducted in Japan, found that their version of the Japanese adaptation was also a reliable measure, which could be used among a wide age group regardless of gender (Yong et al., 2017). In their study Yong et al. (2017) found both a single factor and three factor model for the measure. The three factors identified were *excessive absorption, difficulties setting priorities* and *mood regulation*; Yong and colleagues claim that the three-factor model offers multi-dimensional structure to reflect differences in this construct in the Japanese adaptation. This fit was also achieved regardless of age and gender.

Smartphone ownership and internet use is continuously increasing amongst young adults in countries across the globe (Yang, Chen, Huang, Lin, & Chang, 2017). Among those who own a smartphone, the Pew Research Center (2016) report an increase in social media use and online internet gaming. The problematic use of internet is a growing phenomenon across the globe, as a result of universality of the internet. There is a mounting body of literature highlighting the impact of internet use on low self-esteem and mental health (Fernandes, Biswas, Mansukhani, Casarín, & Essau, 2020; Tian, Qin, Cao, & Gao, 2020), further noting that these patterns in countries belonging to collectivistic cultures. In collectivistic cultures, group identity is emphasised, rather than the notion of a separate, autonomous self (Hofstede, 2011). This sense of belonging has been associated with having an online presence via social media (Gao, Liu, & Li, 2017). Gao and colleagues claim that this sense of belonging further impacts escapism, this form of escapism which in turn leads to addiction to these social networking sites. Escapism in this context is defined as behavioural mechanism to distract the individual from real world events, which could often be unpleasant (Young, Kuss, Griffiths, & Howard, 2017). More generally, it appears that problematic internet use, and those that use social networking sites problematically, use escapism as a coping mechanism (Kırcaburun & Griffiths, 2019).

Regardless of cultural influences, the CIUS appears to be a robust measure for internet addiction, with strong support for a single factor structure across literature (Dhir et al., 2015; Kuzucu, Ozdemir, & Ak, 2015; Laconi et al., 2014). However, even though studies have measured the properties of CIUS in various populations, there is to our knowledge no study that has compared the factor structure of CIUS in several countries together, particularly focusing on countries belonging to collectivistic cultures. Thus, the present study aimed to explore the factor structure of the CIUS scale among young adults in India, Philippines and Turkey. Earlier studies of CIUS in Indian (Dhir, Chen, & Nieminen, 2016) and Turkish (Kuzucu, Ozdemir, & Ak, 2015) populations found good properties with consistent internal reliability. Furthermore, to our knowledge the CIUS has yet to be examined in the Filipino population. The aim was also to examine the reliability and factorial structure amongst these populations, considering age and gender. To further measure construct validity of this scale, the correlation between CIUS and escapism and self-esteem was examined.

2. Material and methods

2.1. Participants

A total of 1,137 internet users voluntarily participated in the study. Data screening reduced the final sample to 837 (239 individuals from India, 366 individuals from the Philippines, and 232 individuals from Turkey). Data from participants who failed to complete large parts of the

questionnaire was excluded from the analyses. Participants were aged between 18 and 25 years with a mean age of 20.62 ($SD = 2.14$), with a majority female sample (80.4%).

The mean age of the participants was 20.51 ($SD = 1.97$) for the Indian sample; 19.98 ($SD = 1.89$) for the Filipino sample; and 21.75 ($SD = 2.21$) for the Turkish sample. Considering gender, most of the participants were female, more specifically, 85.4% of the Indian participants; 74.0% of the Filipino participants and 84.9% of the Turkish participants were female.

Sociodemographic information including education degree (high school, college, university/further education, prefer not to say and other), employment type (full-time, part-time, self-employed, voluntary employed, student and prefer not to say), religious beliefs (Christians, Muslims, Hindus, Buddhists, those without a religion and others) and gender information of all participants are presented in Table 1.

2.2. Measures

2.2.1. The Compulsive Internet Use Scale (CIUS) (Meerkerk et al., 2009) originally devised to measure pathological internet use. This scale is made up of 14 items with a 5-point Likert scale (ranging from 0 = 'never', to 4 = 'very often').

2.2.2. Escapism Scale (Gao et al., 2017) was used to measure escapism from the real-world life events using internet services or apps on individual devices. This short scale consists of four items and is based on a 4-point Likert scale (ranging from 1 = 'Strongly disagree, to 4 = 'Strongly agree').

2.2.3. A short version of the Rosenberg Self-esteem Scale was used to measure self-esteem. The 3 items were extracted from the original Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). The 3 items selected centres around self-concept of competence as outlined by O'Malley and Bachman (1983) as indicators of global self esteem. The

Table 1
Sociodemographic information of all countries.

	N (%)	India	Philippines	Turkey
Gender		N (%)	N (%)	N (%)
Female	672 (80.28)	204 (85.35)	271 (74.04)	197 (84.91)
Male	165 (19.72)	35 (14.65)	95 (25.95)	35 (15.08)
Religious beliefs				
Christian	345 (41.21)	11 (4.6)	331 (90.2)	3 (1.3)
Muslim	240 (28.67)	31 (13.0)	1 (0.3)	208 (89.7)
Hindu	157 (18.75)	157 (65.7)	0	0
Buddhist	9 (1.07)	7 (2.9)	2 (0.5)	0
No Religion	58 (6.92)	18 (7.5)	20 (5.5)	20 (8.6)
Other	28 (3.34)	15 (5.4)	12 (3.3)	1 (0.4)
Education				
High School	415 (49.58)	82 (33.5)	199 (54.4)	134 (57.8)
College	174 (20.78)	76 (31.8)	94 (25.7)	0
University/Further education	212 (25.32)	75 (31.4)	39 (10.7)	98 (42.2)
Prefer not to say	21 (2.50)	3 (1.3)	18 (4.9)	0
Other	15 (1.79)	3 (1.3)	12 (3.3)	0
Employment				
Full-time	43 (5.13)	8 (3.3)	12 (3.3)	23 (9.9)
Part-time	86 (10.27)	4 (1.7)	40 (10.9)	42 (18.1)
Self-employed	215 (25.68)	1 (0.4)	133 (36.3)	81 (34.9)
Voluntary employment	163 (19.47)	1 (0.4)	112 (30.3)	50 (21.6)
Student	328 (39.18)	223 (93.3)	69 (18.9)	36 (15.5)
Prefer not to say	2 (0.23)	2 (0.8)	0	0

items used in this study were as follows: 1. *I feel that I have a number of good qualities.* 2. *I am able to do things as well as most other people.* 3. *I feel that I am a person of worth, at least on an equal plane with others.* This commonly used and well-validated measure of global self-esteem scale is set on a 4-point scale ranging from 1 = 'strongly disagree' to 4 = 'strongly agree'.

2.3. Procedure

The study was approved by Durham University's Psychology ethics committee and was carried out in accordance with the 1975 Helsinki declaration. The questionnaire was published online in Qualtrics, a platform which allows questionnaire data to be collected online using an anonymous link. Participants were recruited online and the link to complete the questionnaire was shared on various social media networks and student groups (e.g., Instagram, Twitter, Facebook). Participants in Turkey completed the Turkish versions of the CIUS, escapism and the self-esteem scale. Participants in India and Philippines completed existing English version of the measures. All the participants voluntarily consented to completing the questionnaire, they were aware that their participation was completely anonymous as no personally identifying information was recorded.

2.4. Statistical analyses

The analyses for the present study were conducted using IBM SPSS 25 and AMOS 25. A series of confirmatory factor analyses using maximum likelihood estimation were conducted independently to confirm the factor structure of the scale. Validity was computed using the Pearson's correlation coefficients.

3. Results

Data screening and preliminary analysis

The data were screened in terms of mis-entries, missing cases and outliers. The skewness and kurtosis values for the scales were also calculated, which showed that the data was normally distributed. Table 2 shows the mean score of Indian, Filipino and Turkish participants.

Factor structure and internal consistency

To measure the best fit for the CIUS, the responses from all the three countries were analysed individually. In each of the three countries, we tested one-factor model with the 14 items with the two most correlated error variances using a confirmatory factor analysis. To check whether the model indicates a good fit, CFI and RMSEA values must be at certain interval. According to Kline (2005) and Hooper et al. (2008), in order to indicate a good fit, the CFI value must be ≥ 0.90 and RMSEA < 0.08. As it can be seen in the Table 3, the Indian, Philippine and Turkey samples' CFI and RMSEA values are in the acceptable cut-off points and one factor model for three countries indicates a good fit with the original study.

3.1. Indian sample

At initial step, we ran the confirmatory factor analysis with one

Table 2
Mean differences (standard deviations) for all the variables.

Countries	India	Philippines	Turkey
CIUS	41.45 (10.23)	49.26 (11.04)	36.1 (11.15)
Self-esteem	9.15 (1.71)	8.86 (1.77)	10.32 (1.65)
Escapism	8.47 (3.19)	10.29 (3.31)	9.06 (4.26)

Note. CIUS = Compulsive Internet Use Scale.

Table 3
Fit Indices for the Indian, Filipino, and Turkish Samples.

Sample	Model	X^2	df	X^2/ df	CFI	RMSEA
Original study*	One-factor model	696.45	358	1.95	0.96	0.06
India	One-factor model	147.79	75	1.96	0.93	0.06
Philippines	One-factor model	219.30	75	2.92	0.92	0.07
Turkey	One-factor model	171.61	71	2.42	0.94	0.07

Note. * Original study = Meerkerk et al. (2009).

factor, without any modification and the model shows a good fit similar to the original scale as mentioned in the study of Meerkerk et al. (2009). The modified model showed one homogeneous factor with substantial factor loadings ranging from 0.48 to 0.66 and yielded a good fit (χ^2 (N = 239) = 147.79 with 75 df, $p < 0.001$, CFI = 0.93, and RMSEA = 0.06 (see Table 3). The internal consistency (Cronbach's alpha) of the scale was 0.87.

3.2. Filipino sample

We tested one-factor model with the 14 items with the two most correlated error variances using a confirmatory factor analysis for the participants in the Philippines. The results showed an acceptable fit with the original scale. The model showed one homogeneous factor with substantial factor loadings ranging from 0.42 to 0.81 and yielded an acceptable fit (χ^2 (N = 366) = 219.30 with 75 df, $p < 0.001$, CFI = 0.92, and RMSEA = 0.07 (See, Table 3). The internal consistency (Cronbach's alpha) of the scale was 0.88.

3.3. Turkish sample

The model did depict an acceptable fit with the original scale as mentioned in the study of Meerkerk et al. (2009). The modified model showed one homogeneous factor with substantial factor loadings ranging from 0.46 to 0.79 and yielded a acceptable fit (χ^2 (N = 232) = 171.61 with 71 df, $p < 0.001$, CFI = 0.94, and RMSEA = 0.07 (See, Table 3). The internal consistency (Cronbach's alpha) of the scale was 0.90.

3.4. Validity

We carried out Pearson's correlations between the CIUS and self-esteem and escapism in order to explore the validity of the scale. The results of the analysis showed that the CIUS did not significantly correlate with self-esteem ($r = 0.02$, $p = 0.76$) and escapism ($r = -0.01$, $p = 0.86$) for Indian sample. In a similar way, findings for the Filipino sample showed that the scores obtained from CIUS did not significantly correlate with self-esteem ($r = 0.01$, $p = 0.88$) and escapism ($r = -0.02$, $p = 0.64$). For the Turkish sample, the CIUS scores was not found to be significantly correlated with self-esteem ($r = 0.11$, $p = 0.09$) either, but significantly correlated with escapism ($r = 0.35$, $p = 0.01$).

4. Discussion

The current study examined the psychometric properties of a well-known internet use scale (CIUS) in three countries. In this respect, factor structure, validity and internal consistency of the CIUS were assessed among adolescents and young adults in India, Philippines and Turkey. To our knowledge this is a first study to investigate the CIUS use in a Filipino sample and compare it with other collectivistic cultures such as India and Turkey. In all of the countries, the internal consistency of the CIUS scale was found to be very good, replicating earlier studies (Dhir et al., 2016; Laconi et al., 2014; Nele Nyenhuis, 2013; Van Den Eijnden, Spijkerman, Vermulst, Van Rooij, & Engels, 2010). These results are consistent with the findings of Meerkerk et al. (2009) study.

Our study also sought to measure the psychometric properties of the CIUS in three different countries. Given that these three countries are vastly different in geographic regions, cultural and technological landscapes, these countries share a collectivistic approach. Hence, it is important to consider the factor structure for these three samples of data. The results from factor analyses confirmed the suitability of a one factor structure in these samples, in line with previous research, including those studies conducted in India (Dhir et al., 2016) and Turkey (Kuzucu et al., 2015). These results offer further support for this scale to be an overall brief measure for a self-report of internet addiction.

To assess the concurrent validity of the measure, correlation co-efficients were calculated between the CIUS, self-esteem and escapism. These results show that escapism positively correlated with the CIUS for the Turkish sample. This finding support previous studies whereby problematic internet use was found to be related to escapism (Gao et al., 2017; Kırcaburun & Griffiths, 2019). There was, however, no significant correlations with escapism and the CIUS within the Indian and Filipino sample; these differences indicate that there may be further cultural factors that may exist in internet addition. These cultural difference have been observed by a study that found prevalence of internet addiction to be similar across young internet users, but noting cultural implications underlying internet addiction (Chen & Nath, 2016). For example, some collectivistic cultures may not all be using the internet for the same length of period (Jackson & Wang, 2013) or for the same purposes (Panova, Carbonell, Chamarro, & Puerta-Cortés, 2020). Panova and colleagues (2020) found that even in some collectivistic countries smartphone use and engagement may be higher as a result of novelty, with participants sharing content and posting social content as often as those belonging to individualistic cultures.

The self-esteem scale did not significantly correlate with the CIUS in this study, similarly an earlier study reported that the link between self-esteem and CIUS was not supported (Muusses, Finkenauer, Kerkhof, & Billedo, 2014). Muusses et al. (2014) claim that self-esteem increases in adulthood and remains stable, compared to childhood or early adolescence. Therefore, self-esteem may remain resilient to the effects of internet addiction, which would explain its lack of relationship to CIUS observed in the present study.

Despite highlighting some key psychometric properties of the CIUS, this study is not without limitations. The participants for this study were all mainly university students with a large female sample, in particular, the data from India is mainly from three states. Moreover, most of the students from Philippines were from a private university, which could influence responses and therefore the generalisability of this could be restrictive. Secondly, data from a significant number of participants had to be excluded as a result of missing responses. As participants completed these questionnaires online shared via a link, this could have affected participant response rate. Furthermore, this study mainly focused on older adolescents and young adults, future studies could focus on a wider pool of participants considering older adults and those from different regions.

4.1. Conclusions

This study examined the psychometric properties of the CIUS amongst adolescents and young adults in three different countries (India, Philippines and Turkey), with shared collectivistic principles. These findings offer further evidence of a single factor structure for the CIUS, for all three countries, with good internal reliability scores. The present study also addressed concurrent validity of CIUS by measuring its relationship with escapism and self-esteem. Although we found a significant relationship between CIUS and escapism for Turkish sample, this was not observed for the other countries, suggesting that there may be intricate cultural implications at play, including the way internet is used in these countries and its purpose. However, future research could examine the factor structure of the CIUS in wider communities within the countries mentioned in this study, alongside a wider age group to further examine the developmental trajectory of CIUS. Nonetheless, this study shows that the CIUS is an effective tool to assess prolonged and problematic internet use as a short and single factor measure.

CRediT authorship contribution statement

Blossom Fernandes: Conceptualization, Validation, Writing - original draft, Writing - review & editing. **Caner Aydin:** Formal analysis, Writing - review & editing. **Bilge Uzun:** Formal analysis, Writing - review & editing. **Roseann Tan-Mansukhani:** Data curation, Writing - review & editing. **Urmi Nanda Biswas:** Data curation, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Chen, L., & Nath, R. (2016). Understanding the underlying factors of Internet addiction across cultures: A comparison study. *Electronic Commerce Research and Applications, 17*, 38–48. https://doi.org/10.1016/j.elerap.2016.02.003.

Dhir, A., Chen, S., & Nieminen, M. (2015). Psychometric Validation of the Chinese Compulsive Internet Use Scale (CIUS) with Taiwanese High School Adolescents. *Psychiatric Quarterly, 86*(4), 581–596. https://doi.org/10.1007/s11126-015-9351-9.

Dhir, A., Chen, S., & Nieminen, M. (2016). Psychometric Validation of the Compulsive Internet Use Scale. *Social Science Computer Review, 34*(2), 197–214. https://doi.org/10.1177/0894439315572575.

Fernandes, B., Biswas, U. N., Mansukhani, R. T., Casarín, A. V., & Essau, C. A. (2020). The impact of COVID-19 lockdown on internet use and escapism in adolescents. *Revista de Psicología Clínica con Niños y Adolescentes, 7*(3), 59–65.

Gao, W., Liu, Z., & Li, J. (2017). How does social presence influence SNS addiction? A belongingness theory perspective. *Computers in Human Behavior, 77*, 347–355. https://doi.org/10.1016/j.chb.2017.09.002.

Ghazanfarpour, M., Tehrani, H. D., Khajeali, N., Keshtkar, A., & Babakhanian, M. (2020). Psychometric properties of Compulsive Internet Use Scale (CIUS): A systematic review and meta-analysis. *Turkish J Clinical Psychiatry, 23*, 352–363.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture, 2*(1), 8. https://doi.org/10.9707/2307-0919.1014.

Jackson, L. A., & Wang, J. L. (2013). Cultural differences in social networking site use: A comparative study of China and the United States. *Computers in Human Behavior, 29*(3), 910–921. https://doi.org/10.1016/j.chb.2012.11.024.

Kardefelt-Winther, D. (2014). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior, 38*, 68–74. https://doi.org/10.1016/j.chb.2014.05.020.

Khazaal, Y., Chatton, A., Atwi, K., Zullino, D., Khan, R., & Billieux, J. (2011). Arabic validation of the Compulsive Internet Use Scale (CIUS). *Substance Abuse: Treatment, Prevention, and Policy, 6*(1), 1–6. https://doi.org/10.1186/1747-597X-6-32.

Khazaal, Y., Chatton, A., Horn, A., Achab, S., Thorens, G., Zullino, D., & Billieux, J. (2012). French validation of the compulsive internet use scale (CIUS). *Psychiatric Quarterly, 83*(4), 397–405.

Kırcaburun, K., & Griffiths, M. D. (2019). Problematic Instagram Use: The Role of Perceived Feeling of Presence and Escapism. *International Journal of Mental Health and Addiction, 17*(4), 909–921. https://doi.org/10.1007/s11469-018-9895-7.

Laconi, S., Rodgers, R. F., & Chabrol, H. (2014). December 1). The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. *Computers in Human Behavior. Elsevier Ltd.*. https://doi.org/10.1016/j.chb.2014.09.026.

Lopez-Fernandez, O., Griffiths, M. D., Kuss, D. J., Dawes, C., Pontes, H. M., Justice, L., … Billieux, J. L. (2019). Cross-Cultural Validation of the Compulsive Internet Use Scale in Four Forms and Eight Languages. *Cyberpsychology, Behavior, and Social Networking, 00*(00). https://doi.org/10.1089/cyber.2018.0731.

Meerkerk, G. J., Van Den Eijnden, R. J. J. M., Vermulst, A. A., & Garretsen, H. F. L. (2009). The Compulsive Internet Use Scale (CIUS): Some psychometric properties. *Cyberpsychology and Behavior, 12*(1), 1–6. https://doi.org/10.1089/cpb.2008.0181.

Muusses, L. D., Finkenauer, C., Kerkhof, P., & Billedo, C. J. (2014). A longitudinal study of the association between Compulsive Internet use and wellbeing. *Computers in Human Behavior, 36*, 21–28. https://doi.org/10.1016/j.chb.2014.03.035.

Nele Nyenhuis, A. B. (2013). The Compulsive Internet Use Scale (CIUS) Adapted to Assess Excessive Multiplayer Gaming. *Journal of Addiction Research & Therapy, 04* (05). https://doi.org/10.4172/2155-6105.1000164.

O'Malley, & Bachman. (1983). Self-esteem: Change and stability between ages 13 and 23. *Developmental Psychology, 19*(2), 257–268. https://doi.org/10.1037/0012-1649.19.2.257.

Kuzucu Yalcın Ozdemir, Y., Kampüs Aytepe, M., & Serife Ak, T. (2015). PSYCHOMETRIC PROPERTIES OF A TURKISH VERSION OF THE COMPULSIVE INTERNET USE SCALE (Vol. 11).

Panova, T., Carbonell, X., Chamarro, A., & Puerta-Cortés, D. X. (2020). Specific smartphone uses and how they relate to anxiety and depression in university students: A cross-cultural perspective. *Behaviour and Information Technology, 39*(9), 944–956. https://doi.org/10.1080/0144929X.2019.1633405.

Pies, R. (2009). Should DSM-V designate "internet addiction" a mental disorder? Psychiatry, 6(2), 31. Retrieved from /pmc/articles/PMC2719452/?report=abstract.

Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). *Acceptance and commitment therapy. Measures package, 61*(52), 18.

Tian, Y., Qin, N., Cao, S., & Gao, F. (2020). Reciprocal associations between shyness, self-esteem, loneliness, depression and Internet addiction in Chinese adolescents. *Addiction Research & Theory, 1–13*. https://doi.org/10.1080/16066359.2020.1755657.

Van Den Eijnden, R. J. J. M., Spijkerman, R., Vermulst, A. A., Van Rooij, T. J., & Engels, R. C. M. E. (2010). Compulsive internet use among adolescents: Bidirectional parent-child relationships. *Journal of Abnormal Child Psychology, 38*(1), 77–89. https://doi.org/10.1007/s10802-009-9347-8.

Yang, S. Y., Chen, M. D., Huang, Y. C., Lin, C. Y., & Chang, J. H. (2017). Association between smartphone use and musculoskeletal discomfort in adolescent students. *Journal of Community Health, 42*(3), 423–430.

Yong, R. K. F., Inoue, A., & Kawakami, N. (2017). The validity and psychometric properties of the Japanese version of the Compulsive Internet Use Scale (CIUS). *BMC Psychiatry, 17*(1), 1–12. https://doi.org/10.1186/s12888-017-1364-5.

Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology and Behavior, 1*(3), 237–244. https://doi.org/10.1089/cpb.1998.1.237.

Young, N. L., Kuss, D. J., Griffiths, M. D., & Howard, C. J. (2017). Passive Facebook use, Facebook addiction, and associations with escapism: An experimental vignette study. *Computers in Human Behavior, 71*, 24–31. https://doi.org/10.1016/j.chb.2017.01.039.