



# การตรวจสอบคุณภาพแบบวัดการเสพติด สมาร์ทโฟนสำหรับผู้ใหญ่ฉบับภาษาไทย

## Validation of Thai version of Smartphone Addiction Proneness Scale for adults

พนิดา หาญพิทักษ์พงศ์\*, นวลลออ ธวินชัย\*

Panida Hanphitakphong\*, Nuanlaor Thawinchai\*

\* ภาควิชากายภาพบำบัด คณะเทคนิคการแพทย์ มหาวิทยาลัยเชียงใหม่ 110 ถ.อินทวิโรตต.ศรีภูมิ อ.เมือง จ.เชียงใหม่ 50200

\* Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University

### บทคัดย่อ

**วัตถุประสงค์** เพื่อแปลแบบวัดการเสพติดสมาร์ทโฟนสำหรับผู้ใหญ่เป็นภาษาไทย และเพื่อตรวจสอบคุณสมบัติทางจิตมิติของแบบวัดการเสพติดสมาร์ทโฟนสำหรับผู้ใหญ่ฉบับภาษาไทย **วิธีการศึกษา** ภายหลังการแปลไปข้างหน้าและแปลย้อนกลับ จากนั้นตรวจสอบความเที่ยงตรงตามเนื้อหา ความสอดคล้องภายใน ความเที่ยงตรงตามโครงสร้างของแบบวัดการเสพติดสมาร์ทโฟนฉบับภาษาไทยในกลุ่มตัวอย่างจำนวน 200 ราย และตรวจสอบความน่าเชื่อถือแบบวัดซ้ำในกลุ่มตัวอย่างจำนวน 30 ราย

**ผลการศึกษา** ค่าเฉลี่ยของดัชนีความสอดคล้องระหว่างข้อคำถาม 15 ข้อและวัตถุประสงค์มีค่าเท่ากับ 0.86 ค่าสัมประสิทธิ์สหสัมพันธ์ภายในชั้นเท่ากับ 0.79 (ช่วงความเชื่อมั่น 95%; 0.61 ถึง 0.89) ค่าสัมประสิทธิ์แอลฟาของครอนบาคภาพรวมเท่ากับ 0.83 (ช่วงความเชื่อมั่น 95%; 0.79 ถึง 0.86) วิเคราะห์องค์ประกอบพบว่ามีความเที่ยงตรงตามโครงสร้าง แบบวัดการเสพติดสมาร์ทโฟนฉบับภาษาไทยทุกข้อคำถามมีค่าน้ำหนักปัจจัยอยู่ในเกณฑ์ยอมรับได้ ( $p < 0.05$ )

**สรุป** แบบวัดฉบับนี้สามารถใช้เป็นเครื่องมือที่มีความเหมาะสมเพื่อประเมินการเสพติดสมาร์ทโฟนสำหรับคนไทยวัยผู้ใหญ่ เนื่องจากมีความเที่ยงตรงและความน่าเชื่อถือในระดับดี

**คำสำคัญ** การเสพติดสมาร์ทโฟน คุณสมบัติทางจิตมิติ คนไทยวัยผู้ใหญ่

Corresponding author: พนิดา หาญพิทักษ์พงศ์

วารสารสมาคมจิตแพทย์แห่งประเทศไทย 2561; 63(2): 141-152

---

## ABSTRACT

**Objective :** To translate the Smartphone Addiction Proneness Scale (SAPS) for adults into Thai and to examine the psychometric properties of the Thai version of SAPS.

**Materials and methods :** After completing the forward- and the back-translation, the content validity was determined. Then, internal consistency and construct validity of the Thai-SAPS were tested among 200 participants. Also, the test-retest reliability was evaluated in 30 participants.

**Results :** The average index of item-objective congruence value of the 15 items was 0.86. The intra-class correlation coefficient value was 0.79 (95% CI; 0.61-0.89). The overall Cronbach's alpha coefficient was 0.83 (95% CI; 0.79-0.86). The factor analysis indicated acceptable construct validity. All items on the Thai-SAPS had significant estimated factor loading values ( $p < 0.05$ ).

**Conclusion :** This scale can be used as a suitable tool in order to determine smartphone addiction for Thais since it achieved good validity and a high reliability score.

**Keywords:** smartphone addiction, psychometric properties, adult Thais

---

Corresponding author: Panida Hanphitakphong

J Psychiatr Assoc Thailand 2018; 63(2): 141-152

## Introduction

In this era of easy, instant, worldwide communication, the number of smartphone users has dramatically increased all over the world during recent years.<sup>1</sup> A smartphone is superior to cell phones of the old because it can access the Internet simply. At the same time, it is easy to use, convenient to carry anywhere, and inexpensive. Furthermore, it can be used as a multifunction device to provide preferred applications such as education, entertainment, and business.<sup>2,3</sup> Unsurprisingly, the penetration rate of smartphones exceeded 55.40% in the top 15 countries in 2013.<sup>4</sup> Last year, a survey by the Pew Research Center demonstrated that 80.0% of college students owned a smartphone.<sup>5</sup> In a period of great technological communication, smartphone ownership has continued to increase in prevalence in Thailand in recent years. A survey from the National Statistical Office of Thailand reports that 70.20% of Thais over 6 years of age had mobile phones in 2012 and that this increased to 81.40% in 2016.<sup>6</sup> Evidently, the smartphone has a tremendous influence on young people and their lifestyle. As a result, the fast-growing use of smartphones has led to great concern with regard to health problems related to excessive smartphone use.<sup>7-13</sup>

Among smartphone users, young people may have higher chances of becoming addicts since they quite often rely on social networks for connectivity.<sup>14</sup> Importantly, several evidences revealed that smartphone addiction could be one of the contributing factors that cause depression<sup>7-9</sup>, aggression, impulsion<sup>7</sup>, stress, academic

performance, satisfaction with life<sup>10</sup>, anxiety, visual display terminal syndrome (VDTS) related symptoms<sup>11</sup>, and physical inactivity.<sup>12,13</sup> Consequently, smartphone addiction has been a matter of concern in many countries, particularly in South Korea. Therefore, self-report questionnaires are needed to assist early detection of this behavioral addiction. The Smartphone Addiction Proneness Scale (SAPS) is one of the most well-known self-report questionnaires across the country. It was developed by the National Information Society Agency (South Korea) for use as a screening indicator to determine whether the users are addicted to their smartphones or not. The score increases when the level of addiction is higher.<sup>15</sup> Recent evidence indicates that the English version of the SAPS has been translated into Chinese so as to investigate the relationship between smartphone addiction and physical activity in Chinese university students.<sup>13</sup> Thus far, there has been no available tool to determine smartphone addiction for Thais despite the fact that there is a fairly high rate of smartphone consumers in the country. In Thailand, adverse impacts of smartphone use on health status perception<sup>16</sup>, concentration during class time<sup>17</sup>, and attention deficit hyperactivity symptoms<sup>18</sup> have been reported in the past few years. Moreover, it is predicted that there will be over 2.56 billion smartphone users across the country in 2018.<sup>1</sup> Nevertheless, the fact that different countries have different languages and cultures may have an influence in that there is a possibility that the questions in the tool used may be misunderstood.<sup>19-21</sup>

This is why it is necessary to perform appropriate translation of the SAPS questionnaire for Thais. For this reason, the present study aimed to translate the SAPS into Thai language and to test its psychometric properties of the Thai version of the Smartphone Addiction Proneness Scale (Thai-SAPS) in order to use in Thailand.

## Materials and methods

The Smartphone Addiction Proneness Scale (SAPS) was initially developed by the NIA of South Korea in 2011 to examine smartphone addiction. It consists of 15 items within 4 subdomains that are designed to assess the following: (A) disturbance of adaptive functions, (B) withdrawal, (C) tolerance, and (D) virtual life orientation. For each item, the score ranges from “1,” representing “strongly disagree,” to “4,” representing “strongly agree.” The total score is the sum of the 15 items, or 60 points. The interpretation of the results in the self-report questionnaire are as follows: if the score is very high, there is more likelihood of addiction. Scores lower than or equal to 39 indicate normal usage; scores between 40 and 43 indicate at-risk usage; and scores greater than or equal to 44 indicate high-risk usage.<sup>15,22</sup> For this study, the adult form was used to translate and identify the psychometric properties. The Cronbach’s alpha coefficient of the original version was 0.81.<sup>23</sup> This study was carried out in two phases which included the translation phase (Phase I) and the psychometric property evaluation phase (Phase II). All the steps of the translation and the psychometric testing are presented in Figure 1.

### *Phase I: Translation*

After obtaining permission from the copyright owner, the 15-item SAPS version in English was translated according to previously published protocols.<sup>19</sup> Since there is no gold standard for translation techniques, a combination of two translation techniques including publishing guidelines stated by Beaton et al.<sup>24</sup> and Jones et al.<sup>25</sup> was considered to perform the translation in this study. The process of translation in the current study consists of four stages. In the beginning, forward translation of the original English version of the SAPS into Thai was produced by two independent bilingual translators whose first language was Thai. One of the translators was aware of the concepts being examined in the questionnaire, whereas the other translator was not. The translation process ensured equivalence with the English version and cultural appropriateness. The two forward translations were then compared. After that, a backward translation (Thai to English) was undertaken by two independent bilingual translators at the Chiang Mai University Language Institute and Humanities Academic Services Center, Chiang Mai University. To prevent possible prejudice, neither of the back-translators was aware or informed of the concepts explored or had ever seen the original version of the questionnaire. Next, the review committee considered all the versions of the questionnaire. The panel consisted of five independent experts from different locations including a researcher with experience in translation of questionnaires, an experienced psychologist, an experienced psychiatrist, and two

well-educated bilingual persons. The committee's considerations were around four areas: semantic equivalence, idiomatic equivalence, experiential equivalence, and conceptual equivalence.<sup>21</sup> Finally, the pre-final Thai version was also determined in a pilot test in order to confirm that the equivalence of the adapted version remains stable in an applied situation. Ten university students were recruited to read and answer the Thai-SAPS and were questioned on its conceptual clarity. All the participants reported that they understood the translation and that the items in the translated version were easy to score. Hence, the newly formulated Thai version of the 15-item SAPS was approved without further modification following the pilot study, and the final version of the Thai-SAPS was then subjected to further psychometric testing after the translation was properly completed.

*Phase II: Psychometric property testing*

The psychometric property testing of the final version was then carried out. The content validity was evaluated first by a panel of three experts from different locations, including one psychiatrist, one psychologist, and one psychiatric-mental health nurse educator. All of the experts possessed more than 5 years of experience in work related to psychology. The index of item-objective congruence (IOC) was considered to identify the content validity which was rated on the standard criteria by the team of experts. If the value of IOC is greater than 0.50, the tool is acceptable since there is congruence between the evaluation question and the objectives, or content.<sup>26</sup> The final

version of the Thai-SAPS was not justified because the average degree of agreement of the panel experts with regard to the questionnaire items used in this study was 0.86, which indicates good content validity.

Therefore, 200 students completed the final version of the Thai-SAPS to test the internal consistency using Cronbach's alpha coefficient and the construct validity using exploratory factor analysis (EFA). All the participants in this study were aged 18 years or older and currently studying in Chiang Mai University. Importantly, all of them have owned smartphones and reported having used their devices daily. All the participants signed the consent form which was approved by the human ethical review board of the Faculty of Associated Medical Sciences, Chiang Mai University (Ethic Code: AMSEC59EX042). A Cronbach's alpha coefficient of 0.70 or higher was considered satisfactory. Additionally, the EFA was also applied to extract factors via principal component analysis (PCA). The varimax orthogonal rotation method was also employed. The model fit was assessed using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity. A value of KMO greater than 0.50 and a significance value of Bartlett's test of sphericity less than 0.05 are acceptable for proceeding with factor analysis. Additionally, a correlation matrix coefficient from the correlation matrix analysis that is greater than 0.30 would be considered to perform the factor analysis. Eigen values greater than 1.0, a screen plot, and all of the cumulative percentages of variance extracted

were considered to carry out the extraction of the factors. Factor scores greater than or equal to 0.40 were accepted as adequate to identify a factor.<sup>27</sup> Lastly, test-retest reliability with 2 weeks' interval was administered using the intraclass correlation coefficient (ICC).<sup>28</sup> Thirty participants who had

already enrolled in this study completed the Thai-SAPS again within 2 weeks after completing the first Thai-SAPS. These participants were chosen using a simple random sampling technique. An ICC greater than 0.70 has been recommended as the minimum standard for reliability.<sup>29</sup>

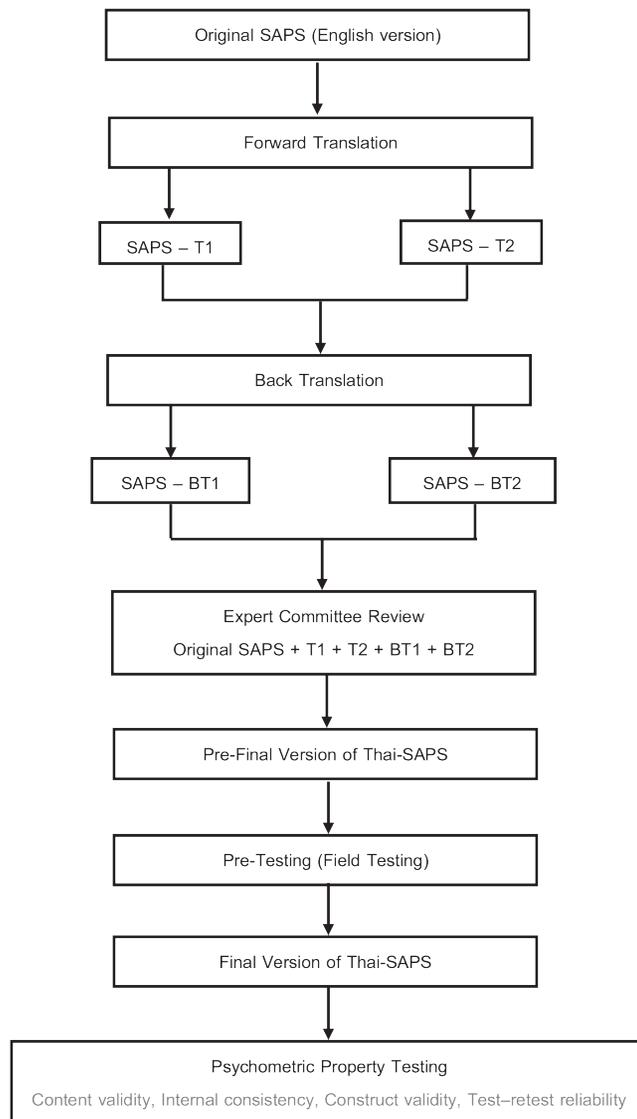


Figure 1 Translation and psychometric testing used in the current study.

## Results

None of the items of the Thai-SAPS were modified since there was no cultural difference because of language in any of the items between the original English version and the Thai-SAPS. Notably, most of the items in the original English version use common and natural language, and are very similar to the usages in Thai culture. The mean age of the participants was 20.27 years and the standard deviation was 1.49 years. This study intended to recruit participants of both male and female genders; however, there were more females (67.50%) than males (32.50%). The participants covered university students in all academic years, but the majority of the participants were first-year students. The IOC of the 15 items ranged from 0.67

to 1.00. The average degree of agreement of the panel experts regarding the questionnaire items used in this study was 0.86, which indicates good content validity for the Thai-SAPS.<sup>26</sup> According to the results, all the experts agreed that the Thai-SAPS could be used for smartphone addiction screening in Thai university students. At the same time, the overall ICC value was 0.79 (95% CI; 0.61-0.89), indicating that there was good agreement between the results in all of the participants.<sup>29</sup> In addition, the overall Cronbach's alpha coefficient was 0.83 (95% CI; 0.79-0.86). This result reflected that all the items of the Thai-SAPS had good relationships.<sup>27</sup> The values of corrected item-total correlation and Cronbach's alpha if item deleted are shown in Table 1.

**Table 1** Item-total Correlation and Cronbach's alpha if item deleted of Thai-SAPS for Adults

Item number/ Item content	Corrected item-total correlation	Cronbach's alpha if item deleted
1. My school grades (or work productivity) dropped due to excessive Internet use.	0.48	0.81
2. When I cannot use a smartphone, I feel like I have lost the entire world.	0.46	0.82
3. Even when I think I should stop, I continue to use my smartphone.	0.43	0.82
4. I am not anxious even when I am without a smartphone.	0.20	0.83
5. People frequently comment on my excessive smartphone use.	0.51	0.81
6. Using a smartphone is more enjoyable than spending time with family or friends.	0.35	0.82
7. I try cutting my smartphone usage time, but I fail.	0.59	0.81
8. It would be painful if I was not allowed to use my smartphone much.	0.39	0.82
9. Family or friends complain that I use my smartphone too much.	0.51	0.81
10. I don't spend much time on my smartphone.	0.35	0.82
11. When I am without a smartphone. I cannot focus on my work (or studies).	0.40	0.82
12. There are times when I could not concentrate on my work (or studies) at hand because I was using my smartphone.	0.54	0.81
13. Spending a lot of time on my smartphone has become a habit.	0.60	0.81
14. I get restless and nervous when I am without a smartphone.	0.53	0.81
15. My smartphone does not distract me from my studies.	0.31	0.82

Prior to performing PCA, the appropriateness of the EFA was determined and the result revealed that the KMO value was 0.83 and the value obtained from Barlett’s test of sphericity was less than 0.05 ( $\chi^2 = 793.12$ ,  $df = 105$ ,  $p < 0.001$ ). The result also revealed that the correlation coefficient was greater than 0.30. Therefore, the PCA extraction method was then used to extract the factors. The varimax orthogonal rotation method was used and four factors were extracted for the Thai-SAPS, which accounted for 56.54% of the total variance. The communalities in each of the factors ranged from 0.36 to 0.75. Factors 1 to 4 explained 30.39%, 11.48%, 8.00%, and 6.68% of the variance, respectively. By way of an overview, the factor structure could be reasonably explained. The Thai version was found to be consistent with the original version which included four dimensions. Dimension A is disturbance of adaptive functions and refers to having a difficult time handling everyday things in daily life due to smartphone use.<sup>22</sup> Dimension B

is withdrawal which means constantly having smartphone in mind even when not using it and the cessation of device use leads to anxiety, impatience, and pain feeling.<sup>30</sup> Dimension C is tolerance and refers to an increasing intensity and frequency of using a smartphone in order to reach the same amount of satisfaction as previous behavior.<sup>22,30</sup> Dimension D is virtual life orientation which means the feeling that spending time to operate smartphone is more pleasurable than relationships with friends or family in real-life.<sup>22</sup> In addition, all the 15 items on the Thai-SAPS showed significant ( $p < 0.05$ ) estimated factor loadings. The variables that show a factor loading value of 0.40 or more within a particular factor are commonly considered to be the factor’s major components.<sup>27</sup> The individual standardized factor loadings of the 15 items in the model ranged from moderate to good. The loading factors of the 15 items of the Thai-SAPS are demonstrated in Table 2.

**Table 2** Varimax-rotated Factor-loading Matrix of Thai-SAPS for adults (n = 200)

Item	Dimension				Item	Dimension			
	A	B	C	D		A	B	C	D
1	0.53*		0.44		9			0.80*	
2	0.53*				10		0.71*		
3	0.60*				11	0.52*			
4		0.79*			12	0.73*			
5			0.81*		13	0.66*			
6				0.67*	14	0.53			0.62*
7	0.59*				15		0.69*		
8				0.68*					

**Note:** the item loaded most heavily is indicated by an asterisk.

## Discussion

This study aimed to translate the English version of the SAPS self-report questionnaire into Thai and then determine the validity of the Thai-SAPS for use in the screening of smartphone addiction in Thai university students. The translation procedure was conducted according to the available guidelines for cross-cultural adaptation, and the authors did not find any problem. Translation of the Thai-SAPS was appropriate with semantic equivalence, idiomatic equivalence, experiential equivalence, and conceptual equivalence between the English and the Thai versions. The result of the content validity testing provides evidence that the Thai-SAPS reasonably reflects the true concept or construct of the smartphone addiction concern in the English version. In addition, the results also show that the Thai-SAPS is a reliable instrument that could be applied in Thai population to detect smartphone addiction due to excessive smartphone use. From the results, it is evident that the Thai-SAPS is easy to understand and simple to use. There was no missing answer since all of the participants had completed all the items of the questionnaire. The Cronbach's alpha coefficient of the Thai version ( $\alpha = 0.83$ ) was in accordance with that of the original version ( $\alpha = 0.81$ )<sup>23</sup> and the Chinese version ( $\alpha = 0.85$ )<sup>13</sup>. Furthermore, the Thai-SAPS also verified the four core components of addiction in the same manner as the original SAPS. After the use of the rotation method, it can be concluded that the Thai-SAPS can represent the four

component factors including disturbance of adaptive functions, withdrawal, tolerance, and virtual life orientation. When using the Thai-SAPS in the future studies, summing score of 15 items should be done before interpretation of each respondent. For each item, the score ranges from 1 to 4 (1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree). The interpretation of sum scores of the Thai-SAPS is the same as the original version which can categorize smartphone users into three groups. Scores lower than or equal to 39 represent normal users; scores between 40 and 43 represent at-risk users; and scores higher than or equal to 44 represent high-risk users.<sup>15,22</sup> The strengths of this study are inclusion of experts from different locations to minimize bias and collection of data using an appropriate sample size by the simple random sampling method. Also, all the questions of the Thai-SAPS were answered by everyone. However, the limitation of this study is that all the participants were students of the same university which is located in the north of Thailand. To be useful, future studies need to be conducted in order to verify the validity of the Thai-SAPS in populations all around the different regions of Thailand and in populations engaged in different professions. The overall findings demonstrate that the Thai-SAPS can be used for assessing smartphone addiction in Thai people. This scale can be used for determining smartphone addiction among Thais in epidemiological studies as well as investigating health problems related to smartphone addiction in clinical studies.

## Conclusion

The original English version of the SAPS has been successfully translated into the Thai language. The Thai-SAPS is comprehensible and simple to use. This new tool seems to be a reliable instrument for screening smartphone addiction in Thai population. This self-report questionnaire holds considerable promise of being useful in clinical practice and in research to classify the levels of addiction among smartphone users.

## Acknowledgments

This study was supported by a research grant from the Faculty of Associated Medical Sciences, Chiang Mai University, Thailand; fiscal year 2016. The authors thank the National Information Society Agency (South Korea) for granting permission to use and translate the SAPS questionnaire. The authors would like to thank Hi-Tech Outsourcing Services (Hi-Tech House, Behind V-Murti Complex, Nr. Gurukul Tower, Gurukul Rd., Memnagar Ahmedabad-380052, Gujarat-INDIA) for their kind review of the manuscript.

## References

1. eMarketer [Internet]. 2 billion consumers worldwide to get smart (phones) by 2016 [update 2014 December 11; cited 2017 May 4]. Available from: <https://emarketer.com/Article/2-Billion-Consumers-Worldwide-Smartphones-by-2016/1011694>.
2. Cuéllar JM, Lanman, TH. "Text neck": an epidemic of the modern era of cell phones?. *Spine J* 2017; 17: 901-2. doi: 10.1016/j.spinee.2017.03.009.
3. Lee S, Kang H, Shin G. Head flexion angle while using a smartphone. *Ergonomics* 2015; 58: 220-6. doi: 10.1080/00140139.2014.967311.
4. MashableAsia [Internet]. The 15 countries with the highest smartphone penetration [update 2013 August 27; cited 2017 May 4]. Available from: <http://mashable.com/2013/08/27/global-smartphone-penetration/#vtMSsGAAaaqS>.
5. Pew research center [Internet]. Mobile fact sheet [update 2018 January 31; cited 2018 February 1]. Available from: <http://www.pewinternet.org/fact-sheet/mobile/>.
6. National statistical office Thailand [Internet]. The 2016 household survey on the use of information and communication technology [update 2017 March 7; cited 2017 June 10]. Available from: <http://web.nso.go.th>
7. Kim MO, Kim H, Kim K, Ju S, Choi J, Yu M. Smartphone addiction: (focused depression, aggression and impulsion) among college students. *Indian J Sci Technol* 2015; 8(25): 1-6. doi: 10.17485/ijst/2015/v8i25/80215.
8. Jun S. The reciprocal longitudinal relationships between mobile phone addiction and depressive symptoms among Korean adolescents. *Comput Hum Behav* 2016; 58: 179-86. doi: 10.1016/j.chb.2015.12.061.

9. Park J, Kim K, Kim N, Choi I, Lee S, Tak S, Yim J. A comparison of cervical flexion, pain, and clinical depression in frequency of smartphone use. *IJBST* 2015; 7: 183-90. doi: 10.14257/ijbsbt.2015.7.3.19.
10. Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Comput Hum Behav* 2016; 57: 321-5. doi: 10.1016/j.chb.2015.12.045.
11. Park S, Choi JW. Subjective symptom of visual display terminal syndrome and state anxiety in adolescent smartphone users. *IJoC* 2015; 11: 31-7. doi: 10.5392/IJoC.2015.11.4.031.
12. Haug S, Castro RP, Kwon M, Filler A, Kowatsch T, Schaub MP. Smartphone use and smartphone addiction among young people in Switzerland. *J Behav Addict* 2015; 4: 299-307. doi: 10.1556/2006.4.2015.037.
13. Kim SE, Kim JW, Jee YS. Relationship between smartphone addiction and physical activity in Chinese international students in Korea. *J Behav Addict* 2015; 4: 200-5. doi: 10.1556/2006.4.2015.028.
14. Skierkowski D, Wood RM. To text or not to text? The importance of text messaging among college-aged youth. *Comput Hum Behav* 2012; 28: 744-56. doi: 10.1016/j.chb.2011.11.023.
15. National information society agency [Internet]. Development of Korean smartphone addiction proneness scale for youth and adults [cited 2016 November 5]. Available from: [http://www.schoolhealth.kr/shnhome/glib/SHDataFileDownload.php?GbnCd=SHData&Istnum1=1530&file\\_seq=1](http://www.schoolhealth.kr/shnhome/glib/SHDataFileDownload.php?GbnCd=SHData&Istnum1=1530&file_seq=1)
16. Kitisri C, Nokham R, Phetcharat K. A smartphone using behavior and health status perception of nursing students. *Community Health Development Quarterly Khon Kaen University* 2017; 5: 19-34.
17. Viphatphumiprathes T. In-class smartphone usage behaviors among Dhurakij Pundit University students. *Suthiparithat Journal* 2016; 30: 48-58.
18. Phanichsiri K, Tuntasood B. Social media addiction and attention deficit and hyperactivity symptoms in high school students in Bangkok. *J Psychiatr Assoc Thailand* 2016; 61: 191-204.
19. Cha ES, Kim KH, Erlen JA. Translation of scales in cross-cultural research: issues and techniques. *J Adv Nurs* 2007; 58: 386-95. doi: 10.1111/j.1365-2648.2007.04242.x.
20. Chwalow AJ. Cross-cultural validation of existing quality of life scales. *Patient Educ Couns* 1995; 26: 313-8. doi: [http://dx.doi.org/10.1016/0738-3991\(95\)00767-T](http://dx.doi.org/10.1016/0738-3991(95)00767-T).
21. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: Literature review and proposed guidelines. *J Clin Epidemiol* 1993; 46: 1417-32. doi: 10.1016/0895-4356(93)90142-N.

22. Kim D, Lee Y, Lee J, Nam JK, Chung Y. Development of Korean smartphone addiction proneness scale for youth. *PLoS One* 2014; 9: e97920. doi: 10.1371/journal.pone.0097920.
23. Kim D, Chung Y, Lee J, Kim M, Lee Y, Kang E, et al. Development of smartphone addiction proneness scale for adults: Self-report. *Korean J Couns* 2012; 13: 629-44.
24. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)* 2000; 25: 3186-91.
25. Jones PS, Lee JW, Phillips LR, Zhang XE, Jaceldo KB. An adaptation of Brislin's translation model for cross-cultural research. *Nurs Res* 2001; 50: 300-4. doi: 10.1097/00006199-200109000-00008.
26. Brown JD. Testing in language programs. New Jersey: Prentice Hall Regents; 1996.
27. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 7<sup>th</sup> ed. New Jersey: Pearson Education; 2010.
28. Marx RG, Menezes A, Horovitz L, Jones EC, Warren RF. A comparison of two time intervals for test-retest reliability of health status instruments. *J Clin Epidemiol* 2003; 56: 730-35. doi: 10.1016/S0895-4356(03)00084-2.
29. Nunnally JC. Psychometric theory. 2<sup>nd</sup> ed. New York: McGraw-Hill; 1978.
30. Alavi SS, Ferdosi M, Jannatifard F, Eslami M, Alaghemandan H, Setare M. Behavioral addiction versus substance addiction: correspondence of psychiatric and psychological views. *Int J Prev Med* 2012; 3: 290-4.