Validation of the Thai version of Bergen Facebook Addiction Scale (Thai-BFAS)

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Objective: To determine the validity of the Thai version of the Bergen Facebook Addiction Scale (Thai-BFAS) using Facebook addiction screening in Thai high school students.

Material and Method: The original BFAS was authorized for translation and validation in Thai. After content validity and usability were approved by three Thai psychiatrists, the Thai-BFAS was adjusted again by the authors and back translated by an English expert. This final version was investigated using the internal consistency method among 874 high schools students in Bangkok, Chiang Mai, Ubon Ratchathani and Songkhla, and confirmatory factor analysis (CFA) was employed to prove that the six-component model could be representative of addiction behaviors. In addition, test-retest reliability was performed separately among 30 pilot high school students in Bangkok.

Results: The Thai-BFAS has six items, which are each scored on a 5-point scale with total score ranges from 0 to 24; the cutoff score for Facebook addiction stands at least 12 points. The Cronbach’s alpha coefficient was 0.91 (95% CI; 0.90, 0.92) and the inter-class correlation coefficient was 0.80 (95% CI; 0.49, 0.92). The CFA showed that the six items accurately represent the six-component model of addiction such as salience, mood modification, tolerance, withdrawal, relapse and conflict.

Conclusion: The Thai-BFAS is consistent as a screening test for Facebook addiction among high school students due to good reliability and validity. It also conforms well to the original version. The six items in the Thai-BFAS are a good representation of the addiction behaviors. Further studies should be undertaken in cases of sensitivity and specificity when compared with other similar tests of addiction as well as in various additional populations and circumstances.

Keywords: Validation, Bergen Facebook Addiction Scale, High school students


Full text. e-Journal: http://www.jmatonline.com

Facebook is an online social network site (SNS), launched in February 2004 by Mr. Mark Zuckerberg(1). In September 2012, there were one billion monthly active members and people had made 140 billion friend connections on Facebook(2). In Thailand, a website called Zocial Rank surveyed social network use during the year 2013 and reported that about 25 million from 66 million Thai people were internet users, while 18 million people were SNS users. Facebook users accounted for 85%, Twitter 10% and Instagram 5% of the total SNS population. The use of SNS dramatically increased and when it was compared to the same period a year ago (April 2012 vs. April 2013), it was found that Facebook usage increased by 24%, Twitter usage grew 53% and Instagram usage increased by 178%(3). In addition, there was a survey conducted regarding the behaviors of Thai internet users in 2013 which showed that the top 3 most popular SNSs were Facebook, Google+ and Line, whereas the most frequent SNS activities were chatting, sharing experiences and ideas, tracking and updating information about popular events and uploading/sharing photos and videos,
This massive increase in the amount of SNS usage coupled with a huge social change in communication and leisure time drew many researchers to be interested in “Social Network Site (SNS) addiction” and “Facebook addiction”; two terms which can be used interchangeably.

In 1999, Young defined cyber-relationship addiction or SNS addiction as one of five kinds of Internet addiction and in 2009 described the criteria for “Facebook Addiction Disorder” such as neglect of personal life, mental preoccupation, escapism, mood modifying experiences, tolerance, and concealing addictive behavior. In 2009, Kesici and Sahin found that college students who were classified as “Internet Addicted” used the Internet more for social functions, leisure functions, and virtual emotional functions, when compared to students considered as “Internet Non-addicted”. Furthermore, many studies reported that not only excessive use of electronic media caused delayed bedtimes and insomnia but poor sleep quality also impaired academic performance. Thereby, Andreassen et al proposed that a Facebook addiction scale should be developed to identify features of this phenomenon. The “Bergen Facebook Addiction Scale (BFAS)” was created in 2012 which was employed as a screening test for Facebook addiction in both epidemiology studies and clinical trials in many countries.

In Thailand, several studies were conducted which indicated that the prevalence of Internet addiction in adolescents ranged from 22.0 to 43.2. Nevertheless, those previous studies can be questioned over their reliability and their adherence to international standards for Facebook addiction assessment. Many teenagers are now accessing internet and SNS more than ever before and some recent studies in Thai teenagers have discovered many negative consequences from addictive online behaviors; for example quality of sleep, academic performance, inappropriate manner, negative emotional expression, impairment of family and social functions and mental health problems. In order to confirm these reasons, the basis of this study was to determine the validity of the Thai version of Bergen Facebook Addiction Scale (Thai-BFAS) for Facebook addiction screening in Thai high school students.

Material and Method

Study design and population

This study was a diagnostic study consisting of 4 steps.

Step 1: translation and back translation

The original Bergen Facebook Addiction Scale was authorized for translation and validation in a Thai version. This questionnaire was translated into Thai by one of the authors who is a practicing psychiatrist. The principles of translation and back translation were to retain the concept of the original BFAS and maintain the colloquial language consistent with Thai teenagers. The Thai-BFAS was back translated accurately by an English expert from the Chulalongkorn Language Institute (Appendix 1).

Step 2: content validity and usability by expert committee

The Thai-BFAS was assessed by three Thai psychiatrists: one general psychiatrist and two child and adolescent psychiatrists. The objective was to identify the accuracy and usability by using the Index of Item Objective Congruence (IOC) which accepts the item if the IOC value is greater than 0.5.

Step 3: reliability

This final version was investigated using the internal consistency method among 992 high school students randomized by multistage cluster sampling technique; 20 students declined to participate in the survey. The first stage was a randomized selection which selected 4 from the top ten provinces with the greatest economic prosperity in Thailand; Bangkok, Chiang Mai, Ubon Ratchathani and Songkhla. Then one of the large secondary schools in each province was randomly selected. “Large secondary school” was defined by using the reference from the Office of the Basic Education Commission, Thai Ministry of Education. Two classrooms per stratum, 10th, 11th and 12th grade, were randomly selected. The participants, who were current high school students, were included while the participants who did not complete the Thai-BFAS questionnaire were excluded. The sample size was estimated using a population proportion formula. The variables in this formula were denoted as $Z_{\alpha/2} = 1.96$, prevalence of Facebook addiction ($p = 0.43$), $q = 1 - p = 0.57$, acceptance error ($d = 0.05$) and design effect = 2. According to the formula, the number of samples was multiplied by the design effect which was 756 participants. However, the authors
prevented error in the data sampling by increasing the sample size by 10 per cent of sample size; therefore, the final sample size stood at 832 participants. The internal consistency, Cronbach’s alpha coefficient, indicated inter-relatedness among items. If the value of Cronbach’s alpha coefficient is greater than 0.70 it means that the relationship of all items is good\(^{(21)}\).

The Thai-BFAS was separately investigated using the test-retest reliability among 30 pilot high school students in one of the big secondary schools in Bangkok\(^{(22)}\). After 3 weeks, test-retest reliability was administered to reflect the agreement of the results in all of the participants, using an inter-class correlation coefficient. Good and excellent reliability are represented by an inter-class correlation coefficient valuing 0.60-0.80 and greater than 0.80 respectively\(^{(21)}\).

**Step 4: confirmatory factor analysis (CFA)**

CFA was performed to test a six component model of addiction where each item represents core addictive criteria such as salience, mood modification, tolerance, withdrawal, conflict, and relapse. CFA was computed through the Verimax Orthogonal Rotation method. Model fit was assessed using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett’s test of sphericity. Interpretations for the KMO measure of sampling adequacy are: higher than 0.80 as excellent, between 0.60 to 0.70 as fair, and below 0.50 as unacceptable. Bartlett’s test of sphericity tests whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate\(^{(23)}\). CFA was administrated in high school students in Bangkok, Chiang Mai, Ubon Ratchathani and Songkhla.

**Measurement**

The Bergen Facebook Addiction Scale (BFAS) was developed in 2011 by Cecilie Schou Andearssen, Torbjorn Torsheim, Geir Scott Brunborg, and Stale Pallesen from the Department of Psychosocial Science at the University of Bergen in Norway. The original questionnaire was created in English and applicable for use in screening Facebook addiction in epidemiology studies and clinical settings. The BFAS was studied for its validity and reliability in 423 Norwegian college students (227 women). Their mean age was 22.0±4.0 years; as a result, this questionnaire can be applied for screening Facebook addiction in high school students as well. Cronbach’s alpha coefficient of the BFAS is 0.83 and the three-week test-retest reliability coefficient is high (r = 0.82)\(^{(9)}\).

BFAS is a self-report questionnaire. The six items are representative of the six core components proposed by Brown (1993) and Griffiths (1996) such as: 1) salience-the activity dominates thinking and behavior, 2) mood modification-the activity modifies/ improves mood, 3) tolerance-increasing amounts of the activity are required to achieve previous effects, 4) withdrawal-the occurrence of unpleasant feelings when the activity is discontinued or suddenly reduced, 5) conflict- the activity causes conflicts in relationships, in work/education and other activities, 6) relapse-a tendency to revert to earlier patterns of the activity after abstinence or control\(^{(9)}\). BFAS’s wording imitated the diagnostic criteria for pathological gambling produced by the American Psychiatric association\(^{(24)}\) and in the Game Addiction Scale\(^{(25)}\). Each item is scored on a 5-point scale; 1 = Very rarely, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very often. The total score ranges from 0 to 24 points. The cutoff score for Facebook addiction is at least 12 points (e.g. scoring 3 or above on at least four of the six items) which use a polythetic scoring method in order to a liberal approach. The BFAS scores were positively related to neurotic and extraverted personality traits, and negatively related to conscientiousness. High scores were also associated with delayed bedtimes and rising times\(^{(9)}\).

**Data collection**

The data were collected from March to June 2014. Permission was granted to administer this questionnaire from homeroom teachers in each school. The present study was approved by the Human Ethics Research Committee of Thammasat University; MTU-EC-PS-2-009/57.

**Statistical analysis**

Statistical Package for the Social Science (SPSS) version 16.0 was used to analyze descriptive statistics such as frequency, percentage, mean, median, standard deviation (SD), 95% confidence intervals (95% CI) and the statistical significance was set at \(p < 0.05\).

**Results**

**Content validity, usability**

Content validity and usability of Thai-BFAS were approved by three Thai psychiatrists. The IOC of the six items ranged from 0.67 to 1.00 except one item, “Used Facebook in order to forget about personal problems?”, which was valued at 0.33. Two experts commented that this item might not only be specific for Facebook addiction but also could also be found in
other addictions and stress reactive behaviors. However, all experts approved that the Thai-BFAS could be used for Facebook addiction screening in Thai adolescents.

**Internal consistency of Thai-BFAS**

The Thai-BFAS was investigated using the internal consistency method in high school students in Bangkok, Chiang Mai, Ubon Ratchathani and Songkhla. There were 972 high school students who participated in this survey and 874 participants (89.90%) were current Facebook users. The number of female current Facebook users was 549 (62.80%) and their mean age was 16.72±1.03 years old (Table 1). This final Thai-BFAS version was The Cronbach’s alpha coefficient was 0.91 (95%CI; 0.90, 0.92) which meant that the relationship of all items was good (Table 2).

**Test-retest reliability of Thai-BFAS**

Test-retest reliability of Thai-BFAS version was piloted with 30 high school students in Bangkok. The pilots aged 16.66±0.55 years old and there were 18 males and 12 females; 60% and 40%, respectively. The inter-class correlation coefficient was 0.80 reflecting that there was excellent agreement between the results in all of the participants (95%CI; 0.49, 0.92).

**Confirmatory factor analysis (CFA) of Thai-BFAS**

CFA was employed to prove that the six-component model could be representative of addiction behaviors in 874 high schools students in Bangkok, Chiang Mai, Ubon Ratchathani and Songkhla (Table 1).

The criteria for CFA was met due to a KMO valued of 0.90, while Bartlett’s test of sphericity concluded that there were significant correlations in the data set ($\chi^2 = 3,405.98, df = 15$ and $p<0.001$). In the correlation matrix among the six items, moderate correlations were observed because their coefficients ranged from 0.57 to 0.78 (Table 3). Using rotation method, Varimax with Kaiser Normalization, the total extraction sums of squared loadings valued nearly 1.0 (0.88-1.01). Therefore, it could be assumed that the six-component model was acceptable. The six items were categorized into six components. The correlation coefficients of each relationship ranged from 0.79 to 0.88 that were considered as a good correlation. Based on CFA, it could be concluded that the Thai-BFAS was composed of the six core addiction criteria-salience, mood modification, tolerance, withdrawal, relapse and conflict. Their factor loading parameters were 0.83, 0.86, 0.78, 0.79, 0.86, and 0.88, respectively (Table 4).

### Table 1. Demographic data (n = 874)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n  (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender*</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>549</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
</tr>
<tr>
<td>10th grade</td>
<td>309</td>
</tr>
<tr>
<td>11th grade</td>
<td>259</td>
</tr>
<tr>
<td>12th grade</td>
<td>306</td>
</tr>
<tr>
<td>Area</td>
<td></td>
</tr>
<tr>
<td>Bangkok</td>
<td>197</td>
</tr>
<tr>
<td>Chiang Mai</td>
<td>213</td>
</tr>
<tr>
<td>Ubon Ratchathani</td>
<td>199</td>
</tr>
<tr>
<td>Songkhla</td>
<td>265</td>
</tr>
<tr>
<td>Age (years) (mean ± SD)</td>
<td>16.72±1.03</td>
</tr>
</tbody>
</table>

* This variable had missing data; there were 7 participants (0.8%) who did not answer the question.

### Table 2. Item-total correlation of Thai-BFAS (n = 874)

<table>
<thead>
<tr>
<th>English questions</th>
<th>Corrected item-total correlation</th>
<th>Cronbach’s Alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spent a lot of time thinking about Facebook or planned use of Facebook?</td>
<td>0.77</td>
<td>0.90</td>
</tr>
<tr>
<td>2. Felt an urge to use Facebook more and more?</td>
<td>0.79</td>
<td>0.89</td>
</tr>
<tr>
<td>3. Used Facebook in order to forget about personal problems?</td>
<td>0.74</td>
<td>0.90</td>
</tr>
<tr>
<td>4. Tried to cut down on the use of Facebook without success?</td>
<td>0.74</td>
<td>0.90</td>
</tr>
<tr>
<td>5. Become restless or troubled if you have been prohibited from using Facebook?</td>
<td>0.81</td>
<td>0.89</td>
</tr>
<tr>
<td>6. Used Facebook so much that it has had a negative impact on your job/studies?</td>
<td>0.71</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Cronbach’s Alpha coefficient = 0.91 (95%CI; 0.90, 0.92)
Discussion

The present study determined the validity of the Thai-BFAS for use with Facebook addiction screening in Thai high school students. Cronbach’s alpha coefficient of Thai version was 0.91 (95%CI; 0.90, 0.92) and inter-class correlation coefficient of test-retest reliability was 0.80 (95%CI; 0.49, 0.92). Compared with the original version, Cronbach’s alpha coefficient of the BFAS was 0.83, and its three-week test-retest reliability coefficient was 0.82. Both Cronbach’s alpha coefficient and the test-retest reliability coefficient of the BFAS were similar to the Cronbach’s alpha coefficients and test-retest reliability coefficient of the Thai version. These results showed that the Thai-BFAS has good reliability and validity, and conformed to the original version.

In order to verify that the Thai-BFAS also contained all six core components of addiction as the original BFAS, CFA was performed on 874 high schools students randomized by multistage cluster sampling technique. Using rotation method, the Varimax with Kaiser Normalization, it could be concluded that the Thai-BFAS could represent the six core addiction criteria (salience, mood modification, tolerance, withdrawal, relapse and conflict).

BFAS was used to assess Facebook addiction in students in colleges and universities in the Philippines and Italy\(^2\),\(^{26}\). From a review of those studies, reliability and validity were not assessed. Consequently, the authors could not compare between Thai-BFAS and other language BFAS versions.

The strengths of the present study were an adequate sample size and multicenter collaboration. The authors calculated the sample size since we had designed this study in order that it is large enough to ensure adequate power and precision of the results. Additionally, the present study design involved multicenter collaboration, which allowed for a larger sample size and improved generalizability of the outcome.

There were several limitations of the present study. First, the cultural difference between Norwegian and Thai, in terms of language and lifestyle, may affect the accuracy of Thai-BFAS. Second, the 5-point scales, which are representative of the frequency of Facebook using behaviors, could influence accuracy as well. Due to the subjective nature of the choices, each person could interpret it in a different way. The authors suggested that giving the description of each option could reduce discrepancy; for example, ‘Very rarely = less than once a month, Rarely = less than once a week, 

<table>
<thead>
<tr>
<th>English questions</th>
<th>Salience</th>
<th>Tolerance</th>
<th>Mood modification</th>
<th>Relapse</th>
<th>Withdrawal</th>
<th>Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spent a lot of time thinking about Facebook or planned use of Facebook?</td>
<td>1.00</td>
<td>0.66</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>1.00</td>
</tr>
<tr>
<td>Felt an urge to use Facebook more and more?</td>
<td>0.78</td>
<td>0.64</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.78</td>
</tr>
<tr>
<td>Used Facebook in order to forget about personal problems?</td>
<td>0.64</td>
<td>0.65</td>
<td>0.64</td>
<td>0.65</td>
<td>0.64</td>
<td>0.64</td>
</tr>
<tr>
<td>Tried to cut down on the use of Facebook without success?</td>
<td>0.60</td>
<td>0.63</td>
<td>0.60</td>
<td>0.63</td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>Became restless or troubled if you have been prohibited from using Facebook?</td>
<td>0.66</td>
<td>0.68</td>
<td>0.66</td>
<td>0.68</td>
<td>0.66</td>
<td>0.66</td>
</tr>
<tr>
<td>Used Facebook so much that it has had a negative impact on your job/studies?</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO); 0.89
Bartlett’s test of Sphericity; Chi-square (χ\(^2\)) = 2,561.13, df = 15, \(p < 0.001\)
### Table 4. Confirmatory factor analysis of Thai-BFAS

<table>
<thead>
<tr>
<th>Component</th>
<th>Conflict</th>
<th>Relapse</th>
<th>Mood modification</th>
<th>Salience</th>
<th>Tolerance</th>
<th>Withdrawal</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spent a lot of time thinking about Facebook or planned use of Facebook?</td>
<td>0.22</td>
<td>0.22</td>
<td>0.25</td>
<td>0.83</td>
<td>0.33</td>
<td>0.22</td>
<td>1.00</td>
</tr>
<tr>
<td>2. Felt an urge to use Facebook more and more?</td>
<td>0.22</td>
<td>0.26</td>
<td>0.26</td>
<td>0.36</td>
<td>0.80</td>
<td>0.23</td>
<td>1.00</td>
</tr>
<tr>
<td>3. Used Facebook in order to forget about personal problems?</td>
<td>0.22</td>
<td>0.26</td>
<td>0.86</td>
<td>0.24</td>
<td>0.23</td>
<td>0.22</td>
<td>1.00</td>
</tr>
<tr>
<td>4. Tried to cut down on the use of Facebook without success?</td>
<td>0.34</td>
<td>0.29</td>
<td>0.26</td>
<td>0.21</td>
<td>0.21</td>
<td>0.23</td>
<td>1.00</td>
</tr>
<tr>
<td>5. Become restless or troubled if you have been prohibited from using Facebook?</td>
<td>0.24</td>
<td>0.86</td>
<td>0.26</td>
<td>0.88</td>
<td>0.22</td>
<td>0.21</td>
<td>1.00</td>
</tr>
<tr>
<td>6. Used Facebook so much that it has had a negative impact on your job/studies?</td>
<td>0.88</td>
<td>0.22</td>
<td>0.21</td>
<td>0.20</td>
<td>0.18</td>
<td>0.25</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*a Rotation method: Varimax with Kaiser Normalization; Rotation converged in 5 iterations.

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### Acknowledgement

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### Potential conflicts of interest

None.

### Potential conflicts of interest


2. Marcell DE. Are you a Facebook addict? Measuring Facebook addiction in the Philippine university. [29-34,45].


Appendix 1. Thai version of Bergen Facebook Addiction Scale (Thai-BFAS)

แบบสอบถามการติดหน้าจอของ Bergen ฉบับภาษาไทย
ค่าชี้วัด: ต้องคำนวณตามหลักโดยใช้ความรู้สึกของตนเองเกี่ยวกับการใช้หน้าจอ
โดยคำนวณให้ผลต่างแบบสอบถามประมาณ 1 นาที
การตอบแบบสอบถามนี้จำเป็นต้องทำตามความรู้สึกที่แท้จริงเพื่อให้ผลที่ถูกต้อง
ค่าถาม: ในช่วง 1 ปีที่ผ่านมา คุณมีพฤติกรรมแบบนี้อย่างไร

<table>
<thead>
<tr>
<th>ชื่อ</th>
<th>คำถาม</th>
<th>ความตั้งค่า</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>น้อยมาก</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

1. ฉันใช้เวลามากในการติดหน้าจอหรือไม่
2. ฉันรู้สึกว่าการติดหน้าจอทำให้ผมมีความพักผ่อนไม่เพียงพอหรือไม่
3. ฉันใช้เวลาเพื่อทำมือถือหรือสิ่งที่ทำมาแล้วไม่จำเป็น
4. ฉันพยายามล่าสุดในการติดหน้าจอจะทำให้ผมมีสิ่งที่มีความสำคัญ
5. ฉันมีการละเว้นจากหรือไม่สนใจ
เมื่อถูกถามไม่ใช่หน้าจอ
6. ฉันใช้หน้าจออย่างมากจนเกิดข้อผิดพลาด

วิธีการแปลผล: หากมีค่าชื่อที่ได้คะแนนตั้งแต่ 3 คะแนนขึ้นไป จำนวนอย่างน้อย 4 ข้อ ถือว่า “ติดหน้าจอ”
ความเที่ยงตรงของแบบสอบถาม Bergen Facebook Addiction Scale ฉบับภาษาไทย (Thai-BFAS)

เนื้อหาเป็นภาษาไทย