The Differentiation of Stress and Depressive Symptoms between University Students with Addictive Smartphone Behavior and University Students with Non-addictive Smartphone Behavior

<table>
<thead>
<tr>
<th>Journal:</th>
<th>Songklanakarin Journal of Science and Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuscript ID</td>
<td>SJST-2018-0470.R1</td>
</tr>
<tr>
<td>Manuscript Type:</td>
<td>Original Article</td>
</tr>
<tr>
<td>Date Submitted by the Author:</td>
<td>13-Mar-2019</td>
</tr>
<tr>
<td>Complete List of Authors:</td>
<td>Charoenwanit, Supawadee; Thammasat University Faculty of Nursing; Charoenwanit, Ekkawit; Thammasat University Faculty of Medicine</td>
</tr>
<tr>
<td>Keyword:</td>
<td>addictive smartphone behavior, depression, stress, university student</td>
</tr>
</tbody>
</table>
Original Article

The Differentiation of Stress and Depressive Symptoms between University Students with Addictive Smartphone Behavior and University Students with Non-addictive Smartphone Behavior

Abstract

The study aimed at studying the differences in stress and depression levels in students demonstrating the behavior of smartphone addiction and students without smartphone addiction. The sample consisted of 460 university students nationwide in Thailand. The instruments used in the data collection were a demographic form, SAS-VS-T, SPST-20, and CES-D (reliabilities are 0.958, 0.972, 0.975, respectively). Data were analyzed and compared the stress and depression levels in participants based on independent t-test.

According to the findings, it shown that the male and female with addictive smartphone behavior spent more money and more time on smartphone than the male and female without addictive smartphone behavior and shown that the stress and depression score in male and female with addictive smartphone behavior were higher than those of the other group at a statistical significance of 0.05 (t = 16.223, p < 0.000, t = 10.307, p < 0.000, respectively).

Keywords: addictive smartphone behavior, depression, stress, university student

1. Introduction

Over the past 10 years, smartphones have come to play increasingly important roles in people’s lives. In fact, nowadays, we can often see people holding and using
their smartphones in restaurants, on the bus, sky train, subway, and so on. Moreover, some people may feel that smartphones are a fifth basic item that they simply cannot live without. In the modern world, smartphones have been developed to do much more than sending or receiving calls for communication. Rather, smartphones support many new forms of communication, such as Facebook, Twitter, Instagram, LINE, Myspace or other channels. Furthermore, a survey report entitled “Digital in 2017” compiled by We Are Social, a renowned digital agency based in Singapore, presented statistics and information about the Internet and social media usage worldwide from both collective and individual perspectives in countries across the world. In Thailand, over 34 million people have been found to use social media through smartphones out of a total population of 68 million people (42.5%) (Kemp, 2017). Other findings have revealed smartphones as the most popular digital devices and representing 64 percent of all digital devices used in this country. Moreover, Thai people spend nearly four hours daily playing or performing activities with their smartphones; and among the demographics one the use of smartphones for online social communication, it was found that 9 million adolescents between the ages of 13 and 19 use smartphones for this purpose (out of 38 million people surveyed from every age group) (Kemp, 2017).

Advances made in communication technology have totally changed the lifestyles of people in society. People in society now give greater importance to online social communication than face-to-face communication with real people. Nearly the entire days of some people are spent in staring at smartphone screens for communication, or keeping up with news, or even for conducting various transactions, all of which can be done on
smartphones rather than going outside and taking part in activities in other places such as exercising, shopping in department stores, or performing other activities. With these changes in the lifestyles of people in society, it cannot be denied that smartphones help make people's lives more comfortable.

Nevertheless, smartphones not only create entertainment and increase our comfort, but also serve as a source for numerous physical and psychological health problems, such as obvious symptoms such as muscle inflammation and aches for example in the back, shoulders, arms or wrists generally what is called the office syndrome. These symptoms occur as a result of using smartphones for long periods in inappropriate postures without physical movements. Other potential symptoms include numb hands, inflamed ligaments, and locked fingers from smartphone use, which requires that hands and fingers remain tense at all times. Moreover, eye strain and headaches can be caused by constantly staring into brightly lit screens. People might also experience insomnia caused by anxiety about always wanting to know about news and activities in the social world (Leonard, 2016; The physio company, 2017; İnal, Demİrcİ, Çetİntürk, Akgönül, & Savaş, 2015; Yang, Chen, Huang, Lin, & Chang, 2017). In terms of frequently encountered psychological health problems, there are stress, anxiety, depression, lower self-esteem, and poorer self-control and decreased life satisfaction, among others (Samaha & Hawi, 2016; Demirci, Akgönül, & Akpınar, 2015; Thomee, Harenstam, & Hagberg, 2011; Shapiro, & Margolin, 2014; Y. Touitou, D. Touitou, & Reinberg, 2016; Haug, Castro, Kwon, Filler, Kowatsch, & Schaub, 2015). Previous studies in Thailand on the correlations among smartphone addiction and physical and psychological health
problems among adolescents are limited in scope, particularly concerning the correlations among smartphone addiction and psychological problems. It is known obvious that psychological and physical are related to each other when there are psychological problems, they always bring the physical problem to occur too, Moreover, some psychological problems such as depression and stressed are one of the most important causes of self-harm, and suicide in adolescents. Thus, the present study aimed at improving our understanding about the correlations between smartphone addiction and psychological health problems in adolescents with the intention of providing guidelines for preventing and resolving health problems for this group.

**Research Question**

Are stress and depression levels different between university students with addictive smartphone behavior and university students with non-addictive smartphone behavior?

**Research Objective**

To study the differences between stress and depression levels between university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior

**Hypothesis**

1. Stress and depression levels are different between university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior.
2. Male university students exhibiting addictive smartphone behavior and male university students exhibiting non-addictive smartphone behavior have different levels of stress.

3. Male university students exhibiting addictive smartphone behavior and male university students exhibiting non-addictive smartphone behavior have different levels of depression.

4. Female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior have different levels of stress.

5. Female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior have different levels of depression.

Research Scope

The present study was of a cross-sectional descriptive design conducted with 460 subjects composed of male and female university students aged between 18 and 25 years nationwide in Thailand.

2. Materials and Methods

The present research was based on a cross-sectional descriptive design and aimed to study the differences between stress and depression levels in university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive...
smartphone behavior composed of 460 male and female subjects aged between 18 and 25 years from across Thailand.

Inclusion criteria: adolescents aged between 18 and 25.
Exclusion criteria: the participants who did not complete the questionnaires, the participants who were diagnosed with depression.

Research Instrumentation

The instruments employed in the research were composed of the following four evaluation forms:

1. **Sociodemographic Interview Form**: This evaluation form was constructed by the researcher and contains multiple choice and fill-in-the-blank questions covering gender, age, education, overall monthly income received from family, monthly telephone bills, time spent playing with one’s smartphone each day, and marital status of parents.

2. **Smartphone Addiction Scale-Short Version-Thai Version (SAS-VS-T)**: This instrument was developed by Kwon Kwon, Kim, Cho, & Yang (2013) for evaluating smartphone addiction. The researcher asked permission to translate the instrument into Thai (forward translation) and then asked a professional translator to retranslate the instrument from Thai back into English (backward translation) before asking another expert in translation/editing to verify the equivalency between the instruments and the reliability is 0.958. The questionnaire contains 10 six-level scale questions (1 means “Highly Disagree”
while 6 means “Highly Agree”). Scores ranged from 6 to 60 points. The cut-off points for the scores were divided by gender as follows: If a male scored more than or equal to 31 points, the subject was considered to be addicted to smartphones. If a female scored more than or equal to 33 points, the subject was considered to be addicted to smartphones.

3. **Center for Epidemiologic Studies-Depression Scale (CES-D):** The Thai version was developed by Umaporn Trankasombut (Trangkasombat, & Likanapichitkul, 1997). The CES-D scale is widely used to evaluate depression in adolescents and the reliability is 0.975. The scales are based on severity or frequency of depressive symptoms and have four levels (0 means no depression while 3 means depressed all the time). The scores ranged from 0 to 60 points. The cut-off point for the scores was 22 points. If the total scores exceeded 22 points, then the subject was considered to be depressed.

4. **Suangprung Stress Test-20:** This instrument was developed by Suwat Mahatnirankul (Department of Mental Health, Ministry of Public Health, Local Mental Health Survey Program Project, 2002) (Mahatnirunkul, Pumpaisanchai, & Tarpunya, 2002). This evaluative form assesses overall stress over the past six months using five-level scales (with 0 meaning no stress and 4 meaning the highest level of stress). Scores were translated into four levels with scores ranging from 0 to 23 points meaning low stress, 24 to 41 points meaning
For Review Only

moderate stress, 42 to 61 points meaning high stress, and 62 points and greater meaning severe stress and the reliability is 0.972.

Data Collection

The researcher proposed the research project for approval by the Institutional Review Board on Research Involving Human Subjects, Thammasat University, Board No. 3, in the field of science. Next, the researcher contacted male and female university students aged 18 to 25 years through student representatives acquainted with the researcher and asked the candidates to invite people interested in willingly participating in the research project by sending the project’s QR code. Documents were used to describe the project objectives and the researcher was available for contact by telephone as well as the researcher’s email, LINE, and Facebook addresses through Facebook, Twitter, Line, or email. The researcher sent questionnaires online (google forms) in addition to informed consent forms for participation in the research through Facebook, Twitter, LINE, and email. The online questionnaires were the Sociodemographic Interview Form, the Smartphone Addiction Scale-Short Version-Thai Version (SAS-VS-T), the Suanprung Stress Test-20 (SPST-20), and the Center for Epidemiologic Studies-Depression Scale (CES-D). For confirming identity and making sure that participants who sent back the questionnaires to researcher, those participants have to send the consent forms back too and who did not send the consent form for confirming the identity the researcher got rid of those questionnaires out of the groups automatically. Once all of the information was obtained, the researcher subjected the data collected to statistical analysis by using the Statistical Package for Social Sciences version 22. In case, participants have a higher
For Review Only

Data Analysis

The researcher verified the integrity of all the data obtained from the record forms and then subjected the data to statistical analysis by using the SPSS software package. The details are as follows:

1. The demographic data for the sample were analyzed by using descriptive statistics; frequency, percentage, mean, and standard deviation.

2. The sample scores obtained from the Smartphone Addiction Scale-Short Version-Thai Version (SAS-VS-T), the Suanprung Stress Test-20 (SPST-20), and the Center for Epidemiologic Studies-Depression Scale (CES-D) between university students with addictive smartphone behavior and university students with non-addictive smartphone behavior were statistically analyzed using independent t-test.

3. Results and Discussion

Demographic Data of the Sample

1. Demographics

   The present study collected data from 460 subjects. A total of 232 subjects were male (50.4%), while 228 subjects were female (49.6%). The mean age was 19.45 years (Mean = 19.45, S.D. = 1.11). Over one-third of the sample (49.1%) lived in student dormitories. The details are shown in Table 1.
Table 2 and 3. Differences in Telephone Bills (baht per month) and Time Spent Playing Smartphones (hours per day) between University Students Exhibiting Addictive Smartphone Behavior and University Students Exhibiting Non-addictive Smartphone Behavior

Table 2 shows that the monthly telephone bills of the sample were different between the male and female university students exhibiting addictive smartphone behavior and those exhibiting with non-addictive smartphone behavior. Nearly half of the male university students with addictive smartphone behavior (48.6%) paid over 1,000 baht per month, while the majority of the male university students with non-addictive smartphone behavior paid under one thousand baht per month. At the same time, about half of the female university students with addictive smartphone behavior paid over 1,000 baht per month and the majority of female university students exhibiting non-addictive smartphone behavior paid less than 1,000 baht per month. The details are shown in Table 2.

Table 3 shows the mean daily time spent by each group on playing with their smartphones. It appears that both the male and female university students showing addictive smartphone behavior had higher means than the non-addicts. The details are shown in Table 3.

Part 2 - Analysis of the Data from the Stress and Depression Evaluation Forms

After the studied variables were analyzed for percentages, mean values, and standard deviation, the findings were as follows:

Table 4 shows that the mean stress score of the male and female university students with addictive smartphone behavior were higher than those of the non-addicts with scores at 60.25 and 61.73 points, respectively. On the other hand, the male and female
university students exhibiting non-addictive smartphone behavior scored 41.30 and 40.83 points, respectively, as shown in Table 4.

Table 5 shows that male and female university students with addictive smartphone behavior had high and severe stress while the male and female university students with non-addictive smartphone behavior had moderate and high stress. The details are shown in Table 5.

The findings shown in Table 6 indicate that the male and female university students exhibiting addictive smartphone behavior had higher mean depression scores than the non-addicts. The mean depression scores of the male and female university students showing addictive smartphone behavior were 42.31 and 44.35 points, respectively, while the depression scores for the male and female university students with non-addictive smartphone behavior were 29.24 and 19.61 points, respectively. The details are shown in Table 6.

Part 3: Data Analysis for Hypothesis Testing

Hypothesis 2: Male University Students with Addictive Smartphone Behavior and Male University Students with Non-addictive Smartphone Behavior have different levels of stress.

In testing Hypothesis 2, which states that male university students with addictive smartphone behavior and university students with non-addictive smartphone behavior have different levels of stress, the results for the comparison between the stress score among male university students exhibiting addictive smartphone behavior and the male
university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table provides the conclusion that the male university students exhibiting addictive smartphone behavior and the male university students exhibiting non-addictive smartphone behavior had different levels of stress with statistical significance at 0.05, which is consistent with the research hypothesis.

Hypothesis 3: Male University Students with Addictive Smartphone Behavior and Male University Students with Non-addictive Smartphone Behavior have different levels of depression.

In testing Hypothesis 3, which states that male university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of depression, the results for the comparison between the depression levels of male university students exhibiting addictive smartphone behavior and the male university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table draws the conclusion that the male university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior had different levels of depression at a statistical significance of 0.05, which is consistent with the research hypothesis.
Hypothesis 4: Female University Students with Addictive Smartphone Behavior and Female University Students with Non-addictive Smartphone Behavior have different levels of stress.

In testing Hypothesis 4, which states that female university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of stress, the results for the comparison between stress score among female university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table provides the conclusion that female university students with addictive smartphone behavior and female university students with non-addictive smartphone behavior have different levels of stress with a statistical significance at 0.05, which is consistent with the research hypothesis.

Hypothesis 5: Female University Students with Addictive Smartphone Behavior and Female University Students with Non-addictive Smartphone Behavior have different levels of depression.

In testing Hypothesis 5, which states that female university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of depression, the results regarding the comparison between the depression levels in female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.
The table draws the conclusion that the female university students exhibiting addictive smartphone behavior and the female university students exhibiting non-addictive smartphone behavior had different levels of depression with a statistical significance at 0.05, which is consistent with the research hypothesis.

4. Conclusions

Discussion of the Research Findings

Part 1: Demographic Data

1. Demographic Data

According to the findings, the subjects in the present study consisted of 460 subjects. A total of 232 subjects were male (50.4%) and 228 subjects were female (49.6%) with a mean age of 19.45 years (Mean = 19.45, S.D. = 1.11). More than one-third of the subjects were studying in the third year of their bachelor's degree courses (40.90%). The mean income that the sample received from family members ranged from 5,000 to 7,000 baht per month (35.4%). Approximately one-third of the subjects spent more than 1,000 baht each month on telephone bills (32.4%), while over half of the sample spent more than five hours daily playing with their smart phones (51.3%), and nearly half of the sample lived in a student dormitory (49.1). Additionally, the male and female university students exhibiting addictive smartphone behavior paid higher monthly telephone bills than the university students exhibiting non-addictive smartphone behavior. Moreover, the time spent daily on playing with their smartphones by the male and female
university students that exhibited addictive smartphone behavior was also greater than the university students that exhibited non-addictive smartphone behavior. Thus, the findings indicate that both time and telephone bills are the factors that reflect smartphone addiction among university students exhibiting addictive smartphone behavior.

Part 2: Data Analysis for Hypothesis Testing

Stress and Depression levels are different between University Students with Addictive Smartphone Behavior and University Students with Non-Addictive Smartphone Behavior.

The study compared the stress and depression levels of university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior and found that the stress and depression levels among the male university students exhibiting addictive smartphone behavior and the male university students exhibiting non-addictive smartphone behavior were different. The mean stress and depression scores for the smartphone addicted students were higher than the male university students that were not addicted to smartphone behavior with a statistical significance of 0.05 ($t = 16.223, p < 0.000$ and $t = 10.307, p < 0.000$, respectively).

This finding is consistent with the study of the stress and depression levels among the female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior.

The mean stress and depression scores for the female university students exhibiting addictive smartphone behavior were found to be higher than the scores for the university students that exhibited non-addictive smartphone behavior with a statistical
significance at 0.05 ($t = 10.372, p < 0.000$ and $t = 12.865, p < 0.000$), respectively. The findings of this research confirm and restate the clear severity of the impacts and problems caused by smartphone addiction. Stress and depression are important psychological symptoms requiring close care because these problems lead to a multitude of other serious problems, particularly suicide. Following the adolescent development, it is known that one of the most important missions that all adolescents have to complete it is finding and founding their own identity and contributing self-esteem and we can see that in several times they always compare themselves with others. Before digital period, comparison is occurred just between real person and real person who stayed in the same place such as comparing between siblings in family, comparing among class mate in the school, comparing among athletes in the team. In contrast, nowadays, they can compared themselves with others although they never know about their lives deeply. Self-esteem and identity frequently takes a hit when they start comparing themselves too much to others. One study shown that often viewing selfies led to decreased life satisfaction (Wang, & Haigh, 2017). Another study found that girls who spend more time looking at pictures on facebook reported higher dissatisfaction and self-objectification (Gray, & Meter, 2014). Once, self-esteem and identity are destroyed the consequent problem especially stress and depression always occur. The findings of the present study are consistent with other studies on the relationships between smartphone addiction and physical and psychological health conditions. Smartphone addiction is a cause of many physical and psychological problems, particularly frequently-encountered psychological problems such as stress, anxiety, depression, lower self-esteem, reduced self-control, lower satisfaction in life, etc. (Samaha & Hawi, 2016, Demirci, Akgonul & Akpinar, 2015;
Thomee, Harenstam, Hagberg, 2011; Shapiro & Margolin, 2014; Touitou, Touitou & Teinberg, 2017; Haug, Castro, Kwon, Filler, Kowatsch & Schaub, 2015). These problems can also be due to the fact that adolescence is an age of self-searching and seeking one's true self. However, by spending most of one's free time on smartphones to explore the online social world, which is a form of fabricated society in which everyone tries only to present him or herself as outstanding, more attractive, better and wealthier than he/she is in reality, the things that adolescents see all the time might cause them to constantly compare their personal lives with the lives viewed online. This can lead to adolescents' feelings of inferiority to others in terms of not being as good as them, not being as attractive as others, or not being as being capable as others. Eventually, this causes negative feelings about one's self and can lead to stress and depression.

**Recommendations**

**Recommendations for Application of the Research Findings**

The present research demonstrated that smartphone addiction is a major factor linked to stress and depression in smartphone addicts and nowadays we known quite clearly that these problems can bring the worst problems to those adolescent's lives. Therefore, all parties involved, such as families, schools, communities, and society, should be aware and give importance to preventing and supervising the use of smartphones in order to ensure that smartphones are used within appropriate limits.

Beginning with families, parents should give importance to talking or coming to an agreement with their children about their smartphone use from the start, even before purchasing a smartphone. Furthermore, for cases where smartphones have already been
purchased, conversations must be had about the appropriate rules for smartphone use by children. Moreover, parents have to act as good role models in using smartphones, because good examples are more valuable than words of teaching alone.

**Recommendations for Future Research**

Experimental studies should be conducted to create programs aimed toward limiting smartphone use among adolescents, combined with promoting knowledge and awareness about the impacts of excessive smartphone use. Furthermore, awareness should be raised on the part of parents and teachers about the significant problems and impacts that might result from excessive smartphone use in order to better resolve problems that might arise from excessive smartphone use among adolescents.

**References**


Original Article

The Differentiation of Stress and Depressive Symptoms between University Students with Addictive Smartphone Behavior and University Students with Non-addictive Smartphone Behavior

Supawadee Chareonwanit¹*, Ekkawit Charoenwanit²

¹Faculty of Nursing, Thammasat University, Pathum Thani, 12120, Thailand.
²Faculty of Medicine, Thammasat University, Pathum Thani, 12120, Thailand.

*Corresponding author, Email address: supawadee.c@nurse.tu.ac.th
Response to Reviewer

1. Abstract:
1.1 Please add the reliability of each instrument.

(reliabilities are 0.958, 0.972, 0.975, respectively)

1.2 If add more details of differences such as gender, paid bills, and time spent, will be more valued.

According to the findings, it shown that the male and female with addictive smartphone behavior spent more money and more time on smartphone than the male and female without addictive smartphone behavior and shown that the stress and depression score... …..

2. Introduction

2.1 Need to add more rationales of the study about psychological problems, not including physical problems

2.2 Please state the evidence that showed the limitation of this study in Thailand

Nevertheless, smartphones not only create entertainment and increase our comfort, but also serve as a source for numerous physical and psychological health problems, such as obvious symptoms such as muscle inflammation and aches for example in the back, shoulders, arms or wrists generally what is called the office syndrome. These symptoms occur as a result of using smartphones for long periods in inappropriate postures without physical movements. Other potential symptoms include numb hands, inflamed ligaments, and locked fingers from smartphone use, which requires that hands and fingers remain tense at all times. Moreover, eye strain and headaches can be caused by constantly staring into brightly lit screens. People might also experience insomnia caused by anxiety about always wanting to know about news and activities in the social...
world (Leonard, 2016; The physio company, 2017; İnal, Demİrcİ, Çetİntürk, Akgönül, & Savaş, 2015; Yang, Chen, Huang, Lin, & Chang, 2017). In terms of frequently encountered psychological health problems, there are stress, anxiety, depression, lower self-esteem, and poorer self-control and decreased life satisfaction, among others (Samaha & Hawi, 2016; Demirci, Akgönül, & Akpınar, 2015; Thomee, Harenstam, & Hagberg, 2011; Shapiro, & Margolin, 2014; Y. Touitou, D. Touitou, & Reinberg, 2016; Haug, Castro, Kwon, Filler, Kowatsch, & Schaub, 2015). Previous studies in Thailand on the correlations among smartphone addiction and physical and psychological health problems among adolescents are limited in scope, particularly concerning the correlations among smartphone addiction and psychological problems. It is known obvious that psychological and physical are related to each other when there are psychological problems, they always bring the physical problem to occur too. Moreover, some psychological problems such as depression and stressed are one of the most important causes of self-harm, and suicide in adolescents. Thus, the present study aimed at improving our understanding about the correlations between smartphone addiction and psychological health problems in adolescents with the intention of providing guidelines for preventing and resolving health problems for this group.

3. Materials & Methods

3.1 Need to add the title “Sample” and its details such as inclusion, exclusion criteria, sample size, and how to access and recruit the samples

Inclusion criteria: adolescents aged between 18 and 25
Exclusion criteria: the participants who did not complete the questionnaires, the participants who were diagnosed with depression
3.2 Instrument: Need to show the reliability of each instrument and explain how to validate these instruments.

3.3 Data collection: Add the reasons of the strategies with references to make sure that is make study validity. It can be an evidence for the later researcher to learn from this study.

For confirming identity and making sure that participants who sent back the questionnaires to researcher, those participants have to send the consent forms back too and who did not send the consent form for confirming the identity the researcher got rid of those questionnaires out of the groups automatically. Once all of the information was obtained, the researcher subjected the data collected to statistical analysis by using the Statistical Package for Social Sciences version 22. In case, participants have a higher score of stress or depression than standard score, the researcher suggested them to go to see the doctor.

4. Results & Discussion: Need to separate the topic and explain reasons why the results showed the differences of stress and depression between two groups and support with literatures.

Following the adolescent development, it is known that one of the most important missions that all adolescents have to complete it is finding and founding their own identity and contributing self-esteem and we can see that in several times they always compare themselves with others. Before digital period, comparison is occurred just between real person and real person who stayed in the same place such as comparing between siblings in family, comparing among class mate in the school, comparing among athletes in the team. In contrast, nowadays, they can compared themselves with others although they never know about their lives deeply. Self-esteem and identity frequently takes a hit when they start comparing themselves too much to others. One study shown that often viewing selfies led to decreased life satisfaction (Wang, & Haigh, 2017). Another study found that girls who spend more time looking at pictures...
on facebook reported higher dissatisfaction and self-objectification (Gray, & Meter, 2014). Once, self-esteem and identity are destroyed the consequent problem especially stress and depression always occur.

5. Recommendations: Need to recommend from the findings. According the findings, it is seem likely to look at factors related or predicted addicted behaviors of this population in Thailand for further research.

The present research demonstrated that smartphone addiction is a major factor linked to stress and depression in smartphone addicts and nowadays we known quite clearly that these problems can bring the worst problems to those adolescent’s lives
Original Article

The Differentiation of Stress and Depressive Symptoms between University Students with Addictive Smartphone Behavior and University Students with Non-addictive Smartphone Behavior

Supawadee Chareonwanit1*, Ekkawit Charoenwanit2

1Faculty of Nursing, Thammasat University, Pathum Thani, 12120, Thailand.
2Faculty of Medicine, Thammasat University, Pathum Thani, 12120, Thailand.
*Corresponding author, Email address: supawadee.c@nurse.tu.ac.th

Abstract

The study aimed at studying the differences in stress and depression levels in students demonstrating the behavior of smartphone addiction and students without smartphone addiction. The sample consisted of 460 university students nationwide in Thailand. The instruments used in the data collection were a demographic form, SAS-VS-T, SPST-20, and CES-D (reliabilities are 0.958, 0.972, 0.975, respectively). Data were analyzed and compared the stress and depression levels in participants based on independent t-test.

According to the findings, it shown that the male and female with addictive smartphone behavior spent more money and more time on smartphone than the male and female without addictive smartphone behavior and shown that the stress and depression score in male and female with addictive smartphone behavior were higher than those of the other group at a statistical significance of 0.05 (t = 16.223, p < 0.000, t = 10.307, p < 0.000, respectively).

Keywords: addictive smartphone behavior, depression, stress, university student
1. Introduction

Over the past 10 years, smartphones have come to play increasingly important roles in people’s lives. In fact, nowadays, we can often see people holding and using their smartphones in restaurants, on the bus, sky train, subway, and so on. Moreover, some people may feel that smartphones are a fifth basic item that they simply cannot live without. In the modern world, smartphones have been developed to do much more than sending or receiving calls for communication. Rather, smartphones support many new forms of communication, such as Facebook, Twitter, Instagram, LINE, Myspace or other channels. Furthermore, a survey report entitled “Digital in 2017” compiled by We Are Social, a renowned digital agency based in Singapore, presented statistics and information about the Internet and social media usage worldwide from both collective and individual perspectives in countries across the world. In Thailand, over 34 million people have been found to use social media through smartphones out of a total population of 68 million people (42.5%) (Kemp, 2017). Other findings have revealed smartphones as the most popular digital devices and representing 64 percent of all digital devices used in this country. Moreover, Thai people spend nearly four hours daily playing or performing activities with their smartphones; and among the demographics one the use of smartphones for online social communication, it was found that 9 million adolescents between the ages of 13 and 19 use smartphones for this purpose (out of 38 million people surveyed from every age group) (Kemp, 2017).

Advances made in communication technology have totally changed the lifestyles of people in society. People in society now give greater importance to online social
communication than face-to-face communication with real people. Nearly the entire days of some people are spent in staring at smartphone screens for communication, or keeping up with news, or even for conducting various transactions, all of which can be done on smartphones rather than going outside and taking part in activities in other places such as exercising, shopping in department stores, or performing other activities. With these changes in the lifestyles of people in society, it cannot be denied that smartphones help make people’s lives more comfortable.

Nevertheless, smartphones not only create entertainment and increase our comfort, but also serve as a source for numerous physical and psychological health problems, such as obvious symptoms such as muscle inflammation and aches for example in the back, shoulders, arms or wrists generally what is called the office syndrome. These symptoms occur as a result of using smartphones for long periods in inappropriate postures without physical movements. Other potential symptoms include numb hands, inflamed ligaments, and locked fingers from smartphone use, which requires that hands and fingers remain tense at all times. Moreover, eye strain and headaches can be caused by constantly staring into brightly lit screens. People might also experience insomnia caused by anxiety about always wanting to know about news and activities in the social world (Leonard, 2016; The physio company, 2017; İnal, Demİrcİ, Çetİntürk, Akgönül, & Savaş, 2015; Yang, Chen, Huang, Lin, & Chang, 2017). In terms of frequently encountered psychological health problems, there are stress, anxiety, depression, lower self-esteem, and poorer self-control and decreased life satisfaction, among others (Samaha & Hawi, 2016; Demirci, Akgönül, & Akpınar, 2015; Thomee, Harenstam, & Hagberg, 2011; Shapiro, & Margolin, 2014; Y. Touitou, D. Touitou, & Reinberg, 2016; Haug,
Castro, Kwon, Filler, Kowatsch, & Schaub, 2015). Previous studies in Thailand on the correlations among smartphone addiction and physical and psychological health problems among adolescents are limited in scope, particularly concerning the correlations among smartphone addiction and psychological problems. It is known obvious that psychological and physical are related to each other when there are psychological problems, they always bring the physical problem to occur too. Moreover, some psychological problems such as depression and stressed are one of the most important causes of self-harm, and suicide in adolescents. Thus, the present study aimed at improving our understanding about the correlations between smartphone addiction and psychological health problems in adolescents with the intention of providing guidelines for preventing and resolving health problems for this group.

**Research Question**

Are stress and depression levels different between university students with addictive smartphone behavior and university students with non-addictive smartphone behavior?

**Research Objective**

To study the differences between stress and depression levels between university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior

**Hypothesis**

1. Stress and depression levels are different between university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior.
2. Male university students exhibiting addictive smartphone behavior and male university students exhibiting non-addictive smartphone behavior have different levels of stress.

3. Male university students exhibiting addictive smartphone behavior and male university students exhibiting non-addictive smartphone behavior have different levels of depression.

4. Female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior have different levels of stress.

5. Female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior have different levels of depression.

**Research Scope**

The present study was of a cross-sectional descriptive design conducted with 460 subjects composed of male and female university students aged between 18 and 25 years nationwide in Thailand.

**2. Materials and Methods**

The present research was based on a cross-sectional descriptive design and aimed to study the differences between stress and depression levels in university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive
smartphone behavior composed of 460 male and female subjects aged between 18 and 25 years from across Thailand.

Inclusion criteria: adolescents aged between 18 and 25.

Exclusion criteria: the participants who did not complete the questionnaires, the participants who were diagnosed with depression.

Research Instrumentation

The instruments employed in the research were composed of the following four evaluation forms:

1. **Sociodemographic Interview Form**: This evaluation form was constructed by the researcher and contains multiple choice and fill-in-the-blank questions covering gender, age, education, overall monthly income received from family, monthly telephone bills, time spent playing with one’s smartphone each day, and marital status of parents.

2. **Smartphone Addiction Scale-Short Version-Thai-Version (SAS-VS-T)**: This instrument was developed by Kwon Kwon, Kim, Cho, & Yang (2013) for evaluating smartphone addiction. The researcher asked permission to translate the instrument into Thai (forward translation) and then asked a professional translator to retranslate the instrument from Thai back into English (backward translation) before asking another expert in translation/editing to verify the equivalency between the instruments and the reliability is 0.958. The questionnaire contains 10 six-level scale questions (1 means “Highly Disagree”
while 6 means “Highly Agree”). Scores ranged from 6 to 60 points. The cut-off points for the scores were divided by gender as follows: If a male scored more than or equal to 31 points, the subject was considered to be addicted to smartphones. If a female scored more than or equal to 33 points, the subject was considered to be addicted to smartphones.

3. **Center for Epidemiologic Studies-Depression Scale (CES-D):** The Thai version was developed by Umaporn Transkosombut (Trangkasombat, & Likanapichitkul, 1997). The CES-D scale is widely used to evaluate depression in adolescents and the reliability is 0.975. The scales are based on severity or frequency of depressive symptoms and have four levels (0 means no depression while 3 means depressed all the time). The scores ranged from 0 to 60 points. The cut-off point for the scores was 22 points. If the total scores exceeded 22 points, then the subject was considered to be depressed.

4. **Suangprung Stress Test-20:** This instrument was developed by Suwat Mahatnirankul (Department of Mental Health, Ministry of Public Health, Local Mental Health Survey Program Project, 2002). Mahatnirunkul, Pumpaisanchai, & Tarpunya, 2002). This evaluative form assesses overall stress over the past six months using five-level scales (with 0 meaning no stress and 4 meaning the highest level of stress). Scores were translated into four levels with scores ranging from 0 to 23 points meaning low stress, 24 to 41 points meaning
moderate stress, 42 to 61 points meaning high stress, and 62 points and greater meaning severe stress and the reliability is 0.972.

Data Collection

The researcher proposed the research project for approval by the Institutional Review Board on Research Involving Human Subjects, Thammasat University, Board No. 3, in the field of science. Next, the researcher contacted male and female university students aged 18 to 25 years through student representatives acquainted with the researcher and asked the candidates to invite people interested in willingly participating in the research project by sending the project's QR code. Documents were used to describe the project objectives and the researcher was available for contact by telephone as well as the researcher's email, LINE, and Facebook addresses through Facebook, Twitter, LINE, or email. The researcher sent questionnaires online (google forms) in addition to informed consent forms for participation in the research through Facebook, Twitter, LINE, and email. The online questionnaires were the Sociodemographic Interview Form, the Smartphone Addiction Scale-Short Version-Thai Version (SAS-VS-T), the Suanprung Stress Test-20 (SPST-20), and the Center for Epidemiologic Studies-Depression Scale (CES-D). For confirming identity and making sure that participants who sent back the questionnaires to researcher, those participants have to send the consent forms back too and who did not send the consent form for confirming the identity the researcher got rid of those questionnaires out of the groups automatically. Once all of the information was obtained, the researcher subjected the data collected to statistical analysis by using the Statistical Package for Social Sciences version 22. In case, participants have a higher
score of stress or depression than standard score, the researcher suggested them to go to see the doctor.

Data Analysis

The researcher verified the integrity of all the data obtained from the record forms and then subjected the data to statistical analysis by using the SPSS software package. The details are as follows:

1. The demographic data for the sample were analyzed by using descriptive statistics; frequency, percentage, mean, and standard deviation.

2. The sample scores obtained from the Smartphone Addiction Scale-Short Version-Thai Version (SAS-VS-T), the Suanprung Stress Test-20 (SPST-20), and the Center for Epidemiologic Studies-Depression Scale (CES-D) between university students with addictive smartphone behavior and university students with non-addictive smartphone behavior were statistically analyzed using independent t-test.

3. Results and Discussion

Demographic Data of the Sample

1. Demographics

The present study collected data from 460 subjects. A total of 232 subjects were male (50.4%), while 228 subjects were female (49.6%). The mean age was 19.45 years (Mean = 19.45, S.D. = 1.11). Over one-third of the sample (49.1%) lived in student dormitories. The details are shown in Table 1.
Table 2 and 3. Differences in Telephone Bills (baht per month) and Time Spent Playing Smartphones (hours per day) between University Students Exhibiting Addictive Smartphone Behavior and University Students Exhibiting Non-addictive Smartphone Behavior

Table 2 shows that the monthly telephone bills of the sample were different between the male and female university students exhibiting addictive smartphone behavior and those exhibiting with non-addictive smartphone behavior. Nearly half of the male university students with addictive smartphone behavior (48.6%) paid over 1,000 baht per month, while the majority of the male university students with non-addictive smartphone behavior paid under one thousand baht per month. At the same time, about half of the female university students with addictive smartphone behavior paid over 1,000 baht per month and the majority of female university students exhibiting non-addictive smartphone behavior paid less than 1,000 baht per month. The details are shown in Table 2.

Table 3 shows the mean daily time spent by each group on playing with their smartphones. It appears that both the male and female university students showing addictive smartphone behavior had higher means than the non-addicts. The details are shown in Table 3.

Part 2 - Analysis of the Data from the Stress and Depression Evaluation Forms

After the studied variables were analyzed for percentages, mean values, and standard deviation, the findings were as follows.

Table 4 shows that the mean stress score of the male and female university students with addictive smartphone behavior were higher than those of the non-addicts with scores at 60.25 and 61.73 points, respectively. On the other hand, the male and female
university students exhibiting non-addictive smartphone behavior scored 41.30 and 40.83 points, respectively, as shown in Table 4.

Table 5 shows that male and female university students with addictive smartphone behavior had high and severe stress while the male and female university students with non-addictive smartphone behavior had moderate and high stress. The details are shown in Table 5.

The findings shown in Table 6 indicate that the male and female university students exhibiting addictive smartphone behavior had higher mean depression scores than the non-addicts. The mean depression scores of the male and female university students showing addictive smartphone behavior were 42.31 and 44.35 points, respectively, while the depression scores for the male and female university students with non-addictive smartphone behavior were 29.24 and 19.61 points, respectively. The details are shown in Table 6.

**Part 3: Data Analysis for Hypothesis Testing**

**Hypothesis 2: Male University Students with Addictive Smartphone Behavior and Male University Students with Non-addictive Smartphone Behavior have different levels of stress.**

In testing Hypothesis 2, which states that male university students with addictive smartphone behavior and university students with non-addictive smartphone behavior have different levels of stress, the results for the comparison between the stress score among male university students exhibiting addictive smartphone behavior and the male
university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table provides the conclusion that the male university students exhibiting addictive smartphone behavior and the male university students exhibiting non-addictive smartphone behavior had different levels of stress with statistical significance at 0.05, which is consistent with the research hypothesis.

**Hypothesis 3: Male University Students with Addictive Smartphone Behavior and Male University Students with Non-addictive Smartphone Behavior have different levels of depression.**

In testing Hypothesis 3, which states that male university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of depression, the results for the comparison between the depression levels of male university students exhibiting addictive smartphone behavior and the male university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table draws the conclusion that the male university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior had different levels of depression at a statistical significance of 0.05, which is consistent with the research hypothesis.
Hypothesis 4: Female University Students with Addictive Smartphone Behavior and Female University Students with Non-addictive Smartphone Behavior have different levels of stress.

In testing Hypothesis 4, which states that female university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of stress, the results for the comparison between stress score among female university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.

The table provides the conclusion that female university students with addictive smartphone behavior and female university students with non-addictive smartphone behavior have different levels of stress with a statistical significance at 0.05, which is consistent with the research hypothesis.

Hypothesis 5: Female University Students with Addictive Smartphone Behavior and Female University Students with Non-addictive Smartphone Behavior have different levels of depression.

In testing Hypothesis 5, which states that female university students exhibiting addictive smartphone behavior and university students exhibiting non-addictive smartphone behavior have different levels of depression, the results regarding the comparison between the depression levels in female university students exhibiting addictive smartphone behavior and female university students exhibiting non-addictive smartphone behavior were obtained through two independent-sample t-tests.
The table draws the conclusion that the female university students exhibiting addictive smartphone behavior and the female university students exhibiting non-addictive smartphone behavior had different levels of depression with a statistical significance at 0.05, which is consistent with the research hypothesis.

4. Conclusions

Discussion of the Research Findings

Part 1: Demographic Data

1. Demographic Data

According to the findings, the subjects in the present study consisted of 460 subjects. A total of 232 subjects were male (50.4%) and 228 subjects were female (49.6%) with a mean age of 19.45 years (Mean = 19.45, S.D. = 1.11). More than one-third of the subjects were studying in the third year of their bachelor's degree courses (40.90%). The mean income that the sample received from family members ranged from 5,000 to 7,000 baht per month (35.4%). Approximately one-third of the subjects spent more than 1,000 baht each month on telephone bills (32.4%), while over half of the sample spent more than five hours daily playing with their smart phones (51.3%), and nearly half of the sample lived in a student dormitory (49.1%). Additionally, the male and female university students exhibiting addictive smartphone behavior paid higher monthly telephone bills than the university students exhibiting non-addictive smartphone behavior. Moreover, the time spent daily on playing with their smartphones by the male and female
university students that exhibited addictive smartphone behavior was also greater than
the university students that exhibited non-addictive smartphone behavior. Thus, the
findings indicate that both time and telephone bills are the factors that reflect smartphone
addiction among university students exhibiting addictive smartphone behavior.

**Part 2: Data Analysis for Hypothesis Testing**

Stress and Depression levels are different between University Students with
Addictive Smartphone Behavior and University Students with Non-Addictive
Smartphone Behavior.

The study compared the stress and depression levels of university
students exhibiting addictive smartphone behavior and university students exhibiting
non-addictive smartphone behavior and found that the stress and depression levels
among the male university students exhibiting addictive smartphone behavior and the
male university students exhibiting non-addictive smartphone behavior were different.
The mean stress and depression scores for the smartphone addicted students were higher
than the male university students that were not addicted to smartphone behavior with a
statistical significance of 0.05 (t = 16.223, p < 0.000 and t-10.307, p < 0.000, respectively).

This finding is consistent with the study of the stress and depression levels among the
female university students exhibiting addictive smartphone behavior and female
university students exhibiting non-addictive smartphone behavior.

The mean stress and depression scores for the female university students
exhibiting addictive smartphone behavior were found to be higher than the scores for the
university students that exhibited non-addictive smartphone behavior with a statistical
significance at 0.05 \( t = 10.372, p < 0.000 \) and \( t = 12.865, p < 0.000 \), respectively. The findings of this research confirm and restate the clear severity of the impacts and problems caused by smartphone addiction. Stress and depression are important psychological symptoms requiring close care because these problems lead to a multitude of other serious problems, particularly suicide. Following the adolescent development, it is known that one of the most important missions that all adolescents have to complete is finding and founding their own identity and contributing self-esteem and we can see that in several times they always compare themselves with others. Before digital period, comparison is occurred just between real person and real person who stayed in the same place such as comparing between siblings in family, comparing among class mate in the school, comparing among athletes in the team. In contrast, nowadays, they can compared themselves with others although they never know about their lives deeply. Self-esteem and identity frequently takes a hit when they start comparing themselves too much to others. One study shown that often viewing selfies led to decreased life satisfaction (Wang, & Haigh, 2017). Another study found that girls who spend more time looking at pictures on facebook reported higher dissatisfaction and self-objectification (Gray, & Meter, 2014). Once, self-esteem and identity are destroyed the consequent problem especially stress and depression always occur. The findings of the present study are consistent with other studies on the relationships between smartphone addiction and physical and psychological health conditions. Smartphone addiction is a cause of many physical and psychological problems, particularly frequently-encountered psychological problems such as stress, anxiety, depression, lower self-esteem, reduced self-control, lower satisfaction in life, etc (Samaha & Hawi, 2016, Demirci, Akgonul & Akpinar, 2015;
Thomee, Harenstam, Hagberg, 2011; Shapiro & Margolin, 2014; Touitou, Touitou & Teinberg, 2017; Haug, Castro, Kwon, Filler, Kowatsch & Schaub, 2015). These problems can also be due to the fact that adolescence is an age of self-searching and seeking one’s true self. However, by spending most of one’s free time on smartphones to explore the online social world, which is a form of fabricated society in which everyone tries only to present him or herself as outstanding, more attractive, better and wealthier than he/she is in reality, the things that adolescents see all the time might cause them to constantly compare their personal lives with the lives viewed online. This can lead to adolescents’ feelings of inferiority to others in terms of not being as good as good them, not being as attractive as others, or not being as being capable as others. Eventually, this causes negative feelings about one’s self and can lead to stress and depression.

Recommendations

Recommendations for Application of the Research Findings

The present research demonstrated that smartphone addiction is a major factor linked to stress and depression in smartphone addicts and nowadays we known quite clearly that these problems can bring the worst problems to those adolescent’s lives. Therefore, all parties involved, such as families, schools, communities, and society, should be aware and give importance to preventing and supervising the use of smartphones in order to ensure that smartphones are used within appropriate limits.

Beginning with families, parents should give importance to talking or coming to an agreement with their children about their smartphone use from the start, even before purchasing a smartphone. Furthermore, for cases where smartphones have already been
purchased, conversations must be had about the appropriate rules for smartphone use by children. Moreover, parents have to act as good role models in using smartphones, because good examples are more valuable than words of teaching alone.

**Recommendations for Future Research**

Experimental studies should be conducted to create programs aimed toward limiting smartphone use among adolescents, combined with promoting knowledge and awareness about the impacts of excessive smartphone use. Furthermore, awareness should be raised on the part of parents and teachers about the significant problems and impacts that might result from excessive smartphone use in order to better resolve problems that might arise from excessive smartphone use among adolescents.

**References**


<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Number (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>232</td>
<td>50.4</td>
</tr>
<tr>
<td>Male</td>
<td>228</td>
<td>49.6</td>
</tr>
<tr>
<td><strong>Age (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>103</td>
<td>22.4</td>
</tr>
<tr>
<td>19</td>
<td>126</td>
<td>27.4</td>
</tr>
<tr>
<td>20</td>
<td>176</td>
<td>38.3</td>
</tr>
<tr>
<td>21</td>
<td>39</td>
<td>8.5</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td>0.9</td>
</tr>
<tr>
<td>23</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td>2.6</td>
</tr>
<tr>
<td>Bachelor Year 1</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Bachelor Year 2</td>
<td>121</td>
<td>30.2</td>
</tr>
<tr>
<td>Bachelor Year 3</td>
<td>188</td>
<td>26.3</td>
</tr>
<tr>
<td>Bachelor Year 4</td>
<td>12</td>
<td>40.9</td>
</tr>
<tr>
<td><strong>Total Monthly Income from Parents (baht per month)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,001-5,000</td>
<td>96</td>
<td>2.6</td>
</tr>
<tr>
<td>5,001-7,000</td>
<td>163</td>
<td></td>
</tr>
<tr>
<td>7,001-9,000</td>
<td>142</td>
<td>20.9</td>
</tr>
<tr>
<td>9,001-12,000</td>
<td>59</td>
<td>35.4</td>
</tr>
<tr>
<td></td>
<td>107</td>
<td>30.9</td>
</tr>
<tr>
<td>Telephone Bills (baht per month)</td>
<td>204</td>
<td>12.8</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>300-500</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>501-1,000</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1,001-1,500</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>1,501-2,000</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Spent Playing Smartphones (hours per day)</th>
<th>44</th>
<th>3.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>1-2 hrs.</td>
<td>42</td>
<td>11.7</td>
</tr>
<tr>
<td>2-3 hrs.</td>
<td>181</td>
<td>12.2</td>
</tr>
<tr>
<td>3-4 hrs.</td>
<td>55</td>
<td>9.6</td>
</tr>
<tr>
<td>4-5 hrs.</td>
<td>236</td>
<td>6.1</td>
</tr>
<tr>
<td>5-6 hrs.</td>
<td>172</td>
<td>9.1</td>
</tr>
<tr>
<td>More than 6 hours</td>
<td>52</td>
<td>39.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital Status of Parents</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>136</td>
</tr>
<tr>
<td>Divorced</td>
<td>48</td>
</tr>
<tr>
<td>Widowed</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Living Situation</th>
<th>226</th>
<th>11.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>With both parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father only</td>
<td>29.6</td>
<td></td>
</tr>
<tr>
<td>Mother only</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>Student dormitory</td>
<td>10.9</td>
<td></td>
</tr>
</tbody>
</table>
Table 1 Demographic Data

<table>
<thead>
<tr>
<th>Addictive</th>
<th>Non-addictive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Telephone Bills</td>
<td></td>
</tr>
<tr>
<td>300-500</td>
<td>0</td>
</tr>
<tr>
<td>501-1,000</td>
<td>56 (51.4%)</td>
</tr>
<tr>
<td>1,001-1,500</td>
<td>49 (45%)</td>
</tr>
<tr>
<td>1,501-2,000</td>
<td>4 (3.6%)</td>
</tr>
</tbody>
</table>

Table 2 Differences in Telephone Bills (baht per month)

<table>
<thead>
<tr>
<th>Addictive</th>
<th>Non-addictive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Time Spent Playing Smartphones (hours per day)</td>
<td></td>
</tr>
<tr>
<td>6.11</td>
<td>2.39</td>
</tr>
</tbody>
</table>

Table 3 Differences in Time Spent Playing Smartphones (hours per day)
<table>
<thead>
<tr>
<th>Normal Range</th>
<th>Addictive</th>
<th>Non-addictive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Total Stress Score</td>
<td>0-80</td>
<td>60.25</td>
</tr>
</tbody>
</table>

**Table 4** Score Range and Mean Stress Scores

<table>
<thead>
<tr>
<th>Stress</th>
<th>Addictive</th>
<th>Non-addictive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High</td>
<td>64(58.7%)</td>
<td>88(56.4%)</td>
</tr>
<tr>
<td>Severe</td>
<td>45(41.3%)</td>
<td>68(43.6%)</td>
</tr>
</tbody>
</table>

**Table 5** Stress Levels by Severity of Stress

<table>
<thead>
<tr>
<th>Normal Range</th>
<th>Addictive</th>
<th>Non-addictive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Depression</td>
<td>0-60</td>
<td>42.31</td>
</tr>
</tbody>
</table>

**Table 6** Score range, minima, maxima, mean values, and standard deviation of depression
### Table 7
Comparison between the stress scores for the male university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Students Exhibiting Addictive Smartphone Behavior</td>
<td>109</td>
<td>60.26</td>
<td>8.31</td>
<td>16.223</td>
<td>0.000</td>
</tr>
<tr>
<td>University students Exhibiting Non-addictive Smartphone Behavior</td>
<td>123</td>
<td>41.31</td>
<td>9.35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 7**: Comparison between the stress scores for the male university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior.
Table 8 Comparison between the depression scores for male university students exhibiting addictive smartphone behavior and those exhibiting non-addictive smartphone behavior

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Students</td>
<td>156</td>
<td>61.74</td>
<td>8.73</td>
<td>10.372</td>
<td>0.000</td>
</tr>
<tr>
<td>exhibiting Addictive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smartphone Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University students</td>
<td>72</td>
<td>40.83</td>
<td>16.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exhibiting Non-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>addictive Smartphone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9 Comparison of the stress scores between female university students exhibiting addictive smartphone behavior and that exhibiting non-addictive smartphone behavior

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Students</td>
<td>156</td>
<td>44.35</td>
<td>5.93</td>
<td>12.865</td>
<td>0.000</td>
</tr>
<tr>
<td>exhibiting Addictive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smartphone Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University students</td>
<td>72</td>
<td>19.61</td>
<td>15.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exhibiting Non-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>addictive Smartphone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10 Comparison of the depression scores between the female university students exhibiting smartphone behavior and the female university students exhibiting non-addictive smartphone behavior