STRESS, LONELINESS, AND PEER ATTACHMENT AS PREDICTORS OF SMARTPHONE ADDICTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

NG YAN YI

YAP PHEI YIE

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Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia

Ng Yan Yi and Yap Phei Yie

University Tunku Abdul Rahman

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NG YAN YI

YAP PHEI YIE

DECLARATION

We declare that the material contained in this paper is the end result of our own work and that due acknowledgement has been given in the bibliography and references to ALL sources, be they printed, electronic or personal.

Name: Ng Yan Yi

Student ID: 2004140

Signed: 

Date: 8 April 2024

Name: Yap Phei Yie

Student ID: 2002987

Signed: 

Date: 8 April 2024

APPROVAL FORM

This research paper attached here to, entitled "Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia", prepare and submitted by Ng Yan Yi and Yap Phei Yie in partial fulfilment of requirements for the Bachelor of Social Sciences (Hons) Psychology is hereby accepted.

Date: 5 April 2024

Supervisor

(Dr Nurul Iman Binti Abdul Jalil)

Abstract

The present study was conducted to examine stress, loneliness, and peer attachment as predictors of smartphone addiction among university students in Malaysia. This study implemented a quantitative analysis research method and a purposive sampling method. The minimum sample size required for this study is 119 participants. Eventually, data from 126 university students aged 20 to 25 were used after data collection and cleaning. The survey was distributed to university students from different states in Malaysia through online platforms. Also, physical recruitment efforts were undertaken at Universiti Tunku Abdul Rahman (UTAR), encouraging recruited participants to share the survey link or poster with others. Qualtrics was utilised to create the survey, and IBM SPSS version 26 was used to analyse the data. The instruments include Socio-Demographic, College Student Stress Scale (CSSS), The 6-item De Jong Gierveld Loneliness Scale (6-Item (short) DJGLS), Inventory of Parent and Peer Attachment - Revised (IPPA-R) and The Smartphone Addiction Scale – Short Version (SAS-SV) were used. Compensatory Internet Use Theory was used to explain the prediction relationship of all variables towards smartphone addiction. Multiple linear regression analysis was used to test the predictors of smartphone addiction. The result showed that loneliness and peer attachment positively predict smartphone addiction, while stress was not significant in predicting smartphone addiction. The present study was expected to contribute to updating the psychology research database of stress, loneliness and peer attachment as predictors of smartphone addiction among university students in Malaysia.

Keywords: Smartphone addiction, stress, loneliness, peer attachment, university students

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List of Abbreviations

6-Item (short) DJGLS	6-item De Jong Gierveld Loneliness Scale
CSSS	College Student Stress Scale
DASS-21	Depression-Anxiety-Stress Scale
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
DV	Dependent Variable
ICD-10	International Classification of Disease, 10th Edition
IPPA-R	Inventory of Parent and Peer Attachment
IV	Independent Variables
MLR	Multiple Linear Regression
MPAI	Mobile Phone Addiction Index
PSS	Perceived Stress Scale
SA	Smartphone Addiction
SAS-SV	Smartphone Addiction Scale – Short Version
SERC	UTAR Scientific and Ethical Review Committee
UTAR	Universiti Tunku Abdul Rahman
VIF	Variance Inflation Factor

Chapter 1
Introduction

Background of Study

Technological advancements have permeated every facet of our lives in this contemporary digital age. Undoubtedly, there has been a significant uptick in technology adoption across diverse sectors such as business (Lee et al., 2019), healthcare (Qadri et al., 2020), and education (Clark-Wilson et al., 2020). These advancements have rendered digital devices indispensable, transforming them into an essential component of modern society. Among these devices, smartphones stand out as one of the most ubiquitous. In Malaysia, the proliferation of smartphones is striking. Between 2010 and 2020, smartphone users skyrocketed from 3.14 million to 28.36 million (*Malaysia: Smartphone Users | Statista*, 2022). The Department of Statistics Malaysia (2022) discovered that approximately 97.3% of Malaysians had access to smartphones. This high rate of users marks a significant advancement in digital connectivity and technology adoption within the country due to the integration of smartphones into daily life, such as communication, e-commerce, navigation, online transactions, entertainment, social connection, banking, and even health monitoring.

The function of a smartphone has broadened into various settings beyond its primary purpose of communication. Nowadays, smartphones are essential tools for scanning quick response codes (QR codes), a technology that has become pervasive daily. Whether it is ordering meals in a restaurant (Intal et al., 2020), verifying a patient's arrival in the hospital (Perdana et al., 2019), or making payments (Fong et al., 2019), smartphones are indispensable for these tasks. Moreover, smartphones offer emotional benefits to users. Research indicates that activities that relieve stress have a more significant impact when using smartphones than laptops (Melumad & Pham, 2020). Smartphone communication also influences social circles; Roos and Wrzus (2022) reported that individuals using smartphones for communication tend to have more close friends. As a result, students also find themselves

reliant on smartphones as indispensable tools, providing them with easy internet access for information retrieval and digital learning resources.

The increasing indispensability of smartphones in daily routines has led to the emergence of social and psychological concerns stemming from excessive usage (Sahimi et al., 2022). However, it is essential to emphasise a particularly concerning issue: the prevalence of smartphone addiction (SA). The adverse consequences of smartphone addiction are well-documented. Empirical studies have highlighted its significant associations with depression, anxiety, sleep disturbances, and even suicidal tendencies (Geng et al., 2021; Okasha et al., 2021; Ozcan & Acımış, 2020; Shinetsetseg et al., 2022). A systematic review by Ratan et al. (2021) underscored the consistent link between smartphone addiction and mental health issues. Notably, in a meta-analysis across 24 countries, Malaysia is one of the countries that had the highest smartphone addiction scores (Olson et al., 2022), especially among university students who are particularly susceptible to smartphone addiction (Alotaibi et al., 2022; Busch & McCarthy, 2021; Okasha et al., 2021).

Regarding smartphone addiction among university students, it's essential to recognize the array of factors influencing it, including social isolation, social support, stress, personal beliefs, hedonic use, and life satisfaction (Al-Kandari & Al-Sejari, 2020; Direktör & Nuri, 2019; Vujić & Szabó, 2022). While acknowledging this complexity, this study strategically narrows its focus to three pivotal predictors: stress, peer attachment, and loneliness. This strategic decision is grounded in the understanding that these specific factors are prevalent in the university context, as empirical studies have shown that university students are prone to stress (Asif et al., 2020; Wong et al., 2023). Furthermore, when university students experience a life transition when adapting to university life, especially those who relocate away from home for their further studies (Gan et al., 2019), they have a higher tendency for loneliness (Vasileiou et al., 2019) and peer attachment is crucial for them to have prosocial

behaviour (Schoeps et al., 2020). Thus, due to the interplay of stress, peer attachment and loneliness in university life, this study seeks to investigate the correlations between these factors and smartphone addiction among university students.

Problem Statement

Smartphone dependency presents substantial challenges for college students, affecting their overall well-being and academic achievements. A study conducted by Balan Rathakrishnan et al. (2021) unveiled a direct link between heightened smartphone addiction scores in university students and decreased academic performance. Moreover, heightened smartphone addiction scores were linked to escalated levels of depression, stress, suicidal tendencies, and anxiety, as emphasized by Wan Salwina Wan Ismail et al. (2020). The Malaysian context has seen a surge in studies examining smartphone addiction among university students, exploring not only its prevalence but also its related factors such as psychological distress, neuroticism, and overall psychological health (Azwanis Abdul Hadi et al., 2019; Lei et al., 2020; Wan Salwina Wan Ismail et al., 2020). These studies collectively underscore the critical need to delve into smartphone addiction issues within the university student population. Recognising the importance of addressing this concern, it becomes imperative to further investigate the predictors of smartphone addiction.

Furthermore, due to the prevalence of stress, the relationship between stress and smartphone have been studied extensively in Malaysia among university students (Chua et al., 2022; Ismail et al., 2020; Tan & Arshat, 2019). All of it have proven stress as a common predictors of smartphone addiction. Several studies published in 2023 also focused on stress-related aspects among Malaysian university students (Dasor et al., 2023; Isha et al., 2023; Lee et al., 2023; Wong et al., 2023). However, among these latest studies, stress did not investigate together with smartphone addiction. Thus, this study aims to contribute to the current body of research by exploring the contemporary correlation between stress levels and

smartphone addiction among Malaysian university students, reaffirming stress as a significant predictor in this context.

Furthermore, multiple studies have studied the connection between loneliness and smartphone addiction in an international context (Aslan, 2022; Cheng et al., 2021; Kao, 2023; Malaeb et al., 2022; Taghizadeh et al., 2019). Aslan (2022), Cheng et al. (2021), and Taghizadeh et al. (2019) targeted high school students instead of university students in their studies. While for Taghizadeh et al. (2019), they targeted Lebanese citizens aged 18 to 29 years instead of university students specifically. Kao (2023) is the only one that targeted undergraduate students. Even in international contexts, not much research specifically investigates loneliness as a predictor of smartphone addiction among university students. This gap in understanding becomes even more pronounced in the Malaysian context, where research regarding loneliness as a predictor of smartphone addiction is scarce. Since 2019, only Zamri et al. (2023) explored smartphone addiction and loneliness among 308 undergraduate students in Malaysia. More Malaysian research regarding loneliness as a predictor of smartphone addiction among university students is needed. Therefore, this study aims to bridge this gap in understanding.

Among the predictors studied in this research, peer attachment is the one that has the most limited studies. Most studies use peer relationships to examine smartphone addiction instead of peer attachment (Gao et al., 2022; Lim, 2023). Research shows that there is a negative relationship between peer attachment and smartphone addiction (Um et al., 2019). However, limited studies view peer attachment as a direct predictor of smartphone addiction; often, it is used as a mediator in empirical studies (Lian et al., 2023; Zhang et al., 2023). Thus, this research includes peer attachment as one of the predictors to address this research gap.

In short, the combination of stress, loneliness, and peer attachment as predictors aims to provide a comprehensive understanding of the factors contributing to smartphone addiction among university students, fostering targeted interventions for this vulnerable demographic.

Research Objectives

1) To investigate whether stress positively predicts smartphone addiction among university students in Malaysia.
2) To study whether loneliness positively predicts smartphone addiction among university students in Malaysia.
3) To examine whether peer attachment negatively predicts smartphone addiction among university students in Malaysia.

Research Questions

1) Does stress positively predict smartphone addiction among university students in Malaysia?
2) Does loneliness positively predict smartphone addiction among university students in Malaysia?
3) Does peer attachment negatively predict smartphone addiction among university students in Malaysia?

Research Hypotheses

H_1: Stress positively predicts smartphone addiction among university students in Malaysia.

H_2: Loneliness positively predicts smartphone addiction among university students in Malaysia.

H_3: Peer attachment negatively predicts smartphone addiction among university students in Malaysia.

Significance of Study

By investigating stress, loneliness and peer attachment, researchers can investigate whether these predictors contribute to smartphone addiction. This exploration not only provides a clearer understanding of the root cause of smartphone addiction but also encourages more in-depth studies in this area. In addition, this research can also raise

awareness among students about the potential negative consequences of excessive use of smartphones such as students' excessive use of smartphone use can negatively impact their academic performance and lead to social isolation as they are spending more time on their devices than studying or engaging with their peers. In a reality where people have grown numb to dedicating significant time to their smartphones, which have seamlessly become integral to their lives, acknowledging, and addressing these consequences is imperative. Additionally, the research offers valuable insights into smartphone addiction for future researchers. The continually evolving nature of technology and the diverse ways people use smartphones cause difficulties in establishing standardized criteria for identifying smartphone addiction. The findings of this research may, therefore, contribute real-time data and insightful perspectives on smartphone addiction, particularly within educational settings.

Furthermore, it is crucial to focus on the significance of stress management, the promotion of healthy peer attachments, and the alleviation of loneliness as essential measures to diminish the risk of smartphone addiction. While some students can smoothly navigate the challenges of academic life with minimal effort, others may face numerous difficulties and may even question their ability to persist. The toll of facing such challenges can be exhausting, manifesting in heightened stress levels, changes in mood, and disruptions to interpersonal relationships. This emotional strain significantly influences not only their mental health but also their educational journey and personal and social life, as noted by Pascoe et al. (2019). In line with this, Hatunolgu (2020) emphasized that the manifestation of stress observable in oneself is equally evident in others, underscoring the need to identify and effectively manage stressors in our environment.

Further investigations into these predictors can help mental health professionals provide better assistance to individuals especially students who are struggling with smartphone addiction. Creating and tailoring treatment plans to not only address the

underlying addiction itself but also its root causes, such as stress or social isolation, can yield more comprehensive and lasting results. These findings will also play a role in informing authorities, decision-makers, and agents of change to create educational programs and initiatives that promote well-being and equip them with skills to navigate the digital world more responsibly. This intervention may also promote responsible and mindful smartphone use among university students. Although these reformations can target children, adolescents, and young adults due to their vulnerability towards smartphone addiction, parents and adults should actively involve themselves, considering the benefits. This collaborative effort is vital for fostering a healthier relationship with technology across various age groups.

Conceptual Definition

Stress

Stress is how an individual deals with the surroundings' expectations and pressure that can perceived as threatening or overwhelming to them (Lazarus & Folkman, 1986). In the educational context, Lee (2018) mentioned that students face stress from various sources, such as financial difficulties, academic challenges, familial concerns, feelings of loneliness, transitions, and the turbulence associated with life changes.

Loneliness

Loneliness, as a social health measure, encompasses both the absence of close relationships, known as emotional loneliness and the longing for a broader social network, termed social loneliness (De Jong Gierveld & Van Tilburg, 2006). It can be understood that this emotional and social void is rooted in a lack of social support, leading to a subjective sense of isolation and disconnection for the individual. As articulated by Gramer and Barry (1999), as cited in Shi et al. (2023), also stated that loneliness is defined as an unpleasant emotional state where an individual feels estranged from others, experiencing a lack of security and closeness in their social relationships.

Peer Attachment

Gullose and Robinson (2005) defined peer attachment as an individual's perceptions of both the positive and negative affective or cognitive dimensions within their relationships with peers or friends and how well these individuals function as sources of psychological security. Essentially, it is how a person views their relationship with friends and peers in both positive and negative aspects and how well these friends serve as an emotional security.

Smartphone Addiction

Smartphone addiction, as outlined by Elsayed Mohammed Abu Hashem Hassan et al. (2021), involves extended periods of smartphone use, often to the detriment of various essential activities. This preoccupation with the device can lead to neglecting significant life responsibilities such as social relationships, work, and studies.

University Students

University students, as defined by Ursu et al. (2021), are people who receive courses at a university or higher education. Basically, a student who enrolls and studies in a college or university, typically aged between 18 to 25.

Operational Definition

Stress

Stress will be measured using the 11-item College Student Stress Scale (CSSS) by Feldt (2005). Each item is rated on a 5-point Likert scale from 1 (*Never*) to 5 (*Very Often*) on how frequently they are distressed or anxious or question their ability. The scores ranged from 11 to 55, with higher scores indicating a greater experience of stress.

Loneliness

Loneliness will be assessed using the 6-item De Jong Gierveld Loneliness Scale by De Jong Gierveld and Van Tilburg (2006). Participants will rate each item as either “Yes”, “More or Less” or “No,” depending on their response. Certain questions may have the reverse

rating scale. The score ranged from 0 to 6. A higher total score indicates a greater degree of loneliness experienced by the individual.

Peer Attachment

Peer attachment will be assessed using the revised Inventory of Parent and Peer Attachment (IPPA-R) developed by Gullose and Robison (2005). Participants will provide ratings for each item on a 3-point Likert scale, ranging from 3 (*always true*) to 1 (*never true*). The score ranged from 25 to 75. A higher score indicates healthier, more secure, and supportive relationships with peers and friends for the individual.

Smartphone Addiction

Smartphone addiction will be measured using The Smartphone Addiction Scale – Short Version (SAS-SV) created by Kwon et al. (2013). Each item is rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The range scored from 10 to 60. A higher overall score indicates the degree of smartphone addiction.

University Students

University students will be required to provide their age and specify the university in which they are currently enrolled. This information will be collected as part of the demographic questions when participants are asked to fill the questionnaire. The criterion for targeted participants is aged 18 to 25 years old whose is currently studying in private or public universities in Malaysia.

Chapter 2
Literature Review

Stress

Cohen et al. (1983) observed that stress arises when individuals lack resources to navigate demanding or threatening situations. Building on this, He et al. (2022) elucidated that college students grappling with challenges in adaptation, academic completion, interpersonal communication, and career planning may face substantial pressure in effectively managing these aspects. This pressure, as emphasised by W. Lee and Shin (2016), often leads students to resort to unhealthy lifestyle practices such as smartphone addiction.

Loneliness

As described by Hidayati (2019, cited in Hidayati 2015), loneliness is the sensation of being unwanted, experiencing emptiness, and feeling isolated even when surrounded by others. Yılmaz et al. (2022) highlighted that students require social behaviours like communication, cooperation, and interaction, and a lack of these elements can lead to the experience of loneliness. Zwilling (2022) discovered that individuals experiencing loneliness are more prone to excessive smartphone use for social purposes.

Peer Attachment

Peer attachment is a close relationship between peers that can act as social support for each other (Li et al., 2022). Schoeps et al. (2020) found that peer attachment that includes trust, communication and alienation impacts prosocial behaviour positively and reduces conduct problems. The findings revealed that those with high levels of trust and communication and low levels of alienation would have high levels of social behaviour. With the three aspects of peer attachment, one can tackle bad habits like academic procrastination (Jin et al., 2019).

Smartphone Addiction

Zhou et al. (2021) acknowledged that one with smartphone addiction will have addiction symptoms like subjective loss of control and withdrawal. Kwon et al. (2013) also mentioned that smartphone addiction can cause disturbance in daily life. Although the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) or International Classification of Diseases, 10th edition (ICD-10) did not classify those who use smartphone excessively as having a formal clinical disorder, those who use smartphone excessively have various behaviour that is similar to those who have behavioural addiction ("Adolescent Addiction," 2020, pp. 216). Typically, those who are addicted to smartphones have addiction symptoms like subjective loss of control and withdrawal (Zhou et al., 2021; Volungis et al., 2019). There is no consensus on the term defining those addicted to smartphone use, leading to varied terminologies such as "problematic smartphone use" (Pivetta et al., 2019), "smartphone addiction" (Gong et al., 2022; Tan & Arshat, 2019), "smartphone dependence" (Nunes et al., 2021; Um et al., 2019), and "smartphone overuse" (Zou et al., 2019). Despite the various terms, the term "smartphone addiction" will be utilised for this study, encompassing all these related terminologies.

Stress and Smartphone Addiction

Numerous empirical studies have consistently established a positive and significant correlation between smartphone addiction and stress. Using smartphone can be a way of dealing with stress and provide effective immediate relief although it is a maladaptive coping mechanism (Kuss et al., 2018). Research conducted by Choksi (2021), Eisanazar et al. (2021), Kim et al. (2022), Tan and Arshat (2019), and Qiu et al. (2023) all concluded that there exists a robust link between smartphone addiction and increased stress levels. Additionally, the findings of the study by Gökçearslan et al. (2018) also highlighted that

stress positively predicts smartphone addiction significantly. Further supporting these findings, Vujić and Szabó (2022) and Zhang et al. (2022) have substantiated that stress is pivotal in elevating the risk of smartphone addiction.

Following extensive investigations into the correlation between stress and smartphone addiction, certain studies have begun to delve into their mutual predictive dynamics. Vujić and Szabó (2022) utilised stress as a predictor for smartphone addiction, while Akinci (2021) examined smartphone addiction as a predictor of stress. Both studies found a significant and positive predictive relationship, highlighting how both stress and smartphone addiction can predict each other. It implied that stress can be the factor leading to smartphone addiction, and smartphone addiction can be the factor leading to stress.

Beyond the commonly highlighted direct association observed in many studies linking smartphone addiction to stress, an alternative viewpoint proposes an indirect influence. Ju et al. (2019) suggested that stress affects smartphone addiction through the lens of self-control. In their model, stress acts as a mediator in the relationship between smartphone addiction and self-control, indicating that individuals with low self-control experience heightened stress, subsequently leading to an increase in their smartphone addiction scores. However, contrasting outcomes surfaced in the investigation conducted by Zhang et al. (2022), indicating that while self-control may serve as a mediator between stress and smartphone addiction, stress still exerts a direct impact on smartphone addiction.

Loneliness and Smartphone Addiction

Numerous researchers have extensively studied the connection between smartphone addiction and feelings of loneliness in their empirical investigations. Noteworthy studies by Aslan (2022), Cheng et al. (2021), Kao (2023), Malaeb et al. (2022), and Taghizadeh et al. (2019) consistently demonstrated a significant and positive link between smartphone addiction and loneliness. In meta-analyses conducted by Ge et al. (2023) and Zhang et al.

(2020), while they identified a positive correlation between loneliness and smartphone addiction, their findings revealed moderate correlations rather than significant ones. Whether these correlations are moderate or significant, researchers have consistently established that heightened levels of loneliness are associated with an increased tendency toward smartphone addiction.

Furthermore, some studies investigate the causation between loneliness and smartphone addiction. Longitudinal research by Hu and Xiang (2022) yielded insightful findings. Their study revealed that while loneliness positively predicted smartphone addiction over time. They have proven a one-way relationship where loneliness contributes to increased tendencies toward smartphone addiction among university students. However, some studies reveal that loneliness has an indirect effect on smartphone addiction. Sun et al. (2023) uncovered that loneliness plays a crucial mediating role in the connection between psychological needs satisfaction and smartphone addiction. According to their findings, a decrease in psychological needs satisfaction leads to an increase in loneliness, subsequently heightening the likelihood of smartphone addiction.

Peer attachment and Smartphone Addiction

Peer attachment emerges as a noteworthy factor in the domain of smartphone addiction among university students, as indicated by several studies. Um et al. (2019) revealed a noteworthy negative correlation between peer attachment and smartphone addiction, underscoring the influence of strong peer attachment in alleviating smartphone addiction. Kim et al. (2020) and Jo and Bang (2022) also mentioned in their study that when one has a better relationship with their peers, they will have lower dependency on their smartphone to find a positive experiences.

Aside from direct effect of peer attachment on smartphone addiction, there is also research that studies the indirect effect of peer attachment on smartphone addiction. Lian et

al. (2023) discovered that peer attachment indirectly strengthens the link between family cohesion and adaptability with smartphone addiction. This indirect influence underscores the interconnectedness of various social dynamics and their collective impact on smartphone addiction. Likewise, Zhang et al. (2023) investigated peer attachment as a partial mediator in the connection between childhood neglect and smartphone addiction. Their findings hint at the potential for strengthening peer attachments to mitigate the risk of smartphone addiction, offering a proactive approach to counter past adverse experiences.

Theoretical Framework

Stress and smartphone addiction

Various stressors faced by students, including academic pressures, personal control, financial concerns, personal relationship dynamics, and life adjustments (Feldt, 2008). Thus, the Compensatory Internet Use Theory explains that stressful students experience a need of coping mechanisms to relieve the negative emotions and stress (Stanković et al., 2021). In response to these stressors, smartphones have unmistakably emerged as indispensable tools which provide a seamless and diverse range of entertainment options to assist students in destressing themselves in the virtual world (Yang et al., 2020). As Yang et al. (2020) highlighted, smartphones offer features like internet browsing, games, e-books, social media, movies, music, and videos, enabling students to alleviate stress and relax in their preferred manner. In addition, people may use smartphones for entertainment or specifically for escapism purposes to cope with stress and to receive immediate gratification (Wang et al., 2015). Using smartphone is a regulation strategy for reducing negative emotions and dysphoric mood (Elhai et al., 2019). however, problematic addictive behaviour has surfaced, considering the potential consequences of excessive smartphone use (Alan & Guzel, 2020). If smartphones become the primary source of stress relievers, there is a notable risk, as

highlighted by Yang et al. (2023): students may come to perceive that engaging with their smartphones is a reliable strategy for stress alleviation and continue to use them in future stressful situations. This in turn, heightens the likelihood of students developing a severe addiction to their mobile devices (Zwilling, 2022).

Loneliness and smartphone addiction

Loneliness, particularly in students lacking peer relationships (Erdem & Efe, 2022), contributes to excessive smartphone use. The Compensatory Internet Use Theory by Kardefelt-Winther (2014) hints that smartphones fulfil psychological needs that are unmet in reality by connecting individuals to the online world. As a result, students who are discontent with their present real-life circumstances are more likely to engage in excessive smartphone usage, as interactions online through smartphones serve as a means of compensating for their dissatisfaction (Liu et al., 2020). Liu et al. (2016) further corroborate this concept, observing that individuals, upon acknowledging the internet's benefits in fulfilling their needs, tend to pursue satisfaction virtually instead of in the physical world. Zhao and Jin (2023) additionally highlighted that the Internet serves as a platform that amplifies social connectedness, imparts a feeling of belonging, and regulates negative moods linked to loneliness. Zwilling (2022) also mentioned that lonely students are more likely to engage in addictive smartphone behaviours, using social media platforms as a substitute for face-to-face interactions. The avoidance of real-life loneliness is achieved through forming virtual bonds via social media platforms using smartphones, allowing students to find comfort in virtual interactions, which strengthens smartphone use, potentially leading to addiction (Liu et al., 2020).

Peer attachment and smartphone addiction

According to the Compensatory Internet Use Theory proposed by Kardefelt-Winther (2014), individuals often resort to smartphone use to fulfil their needs that may be unmet in the real world. For instance, students experiencing a sense of isolation from peer attachments

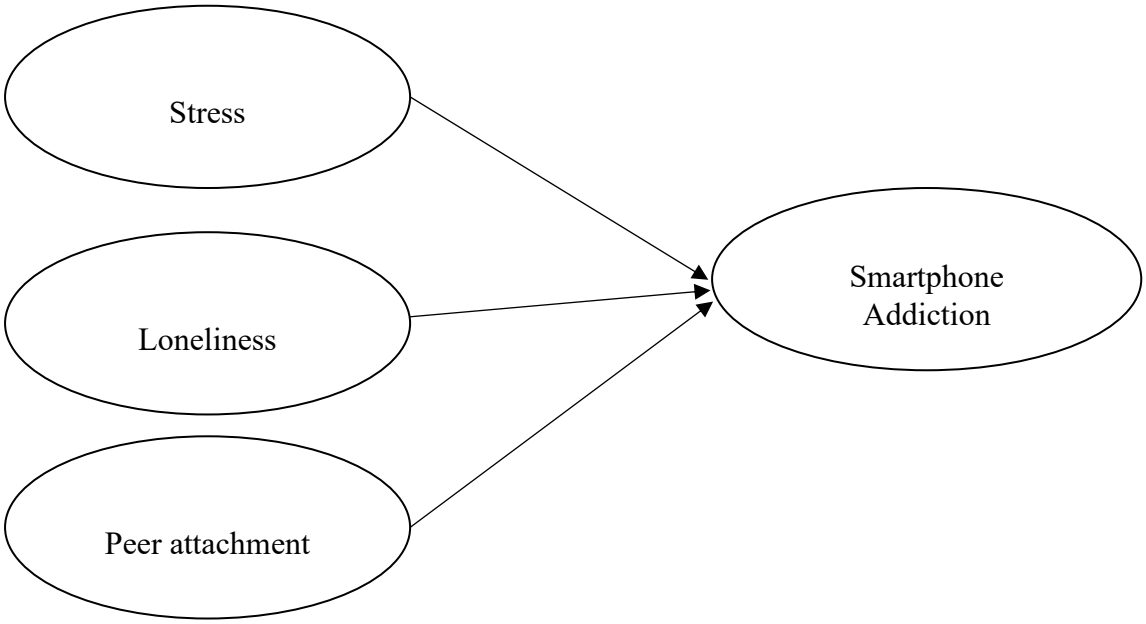
may find seek virtual connections, as highlighted by Kim et al. (2018) and Shen and Wang (2019). Furthermore, seeking support or engaging with like-minded individuals online becomes a coping mechanism for those grappling with social disconnection, as noted by Chu et al. (2020). Additionally, Stanković et al. (2021) highlighted that a lack of real-life social connections may drive individuals toward virtual social spaces, potentially resulting in adverse consequences solely attributed to prolonged engagement in virtual social communication. It is conceivable that these factors could result in frequent social interactions in cyberspace, consequently reinforcing adolescents' interpersonal relationships within the virtual realm, ultimately leading to a dependence on fulfilling their social needs virtually (Carvalho et al., 2023).

However, taking a contrasting perspective, Kim and Kim (2015) argued that smartphone use may be driven by a genuine desire to sustain social connections and foster a sense of belonging. Chu et al. (2020) further emphasise that smartphones are indispensable links to maintaining social relationships within peer groups, contributing to dependency on these devices. Additionally, the abundance of virtual interactions can inadvertently lead individuals to become overly engrossed in mobile socialising, ultimately paving the way for the development of addiction, as highlighted by Tu et al. (2023).

Conceptual Framework

Figure 2.1

Conceptual Framework of Stress, Loneliness, Peer Attachment as the predictors of Smartphone Addiction.



In this technologically advanced era, the smartphone has become a necessity to survive. It has led to a surge in smartphone usage, especially among students which raises concerns about the rise of smartphone addiction. This prompts the crucial need to understand the underlying factors contributing to its development. As there are a lot of factors contributing to smartphones, this study aims to focus on stress, loneliness, and peer attachment as predictors of smartphone addiction among university students utilizing Compensatory Internet Use Theory as a navigator in this study.

The independent variables are stress, loneliness, and peer attachment while smartphone addiction is the dependent variable. Stress is the overwhelming expectations and pressure that students face in their daily lives. The stressors can be from academic concerns, the ability to achieve goals and maintain control, relationship concerns, family, financial, and even life adjustments. Loneliness refers to the personal perception of being isolated and experiencing emptiness because of insufficient social support within the student's

environment. Peer attachment can be defined as the perception of how a student views his relationship with his friends and peers and how well they serve as an emotional security. Smartphone addiction is the preoccupation with smartphones that leads to the neglection of life responsibilities.

The study's predictive model illustrates correlations between stress, loneliness, peer attachment, and smartphone addiction. It suggests a direct link between stress and smartphone addiction, a positive correlation with loneliness, and an inverse correlation with peer attachment. However, these relationships are contingent upon the assumption that students resort to smartphones as coping mechanisms. Should students possess healthy coping mechanisms, it could significantly influence the connections between stress and smartphone addiction (Alan & Guzel, 2020).

Chapter 3
Methodology

Research Design

This research was conducted using a quantitative approach through a cross-sectional study design. Wang and Cheng (2020) mentioned that data for a cross-sectional study is gathered at a specific moment in time. This study design was selected for its ability to avoid the need for participant follow-ups while also enabling the estimation of prevalence in the representative sample being studied (Kesmodel, 2018).

At the same time, quantitative analysis, an approach that employed mathematical, computational, and statistical techniques that could establish a correlation relationship between two variables (Ahmad et al., 2019), was used in this study since it aligned with the primary objective of this study to uncover some insights into the relationship between stress, loneliness, peer attachment, and smartphone addiction among university students in Malaysia.

To gather relevant data, online survey questionnaires were compiled and disseminated using the Qualtrics platform. Burruss and Johnson (2021) emphasised that online surveys effectively gathered information from participants, transcending geographical barriers and reducing expenses. Lastly, Statistical Package for Social Science (SPSS) version 26 was utilised to analyse the collected data.

Sampling Procedures

Sampling Method

A non-probability method which was purposive sampling was employed to select participants since the targeted participants were university students in Malaysia. As mentioned by Andrade (2020), purposive sampling, where participants were selected based on their defined characteristics for the study's purpose and this study was selectively

recruited participants, focusing on university students in Malaysia as the targeted demographic. Hence, purposive sampling was a suitable method to gather participants for this study. The criteria were students aged between 18-25 years old, enrolled in a public or private university, and currently pursuing a course. Participants who met these criteria were subsequently selected for inclusion in the study. With purposive sampling, the target participants could be positioned better in relation to the topic and made the collected data richer (Mweshi & Sakyi, 2020).

Meanwhile, snowball sampling, classified under purposive sampling methods, was also utilised (Denieffe, 2020). It enhanced the reachability of online questionnaires, especially among populations challenging to access through traditional means, such as minorities (Berndt, 2020). Participants were requested to share the online questionnaire link within their social circles, creating a chain-like expansion of the sample.

Location of Study

The study was carried out across multiple private and public universities in Malaysia using online platforms. The Qualtrics platform was employed to distribute online survey questionnaires. Eligible participants included university students enrolled in Malaysian private universities across various states. Furthermore, physical recruitment efforts were undertaken at Universiti Tunku Abdul Rahman (UTAR). Notably, although participants were recruited at UTAR, they were encouraged to share the survey link or survey poster (Refer to Appendix F) with friends from other universities, broadening participants base beyond UTAR.

Ethical Clearance Approval

Prior to initiating data collection, the researchers had sought ethical clearance approval from the UTAR Scientific and Ethical Review Committee (SERC) and the ethical code received was referred as Re: U/SERC/78-205/2024 (Refer to Appendix I). This crucial

step ensured that the research aligns with ethical standards, prioritised participant welfare, and upheld the principles of responsible research conduct. The ethical clearance process involved a thorough review of the research design, methodologies, and protocols, guaranteeing compliance with ethical guidelines to protect the rights and well-being of all participants involved.

Sample Size, Power, and Precision

In this study, G*Power 3.1 software was used to calculate the sample size. First, the effect size of the three predictors and smartphone addiction were calculated using the formula $f^2 = \frac{r}{1-(r)^2}$ and the average effect size was 0.15. Then, the effect size was imputed in G*Power 3.1 software to calculate the necessary sample size, with the statistical power set at 0.95. The results from G*Power 3.1 software suggested a minimum sample size of 119; however, acknowledging the potential for missing data, we aimed to collect 150 responses from participants to ensure robustness in this analysis. The detailed procedure for sample size calculation can be referred to Appendix A.

Data Collection Procedures

First, a Qualtrics survey containing a set of questions derived from the chosen scale was developed. The initial page of the survey explicitly sought participants' consent. Following ethical approval from relevant authorities, it was disseminated through various social media applications like WhatsApp, Instagram, and Microsoft Team. Aside from online recruitment for participants, physical recruitment was also conducted. Written invitations and poster were prepared and presented for the online survey consisting of information regarding the study. As for physical recruitment, researchers were lingering around the participants to help them solve their doubts or questions regarding the content of the questionnaire. Students on campus were also encouraged to complete the survey and share it within their social

circles if they were willing, employing the snowball method. The data collection period was held from 4 February 2024 to 10 March 2024 including the data collected for pilot study.

Inclusion and Exclusion Criteria

This study focused on public and private university students aged 18 to 25 years old as the target participants. Only Malaysian students who were studying at any university in Malaysia were included; international students were excluded. Individuals who did not meet the criteria of being a university student or fell outside the specified age range were also excluded from the data analysis. Additionally, data from participants did not provided consent for processing their information were omitted from the study's dataset.

Procedures of Obtaining Consent

Informed consent was listed at the beginning of the online survey (Refer to Appendix H). Participants were first be introduced to the study's purpose and informed regarding the online survey procedures and their confidentiality. All information collected from the participants remained anonymous and confidential in accordance with the Personal Data Protection Act 2010. The participation of the participants in the online survey was solely based on their volunteer work. Participants had the liberty to withdraw from the study at any point without providing a specific reason. Only the data of participants who chose the statement they claimed they had been notified by us and hereby understood, consented to, and agreed to all the information listed in the informed consent was used for the study. All collected data was solely used for academic purposes, and promptly deleted upon completion of the study.

Instruments

Socio-Demographic

Five questions were administered, requesting personal details such as their age, gender, ethnicity, name of the university that currently attending and programme of study.

These questions were crucial to determine the eligibility of the participants for the online survey. Two additional inquiries were regarding participants' smartphone usage habits which were the average daily duration of smartphone usage in hours and the purpose of using smartphone most of the time.

College Student Stress Scale (CSSS)

The 11-item College Student Stress Scale (CSSS) was developed by Feldt (2008) and was specifically designed to assess stress levels for college students. The scale employed Likert's five-point rating system, ranging from "*1 = Never*" to "*5 = Very Often*," with no reverse-scoring items. Sample items included "felt anxious or distressed about financial matters" and "felt overwhelmed by difficulties in life". Scores range from 11 to 55, with higher scores indicating higher stress levels. The CSSS comprised two factors: the first factor focused on academic concerns, goal attainment, and maintaining control, while the second factor encompassed concerns related to relationships, family, finances, and living away from home. Feldt and Koch (2008) reported strong evidence of reliability and validity for the CSSS, with internal consistency values of .87, .73, and .92, respectively.

The 6-item De Jong Gierveld Loneliness Scale (6-Item (short) DJGLS)

The 6-item De Jong Gierveld Loneliness scale developed by De Jong Gierveld and Van Tilburg (2006) measures loneliness. The scale applied to adults aged 18 to 99 and comprised by six items. It gauged two factors: emotional loneliness and social loneliness. For questions one to three, the scoring of the Likert scale was "*1=Yes" to* "*0 = No*", while for questions four to six, it was "*0 = Yes to* and "*1 = No*". The option "More or Less" for questions one to six is equivalently assigned a score of 1. A higher total score indicated a greater level of loneliness. Sample items included "*I miss having people around*" and "*I often feel rejected*". De Jong Gierveld and Van Tilburg (2006) reported that the alpha coefficients

for the 6-item loneliness scale ranged from .70 to .76, suggesting a high level of reliability for the scale.

Inventory of Parent and Peer Attachment - Revised (IPPA-R)

The revised inventory of Parental and Peer Attachment (IPPA-R) developed by Gullose and Robinson (2005) was used to evaluate peer attachment in this study. The assessment utilized 25 items explicitly focused on peer attachments, suitable for older adolescents and young adults. The three factors assessed by this scale include the degree of mutual trust, quality of communication, and the extent of anger and alienation within peer connections. The items in this scale were self-reported on a 3-point Likert scale, ranging from "*3 = Always True*" to "*1 = Never True*" with the inclusion of reverse-scored questions. A higher total score on the peer attachment scale signified a stronger and more positive connection to peers. Example items included "*My friends understand me*" and "*My friends accept me as I am"*. Notably, negatively worded items function as reverse indicators. Higher scores indicated healthier, more secure, and supportive peer relationships. Gullone and Robinson (2005) substantiated that the coefficient, precisely 0.88 in the context of Peer Trust for females, signified sufficient to good internal consistency for all the investigated sub-samples within the IPPA-R subscales.

The Smartphone Addiction Scale – Short Version (SAS-SV)

The Smartphone Addiction Scale – Short Version (SAS-SV) was developed by Kwon et al. (2013) and was used in this study to assess smartphone addiction. The scale was designed for adolescents and adults and comprised ten items measuring aspects of daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationships, overuse, and tolerance. There is a total of 10 items and each item was scored on a Likert scale ranging from "*1 = Strongly Disagree*" to "*6 = Strongly Agree*". The total SAS-SV score, obtained by summing the scores of the ten items, ranges from 10 to 60, with a higher score indicating

problematic smartphone usage. Sample items included "*Missing planned work due to smartphone use*" and "*Using smartphone longer than I had intended*". The reliability of the scale was evidenced by a Cronbach's alpha correlation coefficient of 0.91 for the SAS-SV, signifying strong internal consistency. Andrade et al. (2020) reported that the SAS-SV exhibited good reliability in assessing smartphone addiction ($\alpha = 0.81$; $\omega = 0.78$).

Pilot Test

A pilot test was conducted among students of Universiti Tunku Abdul Rahman in Malaysia, where participants were recruited physically and online through social media platforms such as WhatsApp, Instagram, and Microsoft Team. The responses were collected between 17th February 2024 and 29th February 2024. After screening for incomplete data, 63 datasets were deemed usable to test the internal consistency reliability of CSSS, 6-Item (short) DJGLS, IPPA-R, and SAS-SV. The decision to use 63 datasets instead of the commonly utilized 30 datasets for a pilot study was made to ensure a more representative sample of the target population. This larger sample size also helped assess the feasibility of recruitment strategies, data collection methods, and other operational aspects of the study. Moreover, a larger pilot study enhances the generalizability and supports the validity of the study design while providing a more robust test of the study procedures (Lewis et al., 2021).

The Cronbach's alpha values of CSSS, IPPA-R, and SAS-SV ranged from .8 to .9, indicating that these scales were a reliable measure for their respective variables, namely stress, peer attachment, and smartphone addiction. However, the Cronbach's alpha for the 6-Item (short) DJGLS, its Cronbach's alpha is .625. Upon examination of item-total statistics, it was found that deleting item 2 would increase the Cronbach's alpha to .707. Koğar and Koğar (2023) emphasized that item 2 is written in a way that might measure how satisfied someone feels about the number of relationships they have, rather than the quality of those relationships, potentially affecting the scale's reliability. Hence, for the actual study, item 2 of

-Item (short) DJGLS will be deleted. For detailed reliability results for each scale, please refer to Appendix C1 to Appendix C4.

Data Analysis

After collecting the data, SPSS version 26 software was used to clean the data. There were 126 responses after cleaning the data because 50 responses had been removed as there are 43 incomplete responses, four disagree to process their data and three non-Malaysian. Then, SPSS version 26 software was used for data analysis. All statistical calculations were calculated at the 0.05 level of significance. Each variable's normality was assessed using histogram, P-P plot, skewness, and Kurtosis, with the results calculated using the Kolmogorov-Smirnov test. In this research, assumptions checking for regression were also made using Durbin-Watson to test for independence of errors as well as tolerance and variance inflation factor (VIF) to check for multicollinearity. A scatterplot was created to test the normality of residual, linearity, and homoscedasticity. Outliers were checked, and Casewise Diagnostic was utilised to identify the cases. Then, to evaluate whether an outlier is influential, it would be exposed to Cook's distance, leverage, and Mahalanobis distance. The prediction of three independent variables (IV) and one dependent variable (DV) was modelled using multiple linear regression (MLR).

Multiple Linear Regression (MLR) was used to investigate the relationship between stress, loneliness and peer attachment to test the hypothesis (H_1, H_2, H_3) in this study after the completion of data collection. Etemadi and Khashei (2021) declared that MLR stands as one of the most utilised statistical methods for gauging the connections between dependent and independent variables. Its successful application spans various fields and contexts, making it a widely favoured analytical tool.

Reliability

Table 3.1 presents the Cronbach's alpha coefficient for both pilot (n = 63) and actual (n = 126) test. The reliability result for the actual test revealed stress (α = .859), peer attachment (α = .779), and smartphone addiction (α = .834). While the reliability for loneliness after delete item 2 is, α = .704. Lance et al. (2006) accentuated that the reliability of .70 or higher is considered acceptable,

Table 3.1

Cronbach's Alpha Coefficient, α of Stress, Loneliness, Peer Attachment, and Smartphone Addiction in Both Pilot (n=63) and Actual Test (n=126)

Variables (51-items)	Cronbach's Alpha, α	
	Pilot Test	Actual Test
Stress (11-items)	.906	.859
Loneliness (5-items) *	.707	.704
Peer Attachment (25-items)	.871	.779
Smartphone Addiction (10-items)	.878	.834

Note. * The reliability for loneliness listed in above table is after deleted item 2 from the original scale.

Chapter 4
Result

Descriptive Statistics

Demographics

Table 4.1 shows the sociodemographic characteristics of the final respondents (N = 126). The result revealed that 38.1% of the respondents were male (n = 48) and 61.9% female (n = 78). The ethnicity was presented, with 92.9% Chinese (n = 117), 6.3% Indian (n = 8), and 0.8% Others (n = 1) that included Siamese. Among the respondents, 76.2% (n= 96) were from Universiti Tunku Abdul Rahman, and 23.8% (n= 30) of them were from different universities. Those participants were from UNITAR International University, Asia Pacific University, IMU University, Open University Malaysia, and others.

Moreover, the average hours participants spend on smartphones per day ranged from 1 hour to 18 hours. The data reveals that the largest segment of participants, 23 individuals or 18.30%, typically use their smartphones for 6 hours daily. The 16 participants, making up 12.7%, average 8 hours of smartphone usage daily. The next significant group comprised 15 participants, accounting for 11.9%, with their average daily usage of 4 and 10 hours.

Furthermore, the result indicated that smartphones serve various purposes for participants. Social connection is the most significant use, with 69 participants (54.80%) engaging on platforms like TikTok, Instagram, and Facebook to stay connected. Entertainment stands out as the second most used, with 54 participants (42.8%) using smartphones for activities such as watching YouTube videos, playing games, and streaming movies. Lastly, a smaller segment of the participants uses their smartphones for academic purposes, such as completing assignments and conducting research, comprising 3 participants (2.4%).

Table 4.1

Sociodemographic Characteristics of Participants (n = 126)

	n	Percentage (%)	M	SD
Age	126	100	21.13	1.50
Gender				
Male	48	38.10		
Female	78	61.90		
Ethnicity				
Malay	0	0.00		
Chinese	117	92.90		
Indian	8	6.30		
Others				
Siamese	1	0.80		
Average hours spend on smartphone per day				
1	3	2.40		
3	4	3.20		
4	15	11.90		
5	14	11.10		
5.5	1	0.80		
6	23	18.30		
7	12	9.50		
8	16	12.70		
9	2	1.60		
10	15	11.90		
11	1	0.80		
12	10	7.90		
14	1	0.80		
15	4	3.20		
16	2	1.50		
18	3	2.40		
Main Purpose of Smartphone				
Entertainment	54	42.80		
Social Connection	69	54.80		
Academic Purpose	3	2.40		

Note. n = Frequency; M = Mean; SD = Standard Deviation.

Descriptive Statistics on Study Variables

The descriptive statistics in Appendix E10 show all variables' mean and standard deviation. Stress (M = 31.35, SD = 6.533), loneliness (M = 3.83, SD = 1.667), peer attachment (M = 55.19, SD = 5.997) and smartphone addiction (M = 37.31, SD = 8.544).

Data Cleaning

A total of 176 responses were collected initially. However, 36 participants stopped filling the survey after giving their demographic information. After the demographics

question, there are four scales: College Student Stress Scale (CSSS), The 6-item De Jong Gierveld Loneliness Scale (6-Item (short) DJGLS), Inventory of Parent and Peer Attachment - Revised (IPPA-R) and the Smartphone Addiction Scale – Short Version (SAS-SV). Two participants only completed until 6-Item (short) DJGLS, and five participants only completed until IPPA-R. Moreover, four participants disagree to process their data. Furthermore, three participants did not meet the criteria as they are non-Malaysian. Thus, a total of 50 responses were removed, and 126 responses were finalized.

Data Diagnostic

Normality

Five indicators which are histogram, Q-Q plots, skewness, kurtosis, and Kolmogorov-Smirnov Test, are used to check the assumption for normality.

Histogram

No violation of normality was observed in the histogram for peer attachment and smartphone addiction. It is because the distribution of data for both variables is fairly symmetrical and closely follows the bell-shaped curve indicative of a normal distribution (Nuzzo, 2019). Minor deviations are present, but they do not appear substantial enough to indicate a significant departure from normality. While for the stress and loneliness, there appears to be a violation of normality. It is because the distribution of data for stress is positively skewed while the distribution of data for loneliness is negatively skewed. The observed skewness in the histogram points to a non-normal distribution and the asymmetry suggests that the values are not evenly distributed around the mean (Refer to Appendix E1).

Q-Q Plots

No violation of normality was observed in the Q-Q plots for all variables. Most of the data points were clustered along the diagonal line and did not deviate too far away from the diagonal line (Bishara et al., 2021) (Refer to Appendix E2).

Skewness and Kurtosis

According to George and Mallery (2010), there is no violation for skewness and kurtosis when the value falls in the range between -2 and 2. Table 4.2 demonstrated the value of skewness and kurtosis for stress, loneliness, peer attachment and smartphone addiction. All the value in table 1 is within the range of -2 and 2. Thus, no violation of normality is observed in the skewness and kurtosis.

Table 4.2

Skewness and Kurtosis of variables

Variables	Skewness	Kurtosis
Stress	.431	.785
Loneliness	-.499	-.655
Peer Attachment	.074	.056
Smartphone Addiction	.206	-.719

Note. Refer to Appendix E3 (Descriptive table) for further details.

Kolmogorov-Smirnov Test

Violation of normality in Kolmogorov-Smirnov Test were observed in two variables: loneliness $D(126) = .10$, $p < .001$ and peer attachment $D(126) = .10$, $p = .04$ as the significance values are less than .05, which signified the sample distribution is significantly different from a normal distribution. While for another two variables, stress $D(126) = .08$, p

= .07 and smartphone addiction $D(126) = .08$, $p = .05$ show no violation of normality in Kolmogorov-Smirnov Test (Refer to Appendix E4).

Summary of Normality Test

Stress demonstrated a violation of normality in the histogram analysis, whereas peer attachment exhibited a violation of normality only when assessed using the Kolmogorov-Smirnov Test. Loneliness, on the other hand, showed violations of normality in both the histogram and the Kolmogorov-Smirnov Test. Smartphone addiction was the exception, as it did not exhibit any violations of normality across all five indicators. Since no single variable displayed violations in more than three of the five indicators, all variables have normality distributed data.

Assumptions of Multiple Linear Regression (MLR)

Independence of Errors

The Durbin-Watson test value is 1.799 (Refer to Appendix E5). There is no violation in the assumption for the independence of errors as the value falls within the range of 1 and 3. The value is close to 2, which indicates congruent with the assumption (Durbin & Watson, 1951).

Multicollinearity

Multicollinearity is measured using collinearity statistics of tolerance and variance inflation factors (VIF). All predictors' tolerance values are more than .10, and VIF values are less than 10 (Refer to Appendix E6). Multicollinearity is not observed, so there is a low correlation below predictors (Pallant, 2016). Therefore, there is no violation of the assumption of multicollinearity.

Table 4.3

Collinearity Statistics

	Tolerance	VIF
Stress	.814	1.229
Loneliness	.744	1.345
Peer Attachment	.899	1.112

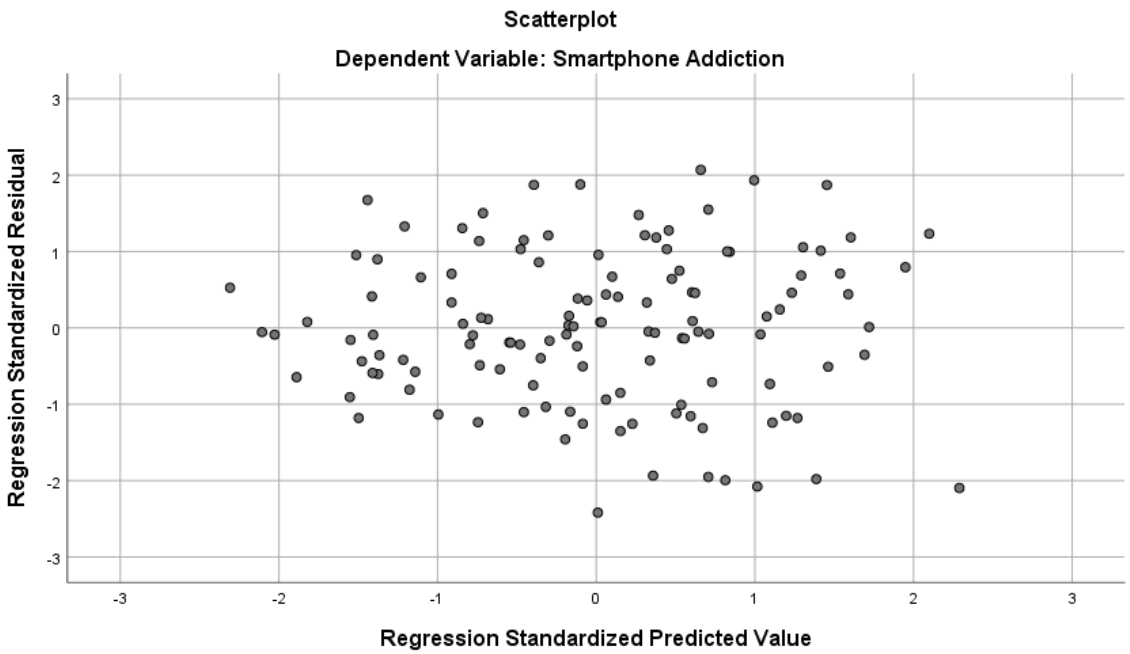
Note. Predictors: Stress, Loneliness, and Peer Attachment; Dependent Variable: Smartphone Addiction

Normality of Residuals, Linearity, Homoscedasticity

Based on the scatterplot in figure 4.1, the residuals are clustered along the zero line, forming an oval shape (Refer to Appendix E7). There is an even pattern between the residuals, although three obvious outliers stand away from the oval shape beyond two standard deviations. Thus, there is no violation of the assumptions for normality of residuals, linearity, and homoscedasticity.

Figure 4.1

Normality of residuals, linearity and homoscedasticity among variables



Multivariate Outliers and Influential Cases

A total of four outliers were identified by the casewise analysis, which is case 14, 28, 106, and 124. All the cases listed in casewise diagnostics tables are beyond two standard deviations (Refer to Appendix E8). Residual statistics, which are Mahalanobis distance, Cook's distance, and Centered Leverage value, are used to determine whether the outliers are considered influential cases that exert undue influence over the parameters of a model. Barnett and Lewis (1994) mentioned that a conservative cut-off point for a sample of 100 is more than 15, and cases with a Mahalanobis distance value that more than 15 are considered outliers and influential cases. Besides, according to Cook and Weisberg (1982), cases with Cook's distance of more than one is potentially influential cases. Lastly, according to Hoaglin and Welsch (1978), cases with more than two times Leverage's value need to be investigated. The complete calculation for Leverage's value twice is as follows: $\frac{3+1}{126}$ X 2 = .0635. Based on Table 4.4, the Mahalanobis distance value for outliers is smaller than 15, the Cook's distance value for outliers is smaller than one, and the Centered Leverage value for outliers is smaller than .0635. Thus, all four outliers identified are not considered influential cases; no cases are required to be deleted.

Table 4.4

Three distances analysis for multivariate outliers and influential cases

Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
14	.773	.021	.006
28	6.164	.071	.049
106	.607	.014	.005
124	1.115	.019	.009

Note. Refer to Appendix E9 (Case Summarise Table) for more details.

Data Analysis and Interpretation

Hypotheses Testing

Multiple linear regression analysis was used to test if stress, loneliness, and peer attachment positively or negatively predicted smartphone addiction. As shown in table 4.5, the model was statistically significant, $F(3,126) = 6.909$, $p < .001$ and accounted for 12.4% of the variance. It was found that loneliness ($\beta = .241$, $p = .014$) and peer attachment ($\beta = .262$, $p = .004$), but not stress significantly predicted smartphone addiction. All predictors positively predict smartphone addiction. Table 4.6 summarised which hypothesis was supported and rejected.

Table 4.5

Results of Multiple Linear Regression for Stress, Loneliness and Peer Attachment as Predictors of Smartphone Addiction

Predictor	Standardized Coefficients Beta		Sig.
Constant			.486
Stress	.158		.092
Loneliness	.241		.014
Peer Attachment	.262		.004
Adjusted R Square		.124	
F		6.909	.000[a]

Note. Refer to Appendix E5 (Model Summary Table), Appendix E11 (ANOVA table) and Appendix E6 (Coefficients table) for more details.

a. Dependent variable: Smartphone Addiction

Table 4.6

Summarise for Acceptance and Rejection of Hypotheses

No	Hypothesis	Supported	Rejected
1.	Stress positively predicts smartphone addiction among university students in Malaysia.		/
2.	Loneliness positively predicts smartphone addiction among university students in Malaysia.	/	
3.	Peer attachment negatively predicts smartphone addiction among university students in Malaysia.		/

***H1*: Stress positively predicts smartphone addiction among university students in Malaysia.**

Multiple linear regression result showed that stress (β = .158, p =.092) positively predict smartphone addiction but it is not significant. Hence, *H1* is rejected.

***H2*: Loneliness positively predicts smartphone addiction among university students in Malaysia**

Multiple linear regression result showed that loneliness (β = .241, p =.014) positively predicted smartphone addiction and it is significant. Hence, *H2* is supported.

***H3*: Peer attachment negatively predicts smartphone addiction among university students in Malaysia.**

Multiple linear regression result showed that peer attachment (β = .262, p = .004) positively predicted smartphone addiction and it is significant. According to the result, the direction of peer attachment predicting smartphone addiction is opposite from the hypothesis. Hence, *H3* is rejected.

Chapter 5
Discussion and Conclusion

Hypothesis 1

Stress and smartphone addiction.

The results of this study rejected hypothesis 1, as they showed that stress positively predicts smartphone addiction among university students in Malaysia, but it was not statistically significant. Due to lack of statistical significance, the hypothesis is rejected. Most of the past studies have highlighted that stress positively predicts smartphone addiction significantly, yet this inconsistent happens. Despite the lack of significance, the positive correlation between stress and smartphone addiction aligns with existing literature highlighting the potential role of stress in smartphone addiction. This could be explained by Vujić and Szabó's (2022) study which emphasized that when individuals perceive their situation as unmanageable, it consequently leads to heightened smartphone usage as a means of escaping or alleviating stress.

The first possibility to explain the lack of statistical significance in this relationship is the differences in samples between this study and past studies. Participants that were used in the study differ demographically from those in past studies, such as in age range, which might influence the purposes for which individuals employ their smartphones, such as for news reading, academic pursuits, social interactions, or leisure activities (Busch et al., 2021). Furthermore, individuals from different regions or cultural backgrounds may experience varying levels of stress, which could influence their smartphone usage patterns. Moreover, the demographic variances might extend to factors beyond stress levels, encompassing aspects such as socioeconomic status, educational background, or occupational roles. These factors can significantly impact how individuals perceive and utilize smartphones by

prioritizing different uses of smartphones, whether for work-related tasks, entertainment, or stress relief

Another possible explanation is that most of the past studies had used different measurement and instrument to measure stress and smartphone addiction. This study has used College Student Stress Scale to measure stress while smartphone addiction was measured by Smartphone Addiction Scale – Short Version (SAS-SV). Some of the past studies like Tu et al. (2023) and Qiu et al. (2023) used Perceived Stress Scale (PSS) and Depression-Anxiety-Stress Scale (DASS-21) to measure stress (Liu et al., 2018; Gao et al., 2018; Yu et al., 2022). Smartphone addiction in Tu et al. (2023) is measured by Mobile Phone Addiction Type Scale while some studies used Mobile Phone Addiction Index (MPAI) to measure smartphone addiction (Liu et al., 2018; Gao et al., 2018; Wang et al., 2021). This discrepancy in measurement tools can lead to challenges when comparing data, as the instruments used may not be directly comparable because their sensitivity in measuring the variable may varies.

This study may have had a smaller sample size compared to past studies. A smaller sample size can reduce the ability to detect significant effects. The past studies have included a sample size ranging from 270 to 1105 participants. The minimum participant count in these studies is nearly double the sample size of 126 participants of this study. Larger sample sizes provide greater statistical power, thereby increasing the likelihood of detecting meaningful relationships or effects. Consequently, with our smaller sample size, our study might have been underpowered to detect the hypothesized relationship between stress and smartphone addiction, contributing to the lack of statistical significance observed in our findings.

The discrepancy can also be explained by the temporal factors. The relationship between variables may vary over time, and the same goes the relationship between stress and smartphone addiction. As the data were collected from participants around the midpoint of semester, when students were facing examinations and quizzes, they may have experienced a

high level of stress but used their smartphones less as they needed to spend more time studying. There is a possibility that students will use their phones to relieve stress but not for an extended period to surpass the threshold of addiction, since they still need to allocate time for studying.

Lastly, stress may serve as the mediating or moderating variable of smartphone addiction. There may be other factors, such as coping mechanisms, social support, or personality traits, that can influence the relationship between stress and smartphone addiction. In the studies by Ju et al. (2019) and Gao et al. (2018), stress acts as a mediator in the relationship between smartphone addiction and self-control, indicating that individuals with low self-control experience heightened stress, subsequently leading to an increase in their smartphone addiction scores. However, contrasting outcomes surfaced in the investigation conducted by Zhang et al. (2022), indicating that while self-control may serve as a mediator between stress and smartphone addiction, stress still exerts a direct impact on smartphone addiction. On the other hand, many of the past studies also have studied stress as the predictor of smartphone addiction but they always incorporate variables to explain their relationship like self-control, grit, negative emotions coping mechanisms, and mindfulness as the mediator or moderator (Liu et al., 2018; Wang et al., 2021; Yu et al., 2022). In a study by Shen et al. (2021) using a moderated-mediation model, the results indicated a positive association between academic stress and smartphone addiction, with depression serving as a mediating factor in this relationship. Future studies with larger samples, more sensitive measurement tools, and a focus on exploring moderating variables could provide a deeper understanding of the relationship between stress and smartphone addiction in the Malaysian university context.

Hypothesis 2

Loneliness and smartphone addiction.

The research findings support hypothesis 2, indicating loneliness positive predicts smartphone addiction among university students. This is consistent with the past studies (Sönmez et al., 2020; Yılmaz et al.,2022; Zwilling, 2022) which revealed that there is a notable positive relationship observed between smartphone addiction and loneliness. Moreover, in the studies of Hu and Xiang (2022) and Laurence et al. (2020), loneliness is determined to be one of the predictors of smartphone addiction, as smartphones are one way for people to alleviate their loneliness.

Kardefelt-Winther (2014) explains that when individuals lack social interaction, they may turn to online platforms like games or social networks for socializing. Smartphones serves as a gateway to social connection, providing access to social media platforms, messaging apps, and online communities (Zhao and Jin, 2023). Sun et al. (2023) mentioned that those experiencing loneliness may excessively engage with these platforms in search of virtual interactions, momentarily easing their feelings of isolation and needs.

This can provide the desired social stimulation, but may hinder offline socializing, leading to dependence on the phone to access internet for social needs (Durak, 2018). While this behaviour might be labelled as smartphone addiction from a pathological standpoint, it's not necessarily compulsive. It's a practical response to satisfy their social needs (Zwilling, 2022), but excessive reliance on it can result in negative consequences and addiction-like symptoms (Liu et al., 2020). Understanding these dynamics is crucial for developing interventions aimed at promoting healthier smartphone usage habits and addressing loneliness among student populations.

In essence, loneliness drives smartphone addiction as individuals seek to fulfil their social needs in the virtual world. Although their loneliness can indeed be alleviated instantly

and momentarily, this could lead to a negative cycle of loneliness as individuals will focus more on the connection in the virtual social spaces, potentially resulting in dependence on virtual social connections (Carvalho et al., 2023). This reliance on smartphones ultimately can increase the feelings of loneliness, creating a self-perpetuating cycle of dependence on the device for emotional regulation and social connection.

Hypothesis 3

Peer attachment and smartphone addiction.

The results do not support Hypothesis 3, as they indicate stress positively predicts smartphone addiction while the hypothesis declare that peer attachment would negatively predict smartphone addiction. This discrepancy may be attributed to smartphones serving as a medium for maintain social connections which can foster a sense of belonging and inadvertently lead individuals to become engrossed in their smartphone to sustain social relationships (Chu et al., 2020; Kim and Kim, 2015; Tu et al., 2023). Specifically, the high prevalence of smartphone usage in facilitating social interactions, as highlighted by Erdem and Efe (2022), revealed that 82.6% adolescents utilize smartphones to access social networking platforms such as Facebook, Twitter, Instagram, WhatsApp, and others for chatting purpose. Additionally, in a study by Çoban (2019) specific purposes for smartphone usage like "Social media use" and "making new friends" on smartphones emerged as the strongest predictors of smartphone addiction among students. This could contribute to the observed relationship between peer attachment and smartphone addiction which underscores the role of smartphone in maintaining social connections.

Although the findings of this study contrast with Hypothesis 3, it remains plausible that the hypothesis could be supported by an alternative theory other than the Compensatory Internet Use Theory. This discrepancy could prompt future researchers to reconsider existing theoretical frameworks and explore alternative theories or model to explain the observed

phenomena. This underscores the importance of continued inquiry and openness to revising the understanding based on empirical evidence.

Another explanation for the discrepancy is that distinguishing between frequent smartphone usage and smartphone addiction has become challenging. Given that smartphones have become integral for nearly all social interactions and their maintenance Sahimi et al., 2022). This challenge may arise from the blurred lines between normal smartphone use for social interaction and excessive use indicative of addiction. Hence, further re-evaluation is needed for classifying and defining smartphone addiction.

As smartphones increasingly serve as primary tools for communication and connection, individuals may find it difficult to gauge when their usage crosses the threshold into addictive behaviour. Consequently, traditional measures of addiction may need refinement to account for the pervasive role of smartphones in modern society considering factor like psychological motivations behind smartphone use and the impact on daily functioning. By addressing these complexities, researchers can develop more nuanced criteria for identifying smartphone addiction and better understand its underlying mechanisms and consequences.

Implication

This study investigates stress, loneliness, and peer attachment to understand their role in smartphone addiction, which negatively impacts academic performance and social interactions among students. This issue is particularly crucial in a society where smartphones are deeply integrated into daily life. Managing stress, promoting healthy peer relationships, and reducing loneliness are vital in mitigating the risk of smartphone addiction. Tailoring treatment plans to address both addiction and its underlying causes can lead to more effective outcomes, especially for students. These findings inform the development of educational programs promoting responsible smartphone use and well-being. Collaboration between

various stakeholders, including parents, adults, organizations, and authorities, is essential in fostering healthier relationships with technology across different age groups. Interventions can be designed to reduce smartphone addiction to compensate for what they lack in real life.

For instance, the results indicated a significant positive relationship between loneliness and smartphone addiction, underscoring the importance of implementing targeted interventions in educational settings to provide students with essential social support. These interventions range from establishing study support groups to implementing peer mentorship programs. By involving students in these initiatives, they receive assistance and learn valuable skills in aiding others, fostering a mutually beneficial support network. This aspect is particularly critical for students who have left their homes to attend university, as they may face heightened challenges in adjusting to new environments. Access to such social support networks is instrumental in mitigating the risk of smartphone addiction among university students. Therefore, educational institutions can be pivotal in promoting healthy behaviors and well-being through proactive social support strategies.

Moreover, this study contributed to updating the psychology research database concerning the predictors of smartphone addiction in the Malaysian context. Mental health professionals, such as university counsellors, can leverage this information to offer improved assistance to university students. By gaining deeper insights into how university students utilize their smartphones, more personalized interventions can be implemented to reduce their tendency to become addicted to smartphones more effectively. For instance, based on the demographic results, most participants used smartphones for social connection. Therefore, to decrease the time university students spend on smartphones for social interactions, counsellors and universities can organize more physical activities to facilitate students' social connections.

Limitations and Recommendations

Every research study has limitations that need to be acknowledged, and this study is no exception. Researchers have employed a questionnaire to gather data from participants, where the responses were self-reported. The possibility of inaccurate or selective responses may occur among the participants, even though the questions were neutrally worded to avoid stigmatizing or demonizing their emotional state and social relationships. Factors such as fear of judgment, social expectations, and cultural stigma may influence participants' responses. Thus, participants may not truthfully answer the questionnaire, providing neutral answers or responses within social expectations. Furthermore, there is also a likelihood of certain participants not fully comprehending the questions, leading to inaccurate responses. As the questionnaire was distributed via social media, participants may have found it overly time-consuming or troublesome to seek clarifications or assistance, despite the contact information of the researchers being provided. To reduce the possibility of this problem, questionnaires distributed physically had researchers accompanying or lingering near participants as they answered the questions. Researchers also frequently asked the participants whether they needed assistance or clarifications. Future researchers are recommended to install a live chat feature in the online questionnaire to address this issue. Additionally, the cross-sectional design of the study limits the drawing of causal conclusions.

The sample of this study may not be an accurate representation of the target population. The female-to-male ratio of participants is 61.9% to 38.1%. The ethnic composition of the sample of this study is also significantly different, with the participants being mostly Chinese. Thus, the results may not be generalized. Random sampling methods were unable to be carried out due to the absence of required personal data such as names, university names, ages, and other personal information necessary for implementation. As implied, personal and sensitive data are almost impossible to obtain due to privacy concerns

and confidentiality; thus, purposive sampling and snowball sampling methods were opted for. Most of the participants were from UTAR Kampar, but the selected method of data collection within the restrictions could still be improved by collecting data from a variety of locations, including urban and rural areas, for better representativeness of the population of university students in Malaysia. Some consideration should also be given to individual characteristics.

Furthermore, the instruments used to measure the variables are mainly available in English and Western contexts. The citizens of Malaysia consist of multiple ethnicities; thus, it is essential to consider adding other main languages commonly used by Malaysians for better comprehension of the instructions and questions. It is also important for them to understand the context better if the questionnaire is adjusted culturally accurately; hence, more research is needed. Another important issue to take note of is the lack of newer existing instruments that measure each variable. The scales should be constantly updated as smartphone addiction is multifaceted, and definitions are unclear. The cut-off point may be highly dubious. It is important to note that newer instruments with good reliability and validity and culturally suitable should always be used. Analysing cross-cultural differences and utilizing a variety of measurement instruments can enhance the comprehension of the effects at hand.

Although this study has utilized The Compensatory Internet Use theory as a guide to gaining insights into stress, loneliness, and peer attachment on smartphone addiction to avoid overcomplicating and ambiguous objectives, it is recommended to be open-minded, as other theories may provide a better explanation for this relationship. Other theories, models, or concepts can be further explored for a better understanding of this area, as have been used in past studies, such as the general strain theory (Liu et al., 2018; Yu et al., 2022; Zhang et al., 2022). It is essential to acknowledge that there may be intricate and integrative perspectives to explaining this relationship.

Conclusion

This study utilizes the Compensatory Internet Use theory as a guide to investigate stress, loneliness, and peer attachment as predictors of smartphone addiction among university students in Malaysia. The results show that while stress, loneliness, and peer attachment positively predict smartphone addiction, only loneliness and peer attachment is statistically significant. Hence, the hypothesis 1 and hypothesis 3 are rejected while only hypothesis 2 is accepted. Although previous studies generally support the negative prediction of smartphone addiction by peer attachment significantly, the findings contradict this, suggesting various factors that might influence the results to explain this inconsistency in this study. Other factors should also be taken into consideration such as differences in sample, instruments, and temporal factors to explain the lack of statistical significance. Future researchers may explore further on this relationship with better preparations and instruments in a larger scale to provide a clearer and deeper understanding of the relationship. These findings hold significance for relevant authorities and stakeholders, urging them to delve deeper into understanding and controlling the escalating use of smartphones to ensure a healthy balance. It is noteworthy that differentiating between frequent smartphone usage and smartphone addiction has become increasingly challenging in today's digital world, where smartphones play a central role in virtually all forms of interaction, leading to heightened dependency. Consequently, establishing a healthy modern lifestyle while keeping pace with rapid technological advancements in this digital era is essential for societal well-being.

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Appendices

Appendix A: Sample Size Calculation

Predictor: Stress

Table 1: Correlation Matrix for Student Background, Parent Background, Parental Attachment, Smartphone Addiction and Stress

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Respondent's Age	1											
2. Respondent's Years of Education	0.54**	1										
3. Father's Age	0.36**	0.26**	1									
4. Mother's Age	0.45**	0.35**	0.88**	1								
5. Father's Years of Education	0.05	0.02	0.01	0.04	1							
6. Mother's Years of Education	-0.01	0.05	-0.21**	-0.16**	0.65**	1						
7. Father's Monthly Income	-0.14**	0.00	-0.37**	-0.36**	0.14**	0.16**	1					
8. Mother's Monthly Income	0.11*	0.10*	-0.05	-0.02	-0.04	0.20**	0.00	1				
9. Mother Attachment	-0.00	-0.01	-0.17**	-0.01	0.12*	0.09	0.12*	-0.08	1			
10. Father Attachment	0.06	0.10*	-0.02	-0.01	0.12*	0.04	-0.14**	-0.01	0.42**	1		
11. Smartphone Addiction	-0.17**	-0.20**	-0.01	-0.11*	0.06	0.08	0.02	-0.17**	-0.20**	-0.28**	1	
12. Stress	-0.14**	-0.09	-0.11*	-0.13**	-0.05	-0.05	0.18**	-0.14**	-0.23**	-0.48**	0.54**	1

Note: *p <0.05, **p <0.01

$$r = 0.54$$

Effect size:

$$f^2 = \frac{r^2}{1-(r)^2} = \frac{(0.54)^2}{1-(0.54)^2} = 0.4116$$

Predictor: Loneliness

Table 1. Descriptive statistics and interrelations among all of the observed variables.

Variables	*M*	*SD*	1	2	3	4	5	6	7
1.age	20.22	1.46	1						
2.grade	–	–	0.78**	1					
3.gender	–	–	-0.22**	-0.18**	1				
4.Loneliness	2.24	0.42	-0.03	-0.02	-0.03	1			
5.Anthropomorphism	2.31	1.44	-0.06	-0.03	-0.01	0.12**	1		
6.Mobile phone addiction	2.91	0.80	-0.04	-0.02	0.15**	0.17**	0.32**	1	
7.Family support	3.40	0.67	-0.07	-0.08*	0.11**	-0.39**	-0.08*	-0.05	1

Note. $N = 582$.
**$p < 0.01$
*$p < 0.05$.

https://doi.org/10.1371/journal.pone.0285189.t001

$$r = 0.17$$

Effect size:

$$f^2 = \frac{r}{1-(r)^2} = \frac{(0.17)^2}{1-(0.17)^2} = 0.0298$$

Predictor: Peer Attachment

Table 3. Correlations between research variables.

Variable	Smartphone Dependency	Aggression	Ego-Resilience	Parenting Behaviour	Peer Attachment
Smartphone dependency	1				
Aggression	0.27 **	1			
Ego-resilience	−0.27 **	−0.23 **	1		
Parenting behaviour	−0.25 **	−0.29 **	0.25 **	1	
Peer attachment	−0.12 **	−0.25 **	0.34 **	0.46 **	1

** $p < 0.01$.

$$r = -0.12$$

Effect size:

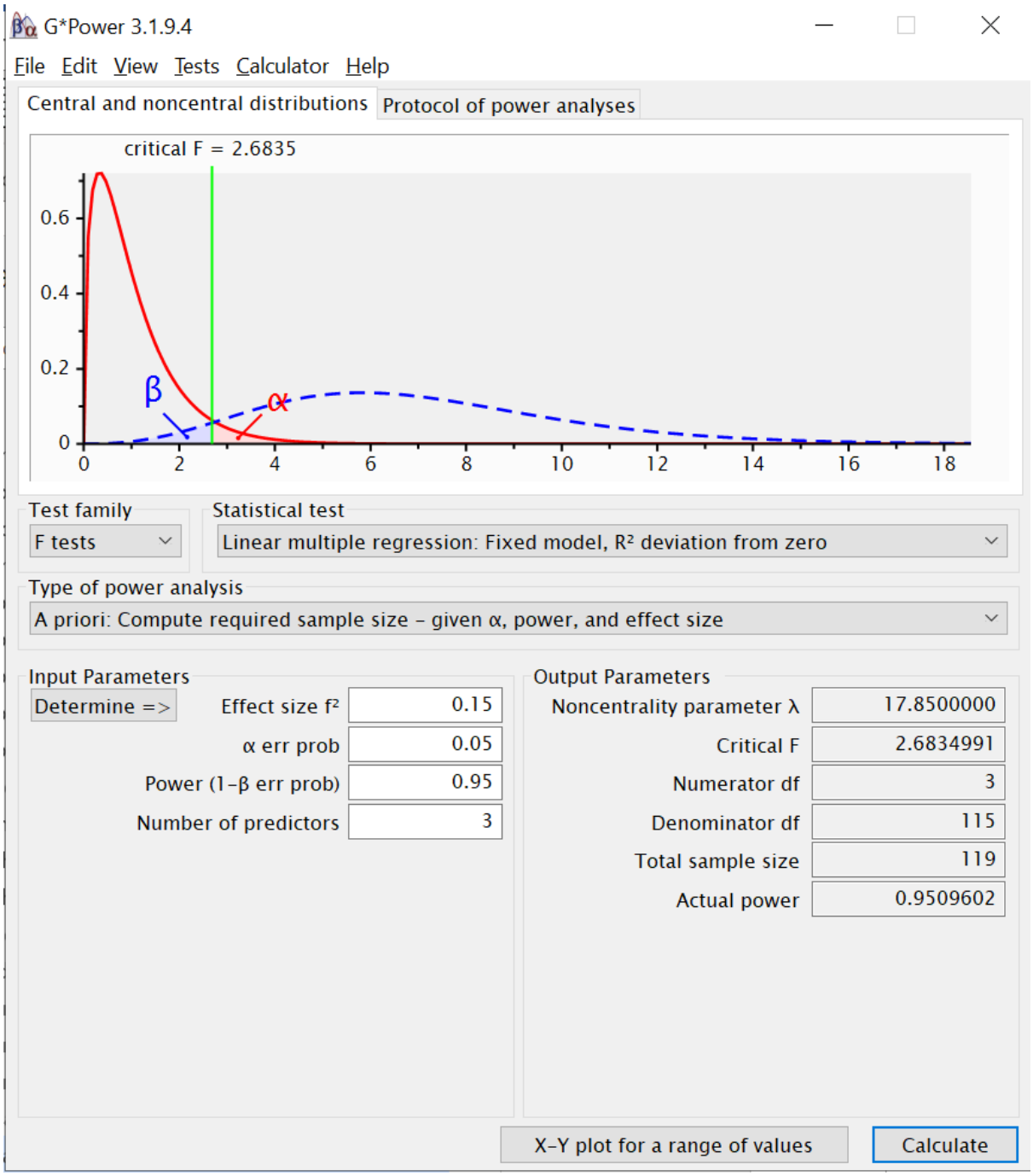
$$f^2 = \frac{r^2}{1-(r)^2} = \frac{(-0.12)^2}{1-(-0.12)^2} = 0.0146$$

Calculation of Effect Size

Average effect size:

$$f^2=\frac{0.4116+0.0297+0.0146}{3}=0.15$$

Sample Size Generated by G Power



Appendix B1: College Student Stress Scale (CSSS)

Feldt, R. C. (2008). Development of a brief measure of college stress: the college student stress scale. *Psychological Reports*, *102*(3), 855–860. https://doi.org/10.2466/pr0.102.3.855-860

Likert's five-point rating system, ranging from "*1 = Never*" to "*5 = Very Often*,"

No	Items	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
1	Felt anxious or distressed about personal relationships					
2	Felt anxious or distressed about family matters					
3	Felt anxious or distressed about financial matters					
4	Felt anxious or distressed about academic matters					
5	Felt anxious or distressed about housing matters					
6	Felt anxious or distressed about being away from home					
7	Questioned your ability to handle difficulties in your life					
8	Questioned your ability to attain your personal goals					
9	Felt anxious or distressed because events were not going as planned					
10	Felt as though you were NO longer in control of your life					
11	Felt overwhelmed by difficulties in your life					

Appendix B2: The 6-item De Jong Gierveld Loneliness Scale (6-Item (short) DJGLS)

De Jong Gierveld, J., & Van Tilburg, T. (2006). A 6-Item scale for overall, emotional, and social loneliness. *Research on Aging*, *28*(5), 582–598. https://doi.org/10.1177/0164027506289723

For questions one to three, the scoring is "*1=Yes, more or less*" and "*0 = No*", while for questions four to six, it is "*0 = Yes, more or less*" and "*1 = No*".

No	**Items**	**Yes** **1**	**More or Less** **1**	**No** **0**
1	I experience a general sense of emptiness			
2	I miss having people around			
3	I often feel rejected			
		Yes **0**	**More or Less** **0**	**No** **1**
4	There are plenty of people I can rely on when I have problems			
5	There are many people I can trust completely			
6	There are enough people I feel close to			

Appendix B3: Inventory of Parent and Peer Attachment - Revised (IPPA-R)

Gullone, E., & Robinson, K. (2005). The Inventory of Parent and Peer Attachment?Revised (IPPA-R) for children: a psychometric investigation. *Clinical Psychology & Psychotherapy*, *12*(1), 67–79. https://doi.org/10.1002/cpp.433

The items in this scale are self-reported on a 3-point Likert scale, ranging from "*3 = Always True*" to "*1 = Never True*" with the inclusion of reverse-scored questions, question 5.

No	Items	Never True 1	Sometimes True 2	Always True 3
1	I like to get my friends' opinions on things I'm worried about.			
2	My friends can tell when I'm upset about something.			
3	When we talk, my friends listen to my opinion.			
4	I feel silly or ashamed when I talk about my problems with my friends.			
5	I wish I had different friends.			
6	My friends understand me.			
7	My friends support me to talk about my worries.			
8	My friends accept me as I am.			
9	I feel the need to be around my friends more often.			
10	My friends don't understand my problems.			

11	I do not feel like I belong when I am with my friends.			
12	My friends listen to what I have to say.			
13	My friends are good friends.			
14	My friends are fairly easy to talk to.			
15	When I am angry about something, my friends try to understand.			
16	My friends help me to understand myself better.			
17	My friends care about the way I feel.			
18	I feel angry with my friends.			
19	I can count on my friends to listen when something is bothering me.			
20	I trust my friends.			
21	My friends respect my feelings.			
22	I get upset a lot more than my friends know about.			
23	My friends get annoyed with me for no reason.			
24	I tell my friends about my problems and troubles.			
25	If my friends know that I am upset about something, they ask me about it.			

Appendix B4: The Smartphone Addiction Scale – Short Version (SAS-SV)

Kwon, M. J., Kim, D., Cho, H., & Yang, S. Y. (2013). The Smartphone Addiction Scale: Development and Validation of a short version for Adolescents. *PLOS ONE*, *8*(12), e83558. https://doi.org/10.1371/journal.pone.0083558

Each item is scored on a Likert scale ranging from "*1 = Strongly Disagree*" to "*6 = Strongly Agree*".

No	**Items**	**Strongly Disagree 1**	**Disagree 2**	**Weakly Disagree 3**	**Weakly Agree 4**	**Agree 5**	**Strongly Agree 6**
1	Missing planned work due to smartphone use						
2	Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use						
3	Feeling pain in the wrists or at the back of the neck while using a smartphone						
4	Won't be able to stand not having a smartphone						
5	Feeling impatient and fretful when I am not holding my smartphone						
6	Having my smartphone in my mind even when I am not using it						
7	I will never give up using my smartphone even when my daily life is already greatly affected by it						
8	Constantly checking my smartphone so as not to miss						

	conversations between other people on WhatsApp, Facebook, or WeChat						
9	Using my smartphone longer than I had intended						
10	The people around me tell me that I use my smartphone too much						

Appendix C1: Pilot test - Reliability of CSSS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.906	.907	11

Appendix C2: Pilot test - Reliability of the 6-Item (short) DJGLS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.625	.605	6

Appendix C2.1: Pilot test - (After Deleted Item 2) Reliability of 6-Item (short) DJGLS

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
LS_1	3.29	2.175	.235	.171	.621
LS_2	3.35	2.424	-.037	.099	.707
LS_3	3.44	1.864	.369	.212	.576
LS_4	3.56	1.606	.550	.484	.493
LS_5	3.44	1.606	.618	.559	.468
LS_6	3.63	1.719	.432	.464	.548

Appendix C3: Pilot test - Reliability of IPPA-R

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.871	.881	25

Appendix C4: Pilot test - Reliability of SAS-SV

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.879	10

Appendix D1: Actual test - Reliability of CSSS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.859	.862	11

Appendix D2: Actual test - Reliability of the 6-Item (short) DJGLS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.625	.620	6

Appendix D2.1: Actual test - (After Deleted Item 2) Reliability of 6-Item (short) DJGLS

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
LS_1	3.04	2.246	.303	.127	.601
LS_2	3.14	2.555	.006	.079	.704
LS_3	3.29	1.841	.507	.263	.516
LS_4	3.20	2.032	.373	.262	.575
LS_5	3.14	1.899	.520	.351	.515
LS_6	3.35	1.877	.474	.331	.531

Appendix D3: Actual test - Reliability of IPPA-R

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.779	.794	25

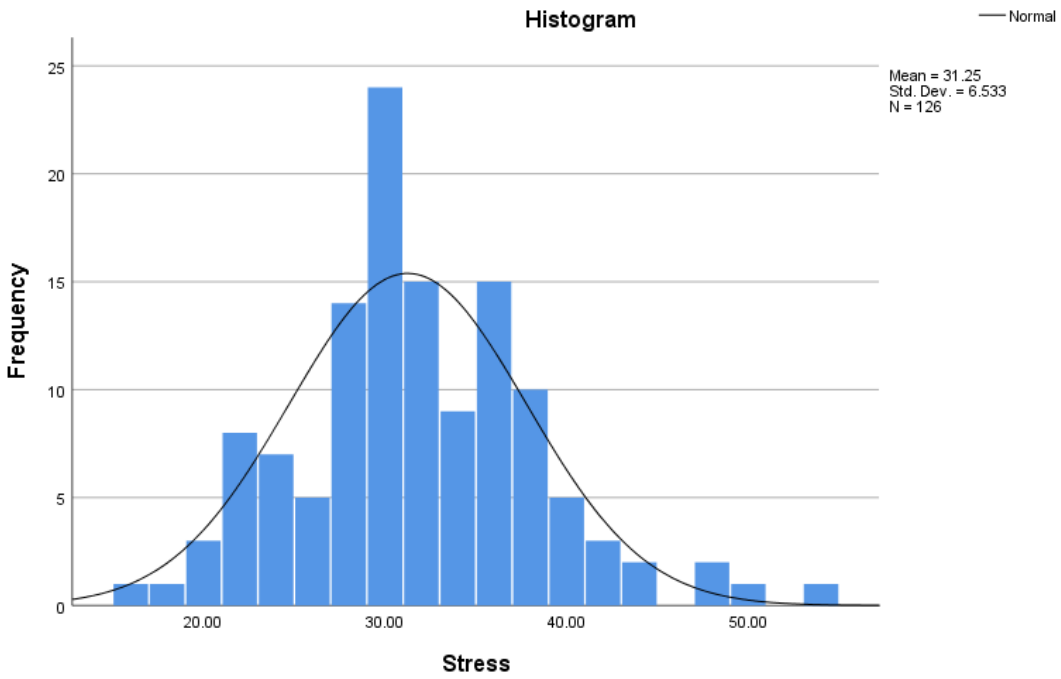
Appendix D4: Actual test - Reliability of SAS-SV

Reliability Statistics

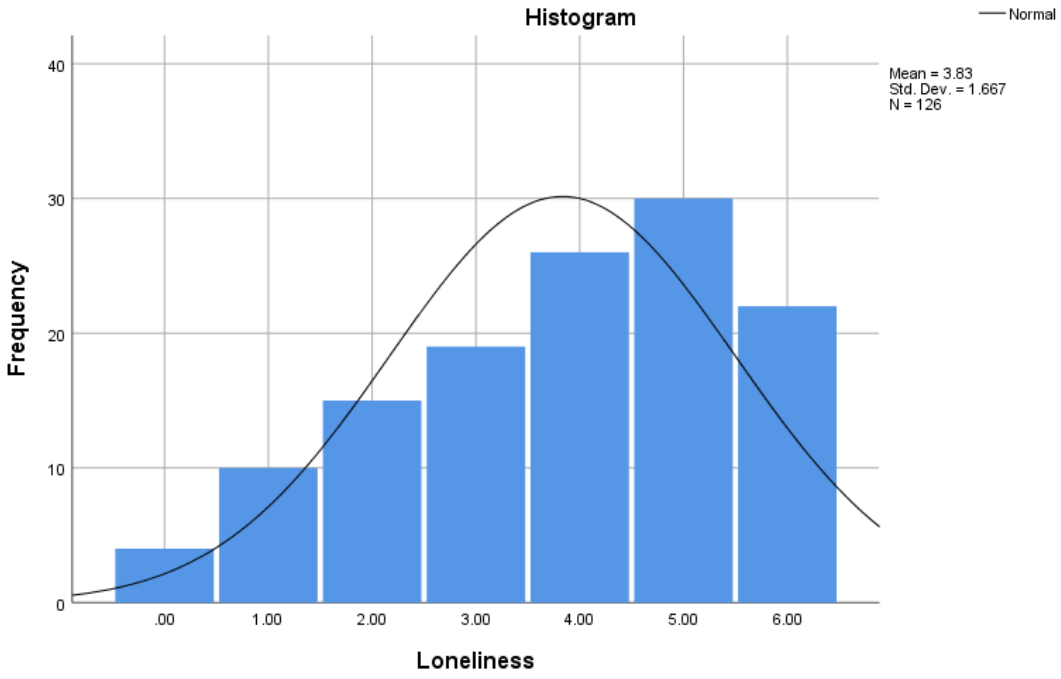
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.834	.834	10

Appendix E1: Histograms

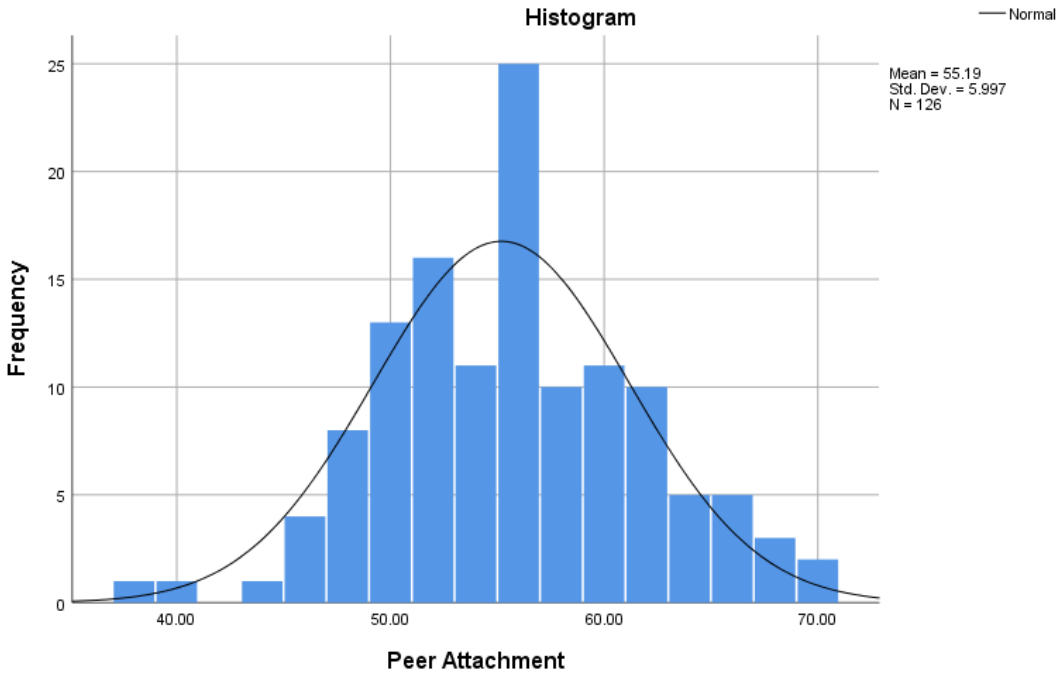
Stress



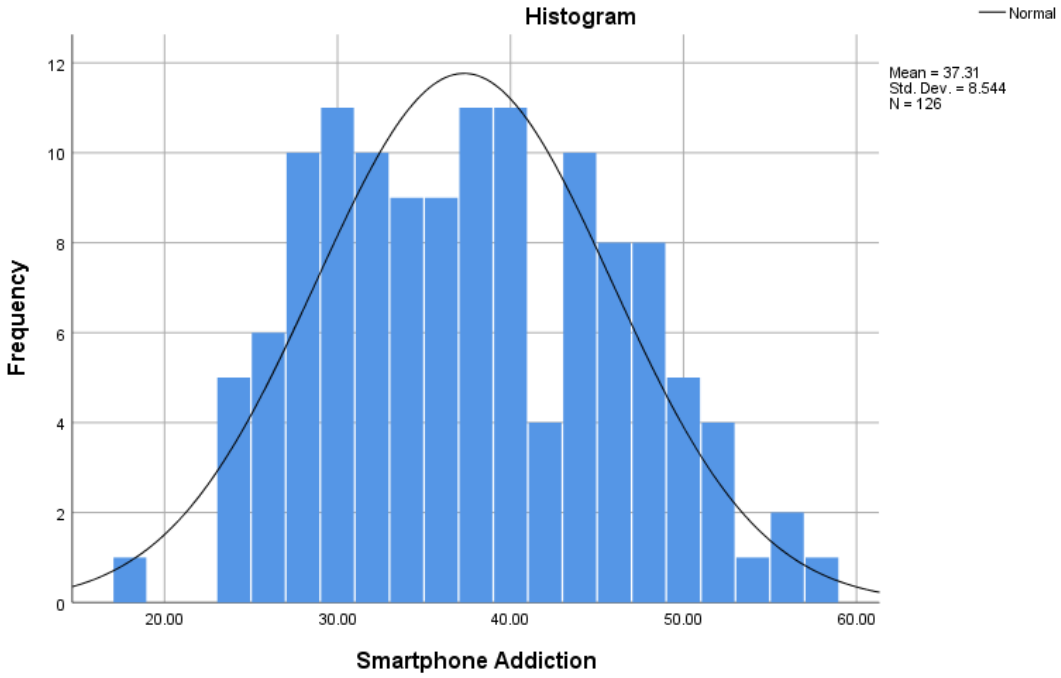
Loneliness



Peer Attachment

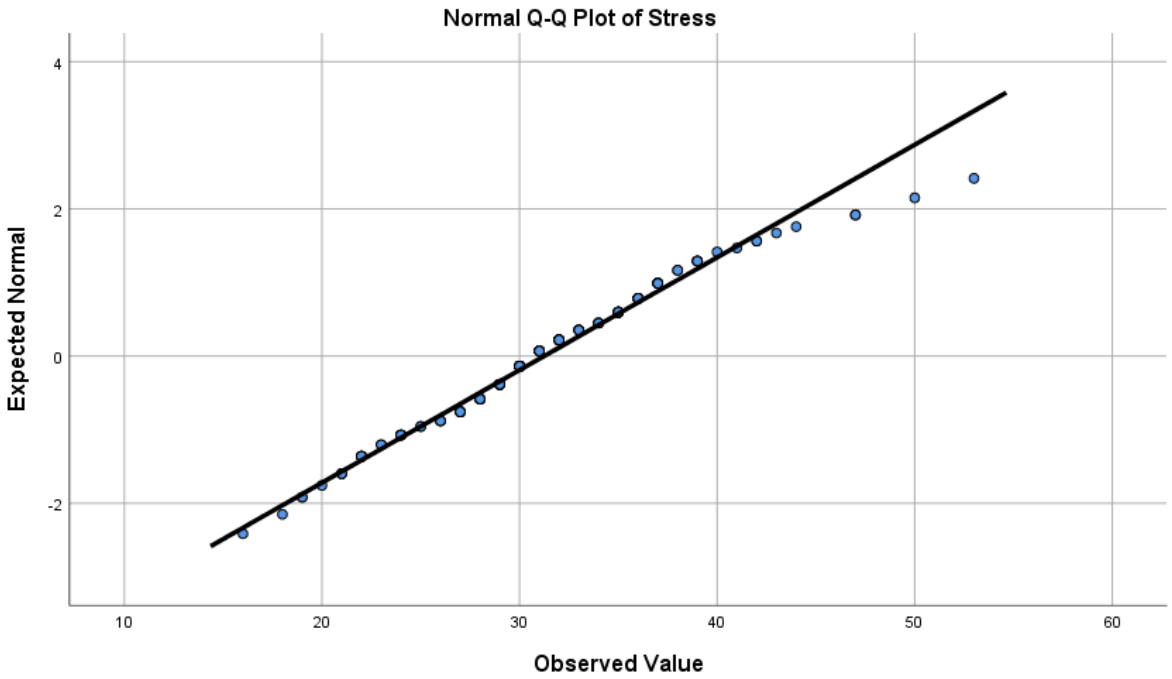


Smartphone Addiction

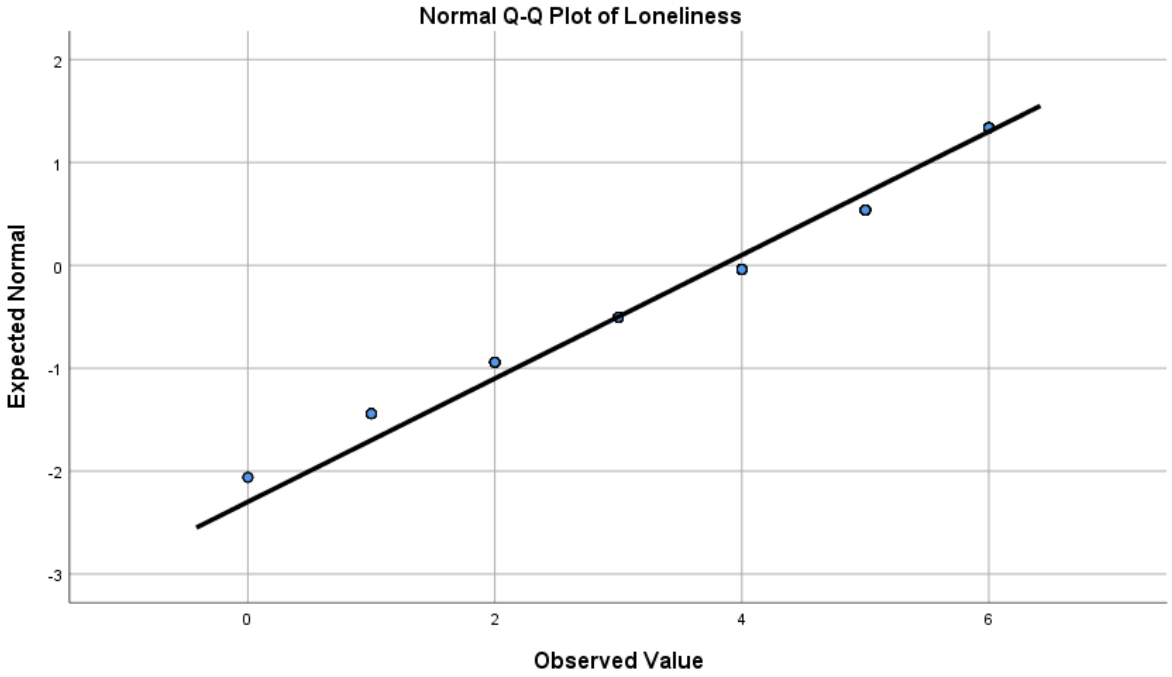


Appendix E2: Q-Q plots

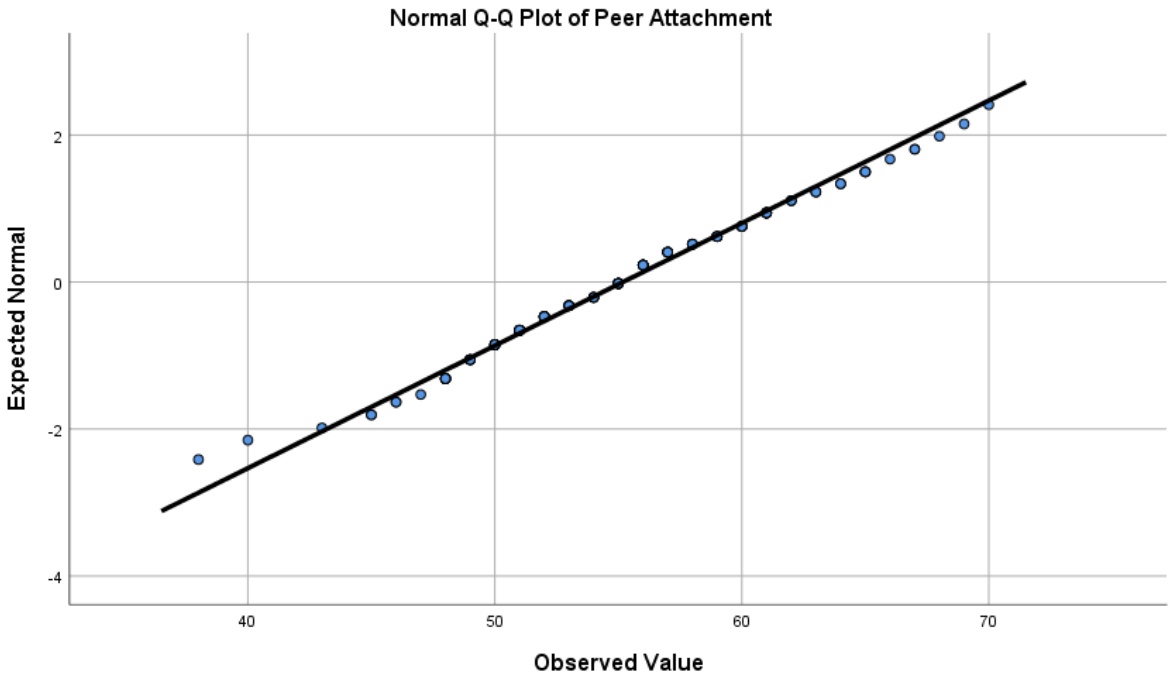
Stress



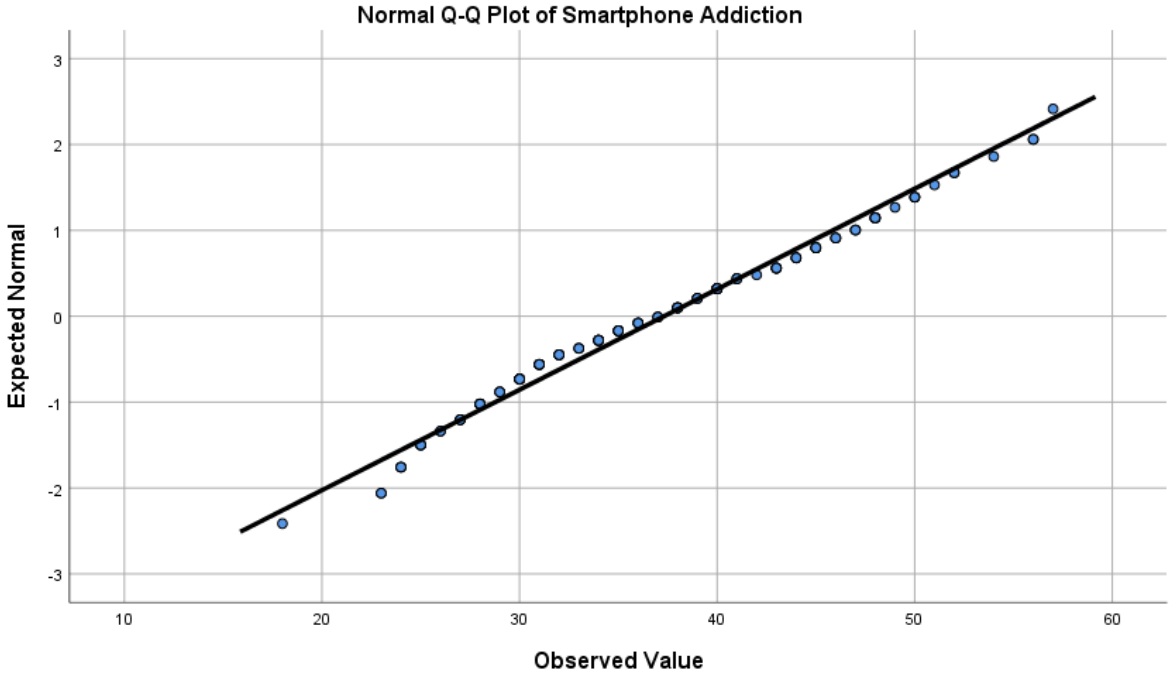
Loneliness



Peer Attachment



Smartphone Addiction



Appendix E3: Descriptive Table

Descriptives

			Statistic	Std. Error
Stress	Mean		31.2460	.58203
	95% Confidence Interval for Mean	Lower Bound	30.0941	
		Upper Bound	32.3979	
	5% Trimmed Mean		31.0503	
	Median		30.5000	
	Variance		42.683	
	Std. Deviation		6.53322	
	Minimum		16.00	
	Maximum		53.00	
	Range		37.00	
	Interquartile Range		7.25	
	Skewness		.431	.216
	Kurtosis		.785	.428
Loneliness	Mean		3.8333	.14854
	95% Confidence Interval for Mean	Lower Bound	3.5394	
		Upper Bound	4.1273	
	5% Trimmed Mean		3.9056	
	Median		4.0000	
	Variance		2.780	
	Std. Deviation		1.66733	
	Minimum		.00	
	Maximum		6.00	
	Range		6.00	
	Interquartile Range		2.00	
	Skewness		-.499	.216
	Kurtosis		-.655	.428
Peer Attachment	Mean		55.1905	.53425
	95% Confidence Interval for Mean	Lower Bound	54.1331	
		Upper Bound	56.2478	
	5% Trimmed Mean		55.1737	
	Median		55.0000	
	Variance		35.963	
	Std. Deviation		5.99695	
	Minimum		38.00	
	Maximum		70.00	
	Range		32.00	

	Interquartile Range		8.25	
	Skewness		.074	.216
	Kurtosis		.056	.428
Smartphone Addiction	Mean		37.3095	.76116
	95% Confidence Interval for Mean	Lower Bound	35.8031	
		Upper Bound	38.8159	
	5% Trimmed Mean		37.1684	
	Median		37.0000	
	Variance		72.999	
	Std. Deviation		8.54397	
	Minimum		18.00	
	Maximum		57.00	
	Range		39.00	
	Interquartile Range		14.00	
	Skewness		.206	.216
	Kurtosis		-.719	.428

Appendix E4: Test of Normality table

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Stress	.076	126	.074	.980	126	.065
Loneliness	.171	126	.000	.919	126	.000
Peer Attachment	.081	126	.040	.990	126	.521
Smartphone Addiction	.079	126	.049	.981	126	.070

a. Lilliefors Significance Correction

Appendix E5: Model Summary Table

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.381[a]	.145	.124	7.99580	1.799

a. Predictors: (Constant), S_PA, S_CSSS, S_L

b. Dependent Variable: S_SA

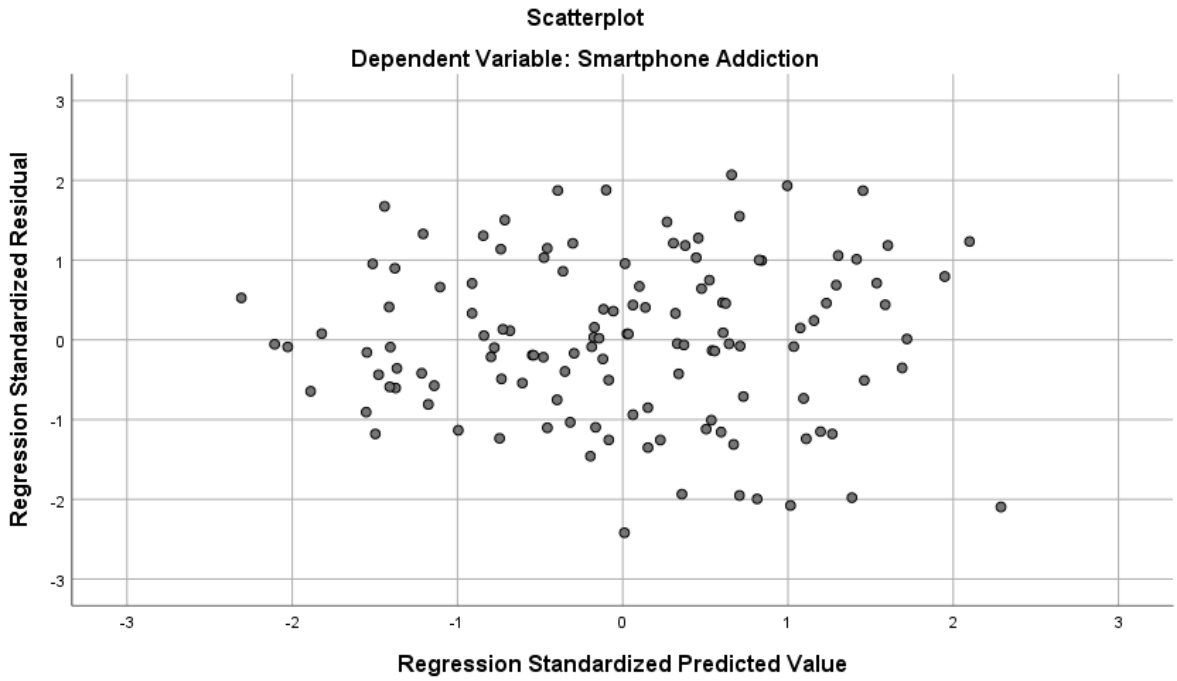
Appendix E6: Coefficients table

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5.513	7.889		.699	.486		
	S_CSSS	.206	.121	.158	1.699	.092	.814	1.229
	S_L	1.236	.497	.241	2.485	.014	.744	1.345
	S_PA	.374	.126	.262	2.971	.004	.899	1.112

a. Dependent Variable: S_SA

Appendix E7: Scatterplot



Appendix E8: Casewise diagnostics table

Casewise Diagnostics[a]

Case Number	Std. Residual	S_SA	Predicted Value	Residual
14	-2.419	18.00	37.3422	-19.34219
28	-2.096	28.00	44.7618	-16.76184
106	2.069	56.00	39.4549	16.54514
124	-2.078	24.00	40.6143	-16.61430

a. Dependent Variable: S_SA

Appendix E9: Case Summaries Table

Case Summaries[a]

			Case Number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
Group_MO	0	1	1	3.70787	.00003	.02966
		2	2	7.17690	.06982	.05742
		3	3	5.28756	.00236	.04230
		4	4	5.48376	.00014	.04387
		5	5	5.27080	.00064	.04217
		6	6	2.20244	.00938	.01762
		7	7	3.25548	.01218	.02604
		8	8	2.17611	.00220	.01741
		9	9	2.70740	.00397	.02166
		10	10	1.47154	.00081	.01177
		11	11	1.27058	.00717	.01016
		12	12	6.87933	.00011	.05503
		13	13	.09236	.00482	.00074
		14	15	5.58234	.02386	.04466
		15	16	3.78022	.00059	.03024
		16	17	2.74149	.01792	.02193
		17	18	2.86893	.00018	.02295
		18	19	3.63644	.00805	.02909
		19	20	.07340	.00396	.00059
		20	21	1.62463	.00309	.01300
		21	22	1.12290	.01534	.00898

	22	23	.19232	.00852	.00154
	23	24	2.80503	.03164	.02244
	24	25	1.80243	.00384	.01442
	25	26	3.49521	.00017	.02796
	26	27	4.17734	.00009	.03342
	27	29	.36603	.00334	.00293
	28	30	5.47115	.00775	.04377
	29	31	3.21395	.00115	.02571
	30	32	1.06734	.01696	.00854
	31	33	3.56666	.00122	.02853
	32	34	3.31188	.00023	.02650
	33	35	1.46073	.00001	.01169
	34	36	5.78467	.01247	.04628
	35	37	2.12094	.00038	.01697
	36	38	1.24449	.00006	.00996
	37	39	3.19464	.00263	.02556
	38	40	2.82267	.01130	.02258
	39	41	.91526	.00678	.00732
	40	42	.77641	.00575	.00621
	41	43	4.10673	.00561	.03285
	42	44	3.73862	.00222	.02991
	43	45	.65536	.00446	.00524
	44	46	1.93209	.00079	.01546
	45	47	1.91801	.00765	.01534
	46	48	.24112	.00230	.00193
	47	49	2.27094	.00324	.01817
	48	50	5.62399	.00408	.04499
	49	51	8.78008	.00084	.07024
	50	52	2.42367	.00006	.01939
	51	53	4.22492	.01470	.03380
	52	54	.97640	.00060	.00781
	53	55	1.65883	.00588	.01327
	54	56	2.95464	.01435	.02364
	55	57	6.45407	.04718	.05163
	56	58	1.66018	.00401	.01328
	57	59	1.63314	.00116	.01307
	58	60	.89185	.00473	.00713
	59	61	.90117	.00396	.00721
	60	62	3.30939	.00381	.02648
	61	63	.93365	.00095	.00747

	62	64	7.30353	.02023	.05843
	63	65	.13141	.00025	.00105
	64	66	1.63100	.00307	.01305
	65	67	7.31597	.02127	.05853
	66	68	2.41853	.00316	.01935
	67	69	2.10367	.00013	.01683
	68	70	1.79946	.00003	.01440
	69	71	2.67875	.00004	.02143
	70	72	3.21080	.00002	.02569
	71	73	.88367	.00541	.00707
	72	74	3.48245	.00036	.02786
	73	75	3.84525	.01347	.03076
	74	76	8.57922	.01124	.06863
	75	77	11.61622	.00000	.09293
	76	78	1.66728	.00014	.01334
	77	79	3.43473	.00942	.02748
	78	80	3.65450	.00740	.02924
	79	81	.38571	.00414	.00309
	80	82	.30076	.00013	.00241
	81	83	5.54360	.02292	.04435
	82	84	.70989	.00309	.00568
	83	85	.25039	.00371	.00200
	84	86	.30480	.00001	.00244
	85	87	5.31397	.00268	.04251
	86	88	1.25508	.00210	.01004
	87	89	2.47625	.00190	.01981
	88	90	1.61570	.00114	.01293
	89	91	.75849	.01349	.00607
	90	92	2.68453	.00151	.02148
	91	93	.65872	.00086	.00527
	92	94	3.06492	.01530	.02452
	93	95	6.97981	.00006	.05584
	94	96	3.36050	.00342	.02688
	95	97	.70989	.00067	.00568
	96	98	3.95177	.01502	.03161
	97	99	3.19421	.00016	.02555
	98	100	.79970	.00061	.00640
	99	101	4.03857	.00991	.03231
	100	102	4.46038	.00496	.03568
	101	103	2.07796	.00647	.01662

	102	104	6.67743	.02645	.05342
	103	105	2.43545	.00776	.01948
	104	107	6.16724	.01015	.04934
	105	108	4.06556	.00001	.03252
	106	109	.27609	.00002	.00221
	107	110	1.97360	.02372	.01579
	108	111	2.61149	.00134	.02089
	109	112	3.99972	.02308	.03200
	110	113	8.94720	.02398	.07158
	111	114	1.76783	.00000	.01414
	112	115	5.43607	.05000	.04349
	113	116	1.97360	.01494	.01579
	114	117	4.59533	.00009	.03676
	115	118	6.81359	.02736	.05451
	116	119	1.26667	.00013	.01013
	117	120	1.63978	.00061	.01312
	118	121	2.00191	.00114	.01602
	119	122	4.47131	.00009	.03577
	120	123	2.12297	.00869	.01698
	121	125	.62632	.00002	.00501
	122	126	2.32936	.00244	.01863
	Total N		122	122	122
1	1	14	.77286	.02125	.00618
	2	28	6.16370	.07076	.04931
	3	106	.60731	.01405	.00486
	4	124	1.11505	.01882	.00892
	Total N		4	4	4
Total	N		126	126	126

a. Limited to first 150 cases.

Appendix E10: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Stress	126	16.00	53.00	31.2460	6.53322
Loneliness	126	.00	6.00	3.8333	1.66733
Peer Attachment	126	38.00	70.00	55.1905	5.99695
Smartphone Addiction	126	18.00	57.00	37.3095	8.54397
Valid N (listwise)	126				

Appendix E11: ANOVA table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1325.122	3	441.707	6.909	.000[b]
	Residual	7799.806	122	63.933		
	Total	9124.929	125			

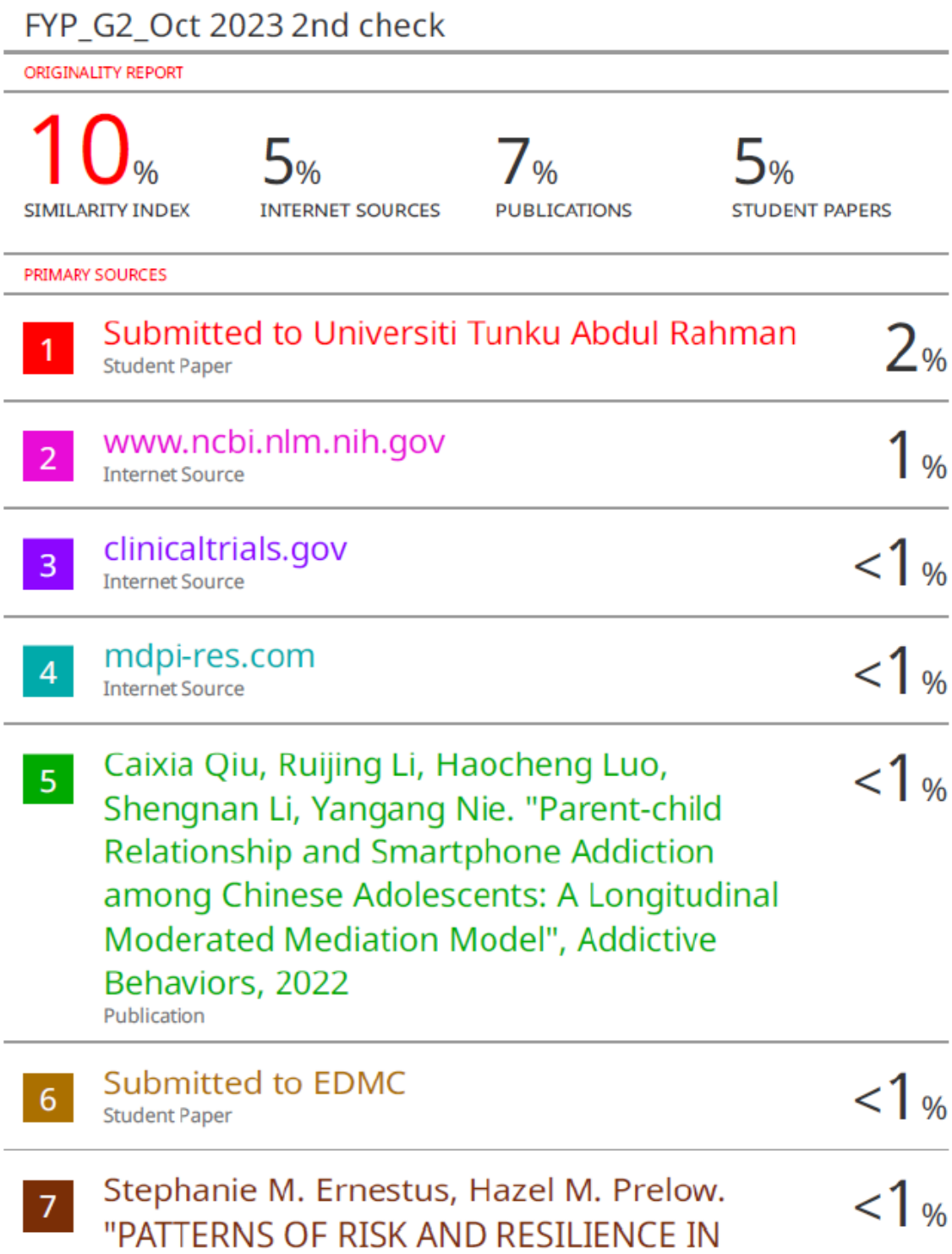
a. Dependent Variable: S_SA

b. Predictors: (Constant), S_PA, S_CSSS, S_L

Appendix F: Survey Poster

Appendix G: Turnitin Report

FYP I



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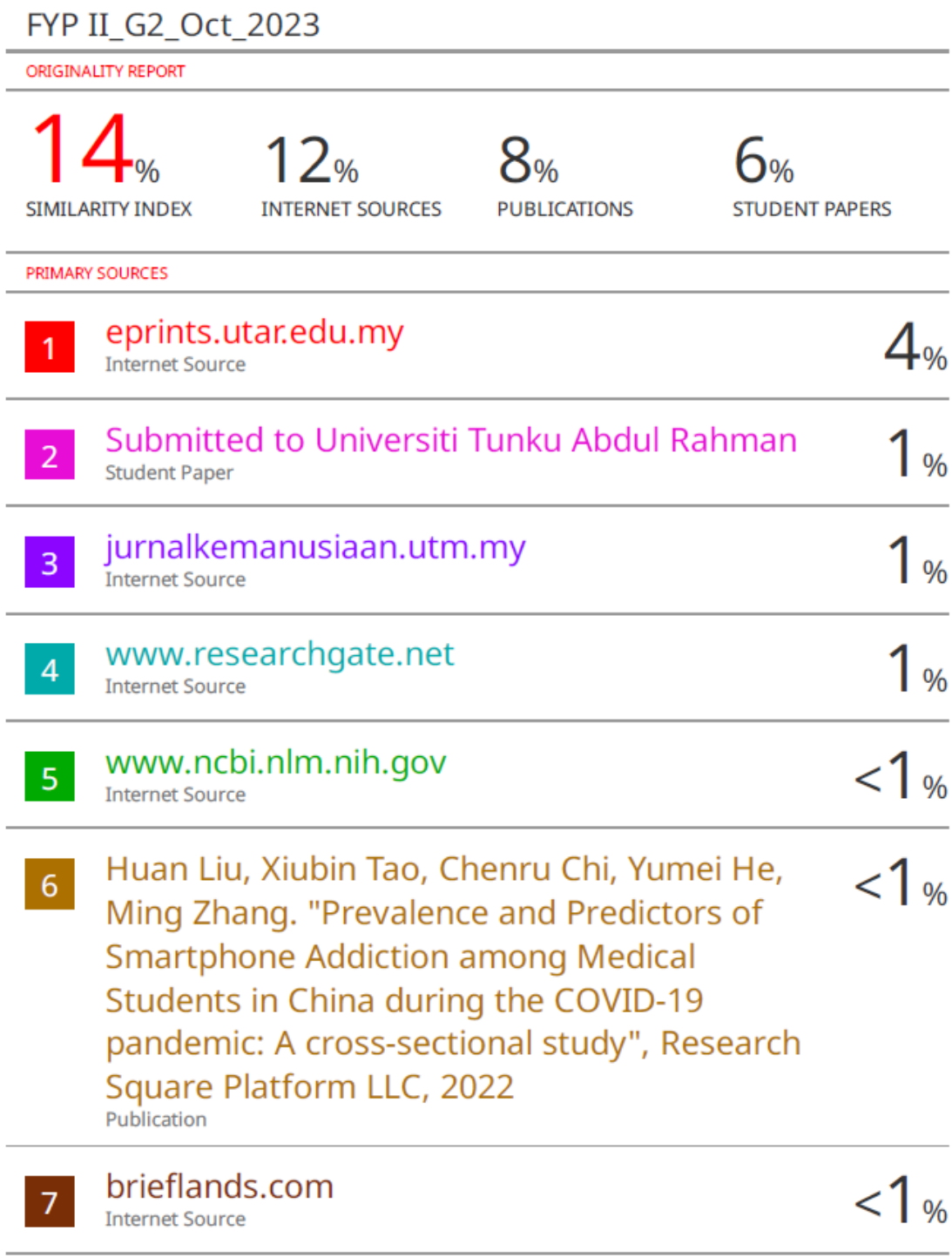

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Appendix H: Informed Consent

PERSONAL DATA PROTECTION STATEMENT

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. The purposes for which your personal data may be used are inclusive but not limited to:-
   - For assessment of any application to UTAR
   - For processing any benefits and services
   - For communication purposes
   - For advertorial and news
   - For general administration and record purposes
   - For enhancing the value of education
   - For educational and related purposes consequential to UTAR
   - For the purpose of our corporate governance
   - For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan

2. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

3. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

4. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

1. By submitting this form you hereby authorise and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.

2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

3. You may access and update your personal data by writing to us at _____.

Acknowledgment of Notice

[ ] I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.

[ ] I disagree, my personal data will not be processed.

.....
Name:
Date:

Appendix I: Ethical Clearance Letter

UNIVERSITI TUNKU ABDUL RAHMAN DU012(A)
Wholly owned by UTAR Education Foundation Co. No. 578227-M

Re: U/SERC/78-205/2024

13 January 2024

Dr Pung Pit Wan
Head, Department of Psychology and Counselling
Faculty of Arts and Social Science
Universiti Tunku Abdul Rahman
Jalan Universiti, Bandar Baru Barat
31900 Kampar, Perak.

Dear Dr Pung,

Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research project from Bachelor of Social Science (Honours) Psychology programme enrolled in course UAPZ3023. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Perceived Social Support, Job Stress, and Self-Efficacy as Predictors on Employee Engagement in Malaysia	1. Chua Jiaen 2. Ricky Tan Wai Hong 3. Wendy Ngu Tang Xi	Dr Nurul Iman Binti Abdul Jalil	13 January 2024 – 12 January 2025
2.	The Influence of Perceived Stress, Self-Esteem, and Self-Efficacy on Life Satisfaction in University Students	1. Ng Wei Bei 2. Lim Seok Fang 3. Zhang Zi Mo		
3.	Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction Among University Students in Malaysia	1. Ng Yan Yi 2. Yap Phei Yie		

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research;

(2) Confidentiality of participants' personal data must be maintained; and

(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

(4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,

Professor Ts Dr Faidz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Arts and Social Science
Director, Institute of Postgraduate Studies and Research

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 Fax: (605) 466 1313
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 Fax: (603) 9019 8868
Website: www.utar.edu.my

FACULTY OF ARTS AND SOCIAL SCIENCE

UNIVERSTI TUNKU ABDUL RAHMAN

Date: 8 April 2024

SUBMISSION OF FINAL YEAR PROJECT

It is hereby certified that Ng Yan Yi (ID No: 2004140) has completed this final year project entitled "Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia" under the supervision of Dr. Nurul Iman Binti Abdul Jalil (Supervisor) from the Department of Psychology and Counselling, Faculty of Arts and Social Science.

I understand that University will upload softcopy of my final year project in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

Name: Ng Yan Yi

FACULTY OF ARTS AND SOCIAL SCIENCE
UNIVERSTI TUNKU ABDUL RAHMAN

Date: 8 April 2024

SUBMISSION OF FINAL YEAR PROJECT

It is hereby certified that Yap Phei Yie (ID No: 2002987) has completed this final year project entitled "Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia" under the supervision of Dr Nurul Iman Binti Abdul Jalil (Supervisor) from the Department of Psychology and Counselling, Faculty of Arts and Social Science.

I understand that University will upload softcopy of my final year project in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

Name: Yap Phei Yie

Universiti Tunku Abdul Rahman			
Form Title : Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)			
Form Number: FM-IAD-005	Rev No.: 0	Effective Date: 01/10/2013	Page No.: 1of 1

FACULTY OF ARTS AND SOCIAL SCIENCE (FAS)

Full Name(s) of Candidate(s)	Ng Yan Yi, Yap Phei Yie
ID Number(s)	2004140, 2002987
Programme / Course	Bachelor of Social Science (Hons) Psychology
Title of Final Year Project	Stress, Loneliness and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia

Similarity	**Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)**
Overall similarity index: 14 % **Similarity by source** Internet Sources: 12 % Publications: 8 % Student Papers: 6 %	Accepted
Number of individual sources listed of more than 3% similarity: 1	The similarity is not the major sentence, it's only the minor and common words.

Parameters of originality required and limits approved by UTAR are as follows:

(i) Overall similarity index is 20% and below, and

(ii) Matching of individual sources listed must be less than 3% each, and

(iii) Matching texts in continuous block must not exceed 8 words

Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Name: Dr. Nurul Iman binti Abdul Jalil

Date: 1 April 2024

Signature of Co-Supervisor

Name: _____

Date: _____

Action Plan of UAPZ 3023 (group-based)Final Year Project II for Jan & May trimester

Supervisee's Name: Ng Yan Yi, Yap Phei Yie

Supervisor's Name: Dr. Nurul Iman Binti Abdul Jalil

Task Description	Duration	Date/Time	Supervisee's Signature	Supervisor's Signature	Supervisor's Remarks	Next Appointment Date/Time
Methodology, Data Collection & Data Analysis	W1-W2	7/2/2024		*nuruliman*	submission of results findings	6/3/2024
Finding & Analysis Discuss Findings & Analysis with Supervisor Amending Findings & Analysis	W3-W6	6/3/2024		*nuruliman*	Submission of data analysis	27/3/2024
Discussion & Conclusion Discuss Discussion & Conclusion with Supervisor Amending Discussion & Conclusion	W7-W9	27/3/2024		*nuruliman*	Submission of Chapter 3, 4 & 5	
Submission of first draft*	Monday of Week 10	submit the first draft to Turnitin.com to check similarity rate				
Amendment	W10					
Submission of final FYP (FYP I + FYP II)*	Monday of W11	final submission to supervisor				
Oral Presentation		Oral Presentation Schedule will be released and your supervisor will inform you				

Notes:
1. **The listed duration is for reference only, supervisors can adjust the period according to the topics and content of the projects.**
2. ***Deadline for submission can not be changed, one mark will be deducted per day for late submission.**
3. **Supervisees are to take the active role to make appointments with their supervisors.**
4. **Both supervisors and supervisees should keep a copy of this rec 5. This record is to be submitted together with the submission of the FYP II.**

UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF ARTS AND SOCIAL SCIENCE
DEPARTMENT OF PSYCHOLOGY AND COUNSELLING

UAPZ 3023 Final Year Project II

Quantitative Research Project Evaluation Form

TURNITIN: ***'In assessing this work you are agreeing that it has been submitted to the University-recognised originality checking service which is Turnitin. The report generated by Turnitin is used as evidence to show that the students' final report contains the similarity level below 20%.'***

Project Title: Stress, Loneliness, and Peer Attachment as Predictors of Smartphone Addiction among University Students in Malaysia	
Supervisor: Dr. Nurul Iman Binti Abdul Jalil	
Student's Name: 1. Ng Yan Yi 2. Yap Phei Yie	Student's ID 1. 2004140 2. 2002987

INSTRUCTIONS:
Please score each descriptor based on the scale provided below:

1. Please award 0 mark for no attempt.
2. For criteria **7**:
   Please retrieve the marks from "**Oral Presentation Evaluation Form**".

1. ABSTRACT (5%)	**Max Score**	**Score**
a. State the main hypotheses/research objectives.	5%	
b. Describe the methodology: • Research design • Sampling method • Sample size • Location of study • Instruments/apparatus/outcome measures • Data gathering procedures	5%	
c. Describe the characteristics of participants.	5%	
d. Highlight the outcomes of the study.	5%	
e. Conclusions, implications, and applications.	5%	
Sum	25%	/25%
Subtotal (Sum/5)	5%	/5%
Remark:		

2. METHODOLOGY (25%)	**Max Score**	**Score**
a. Research design/framework: • For experiment, report experimental manipulation, participant flow, treatment fidelity, baseline data, adverse events and side effects, assignment method and implementation, masking. (*if applicable with the study design) • For non-experiment, describe the design of the study and data used.	5%	
b. Sampling procedures: • Justification of sampling method/technique used. • Description of location of study. • Procedures of ethical clearance approval. (Provide reference number of approval letter)	5%	
c. Sample size, power, and precision: • Justification of sample size. • Achieved actual sample size and response rate. • Power analysis or other methods (if applicable).	5%	
d. Clear explanation of data collection procedures: • Inclusion and exclusion criteria • Procedures of obtaining consent • Description of data collection procedures • Provide dates/duration of recruitment repeated measures or follow-up. • Agreement and payment (if any)	5%	
e. Explanation of instruments/questionnaire used: • Description of instruments	5%	

• Scoring system • Meaning of scores • Reliability and validity		
Subtotal	25%	/25%
Remark:		
3. RESULTS (20%)	**Max Score**	**Score**
a. Descriptive statistics: • Demographic characteristics • Topic-specific characteristics	5%	
b. Data diagnostic and missing data: • Frequency and percentages of missing data. (if applicable) • Methods employed for addressing missing data. (if applicable) • Criteria for post data-collection exclusion of participants. • Criteria for imputation of missing data. • Defining and processing of statistical outliers. • Analyses of data distributions. • Data transformation (if applicable).	5%	
c. Appropriate data analysis for each hypothesis or research objective.	5%	
d. Accurate interpretation of statistical analyses: • Accurate report and interpretation of confidence intervals or statistical significance. • Report of *p* values and minimally sufficient sets of statistics (e.g., *dfs*, *MS*, *MS error*). • Accurate report and interpretation of effect sizes. • Report any problems with statistical assumptions.	5%	
Subtotal	20%	/20%
Remark:		
4. DISCUSSION AND CONCLUSION (20%)	**Max Score**	**Score**
a. Constructive discussion of findings: • Provide statement of support or nonsupport for all hypotheses. • Analyze similar and/or dissimilar results. • Rational justifications for statistical results.	8%	

b. Implication of the study: • Theoretical implication for future research. • Practical implication for programs and policies.	4%	
c. Relevant limitations of the study.	4%	
d. Recommendations for future research.	4%	
Subtotal	20%	/20%
Remark:		

5. LANGUAGE AND ORGANIZATION (5%)	**Max Score**	**Score**
a. Language proficiency	3%	
b. Content organization	1%	
c. Complete documentation (e.g., action plan, originality report)	1%	
Subtotal	5%	/5%
Remark:		

6. APA STYLE AND REFERENCING (5%)	**Max Score**	**Score**
a. 7th Edition APA Style	5%	/5%
Remark:		

***ORAL PRESENTATION (20%)**	**Score**		
	Student 1	Student 2	Student 3
Subtotal	/20%	/20%	/20%
Remark:			

PENALTY	**Max Score**	**Score**
Maximum of 10 marks for LATE SUBMISSION (within 24hours), or POOR CONSULTATION ATTENDANCE with supervisor. *Late submission after 24hours will not be graded	10%	

	Student 1	Student 2	Student 3
****FINAL MARK/TOTAL**	/100%	/100%	/100%

*****Overall Comments:**

Signature: _____ Date: _____

Notes:

1. **Subtotal**: The sum of scores for each assessment criterion
2. **FINAL MARK/TOTAL**: The summation of all subtotal score
3. Plagiarism is **NOT ACCEPTABLE**. Parameters of originality required and limits approved by UTAR are as follows:
   (i) **Overall similarity index is 20% or below**, and
   (ii) **Matching of individual sources listed must be less than 3%** each, and
   (iii) Matching texts in continuous block must **not exceed 8 words**

   Note: Parameters (i) – (ii) shall exclude quotes, references and text matches which are less than 8 words. Any works violate the above originality requirements will NOT be accepted. Students have to redo the report and meet the requirements in **SEVEN (7)** days.

*The marks of "Oral Presentation" are to be retrieved from **"Oral Presentation Evaluation Form".**
**It is compulsory for the supervisor/examiner to give the overall comments for the research projects with A- and above or F grading.