



Understanding the Relationship Between Mindfulness, Problematic Smartphone Usage, and  
Psychological Well-being in Young Adults

Carlos Feitosa

18106242

Supervisor: Dr. David Mothersill

B.A. (Hons) in Psychology

National College of Ireland

March 2022

## Submission of Thesis and Dissertation

National College of Ireland  
Research Students Declaration Form  
(Thesis/Author Declaration Form)

Name: Carlos Feitosa

Student Number: 18106242

Degree for which thesis is submitted: Bachelor of Arts Honours Psychology

Title of Thesis: Understanding the relationship between mindfulness,  
problematic smartphone use, and psychological well-being in young adults

Date: 14/03/2022

### Material submitted for award

- A. I declare that this work submitted has been composed by myself.
- B. I declare that all verbatim extracts contained in the thesis have been distinguished by quotation marks and the sources of information specifically acknowledged.
- C. I agree to my thesis being deposited in the NCI Library online open access repository NORMA.
- D. *Either* \*I declare that no material contained in the thesis has been used in any other submission for an academic award.  
*Or* \*I declare that the following material contained in the thesis formed part of a submission for the award of

*I declare that the following material contained in the thesis formed part of a submission for the award of QQI BA (Honours) Degree in Psychology at level 8*

Signature of research student: Carlos Feitosa

Date: 14/03/2022

### **Acknowledgement**

I would like to extend my gratitude to all those who helped make this project possible. In the first place, I would like to thank my grandmother, Veronica, who has always believed in me even at times when I did not. Our love and memories will always reside in my heart. I pray she rests in peace. Second, I would like to express my gratitude to my mother, Gizelle, for always providing me and my siblings with unconditional love and support, even through difficult times. I am grateful to my mother for always putting our needs first so that we could live a happy life. Look at me now, almost completing the final stages of my undergraduate degree thanks to her. In third place, I would like to thank my fantastic supervisor, Dr. David Mothersil. I really appreciate your patience and constant support making this academic work possible. Your positive attitude toward your students' success gave me strength throughout the current study. Additionally, I would like to thank each and every lecturer who has taught me skills that I will cherish forever. Last but not least, thank you to all those who took the time to participate in the current study, your contributions have been greatly appreciated.

**Table of Contents**

Abstract .....5

Literature Review.....6

    Mindfulness: Introduction.....6

    Problematic use of smartphones and psychological well-being in young adults: Problem...8

    The Addictive Nature of Problematic Smartphone Usage: Evidence.....9

    The benefits of mindfulness for psychological well-being: Solution .....11

    Research Aim and Hypothesis .....13

Methodology .....14

    Participants.....14

    Measures .....14

        Mindfulness.....14

        Problematic Smartphone Use.....15

        Psychological Well-being .....15

    Design .....16

    Procedure .....16

    Procedure and Ethical Considerations .....17

Results.....18

    Descriptive Statistics.....18

    Inferential Statistics .....19

Discussion .....20

Conclusion .....25

Bibliography .....27

Appendix.....41

    Appendix A.....41

    Appendix B .....44

    Appendix C .....45

    Appendix C .....48

    Appendix D.....49

### **Abstract**

In recent years, smartphones have become increasingly common in society, and with them have come a number of unintended consequences. The purpose of this study is to determine whether higher levels of mindfulness predict less problematic smartphone usage among young adults. Furthermore, this study examines the relationship between problematic smartphone usage and psychological well-being in young adults. Among young adults, higher levels of mindfulness were hypothesised to be associated with lower levels of problematic smartphone usage, while a lower level of smartphone usage was hypothesised to be associated with higher levels of psychological well-being. In total, 140 individuals aged 18 to 24 participated in the present study. Recruitment took place through an Instagram account and advertisements within a private company. The participants completed an online survey that included demographic questions, Five Facet Mindfulness Questionnaire, Problematic Smartphone Usage Measures and the short Depression Anxiety Stress Scale. The results of standard multiple regression analyses indicated that mindfulness predicted lower levels of problematic smartphone use, which is correlated with a higher psychological well-being. The results suggest that the public should become more aware of the benefits of mindfulness in order to prevent psychological problems associated with excessive smartphone usage.

## Literature Review

### Mindfulness: Introduction

Mindfulness involves being present and focused in the current moment (Schuman-Olivier et al., 2020). It is therefore important to pay attention to how the body feels, the sensations, thoughts, as well as what is occurring in the environment (Brewer, 2019). The benefits of mindfulness have been demonstrated in a variety of studies, such as reducing stress (Kriakous et al., 2021), improving psychological well-being (Lima & Mendes, 2020) and enhancing overall quality of life (Hearn & Cross, 2020). Recently, many studies have focused on the benefits of mindfulness for people struggling with stress during the COVID-19 pandemic (Behan, 2020; Conversano et al., 2020; Vatansever et al., 2021). A systematic review conducted by Behan (2020) found that mindfulness can reduce anxiety, depression, and pain. Additionally, the authors note that mindfulness increases the generation of new neural networks within the brain, which is a key factor in helping individuals cope with stress and emotions (Heuschkel & Kuypers, 2020). As a matter of fact, Regan et al. (2020) found that mindfulness lowers the psychological symptoms associated with excessive smartphone usage.

The majority of studies assessing mindfulness in recent years have relied on self-report questionnaires (Economides et al., 2018; Elhai et al., 2018; Regan et al., 2020). As a result, mindfulness questionnaires are of great value since they offer new options for further empirical research and their correlation with other aspects of psychological wellbeing (Bohlmeijer et al., 2011). Several studies have examined the level of mindfulness using the Five Facet Mindfulness Questionnaire (FFMQ) (Carpenter et al., 2019; de Bruin et al., 2012; Tran et al., 2013). Developed by Baer and colleagues (2006), the FFMQ consists of five categories: observation (noticing what is happening both externally and internally), description (putting feelings, thoughts, and experiences into words), awareness (paying

attention to the present moment), non-judgment (looking at feelings and thoughts without judging them), and non-reactivity (allowing emotions and thoughts to pass without being affected by them). Acting with awareness and non-judgment may have the greatest validity, as its description is more closely related to mindfulness training.

Research into mindfulness meditation has demonstrated a positive relationship between awareness and stress reduction (Janssen et al., 2018). The study by Donald et al (2016) has shown that awareness of the present moment enhances self-regulation abilities in stressful situations. According to Donald, et al. (2016), mindfulness is a way of reducing daily stress by being aware of what is occurring in the present moment. Through cognitive fusion and present-moment awareness, Yung and Jo (2017) suggest that mindfulness can reduce binge eating and depression. According to the website (2017), in order to practice mindfulness effectively, one must cultivate a sense of non-judgement and acceptance. Nevertheless, it can be argued that mindfulness is best defined as being aware of the present moment and observing one's feelings and thoughts without judging them (Weber, 2017). This type of mindfulness training will also allow young adults to reduce some of the stress caused by the misuse of technology and mobile devices (Mrazek et al., 2019). Despite this, very few studies have examined the connection between mindfulness and smartphone use among young adults. As the brains and behaviours of young adults undergo dramatic changes, it is imperative to understand what are the predictors of mindfulness related to their smartphone usage, which may affect their psychological well-being and behaviour (Casey et al., 2019).

Sawyer et al. (2018), for example, assert that people's perspectives, behaviours, and cognitive processes undergo significant changes during pre-adulthood, that is, between the ages of 18 and 25. It has become more apparent in recent years that young adults undergo a wide range of developmental transitions, including significant social role transitions. As a result of earlier puberty across virtually all racial groups, Sawyer et al. (2018) assert that the

end point of adolescence has increased well into the 20s. The effects of digital media and marketing have also been found to have contributed to a widening of the gap between childhood and adulthood as well as influencing how people perceive health and wellness (Sawyer et al., 2018).

### **Problematic use of smartphones and psychological well-being in young adults: Problem**

Young people and children are increasingly using smartphones in recent years (Twenge, 2020). Experts have expressed concern over "smartphone addiction" and problematic smartphone usage (PSU) among young adults (Elhai et al., 2019; Fischer-Grote et al., 2019; Twenge, 2020; Wacks & Weinstein, 2021). Researchers have demonstrated that PSU may be caused by psychological dependence, which may result from the inability to control its use, such as internet addiction or social media addiction (Harris et al., 2020). In recent decades, a number of studies have examined the prevalence of PSU among young adults (Sohn et al., 2019; Wang et al., 2020; Yang et al., 2020). In a study by Tangmunkongvorakul et al. (2019), 366 young adults aged 18 to 24 were categorised as excessive smartphone users, while Twenge and Campbell (2019) examined a larger sample and found that 48% of participants used their smartphones for over five hours per day, and those who participated had more suicidal symptoms such as depression and previous suicide attempts. Research has linked PSU to anxiety and depression (Hussain et al., 2020; Marino et al., 2021). The relationship between mental well-being and mental symptoms has not been well investigated. Findings from Guo et al. (2020) suggest PSU is associated with lower levels of mental wellbeing. Halluer et al. (2022) found positive associations between mindfulness and decreased PSU, which led to decreased depression and anxiety symptoms, as was anticipated by Gou and colleagues (2020). Furthermore, PSU has been found to impair young adults' mental health and behaviours, as well as their academic performance and relationships with others (Melcher et al., 2020).



The study by Lepp et al. (2014) notes that college students have adapted rapidly to smartphones, which may negatively affect their health and behaviour as a result of excessive use. The authors suggest that today's smartphones are like having a computer in your pocket due to similar functions such as simple internet access, texting, e-mailing, video conferencing, sharing videos, photos, and other software-driven applications. Since smartphones are accessible and can be accessed anywhere and anytime, Lepp et al. (2014) point out that it is vital to consider how smartphones will affect students' behaviour, beliefs, and attitudes. In their study, Lepp and colleagues suggest that unrestricted smartphone use has an impact on human behaviour beyond merely communications. Based on their earlier study conducted in 2013, it was concluded that students' physical fitness was adversely affected by excessive smartphone usage. The study by Lepp et al (2014) found that excessive smartphone use adversely affects physical fitness in young adults, while the study by Grimaldi-Puyana et al (2020) used 306 college students between the ages of 19 and 25. Grimaldi-Puyana and co-workers determined that those with higher amounts of physical activity, lower moods, poor sleep quality, and sedentary behaviours are more likely to use smartphones. As problematic smartphone use is common in young adults, Hosen et al (2021) suggest psychiatric professionals, social workers, and activists should increase awareness of problematic smartphone use in young adults and encourage them to limit their use.

### **The Addictive Nature of Problematic Smartphone Usage: Evidence**

The use of the internet has demonstrated many benefits for users, however, there is a problem with problematic internet use (PIU) (Kim, 2019), which can lead to problematic smartphone usage (Hadlington, 2015). PIU has been described as excessive use that interferes with an individual's quality of life and daily functioning (Alheneidi et al., 2021a). People often use the internet to deal with psychological stressors and moods, which can predict problematic internet use (Alt & Boniel-Nissim, 2018). During the global COVID-19

pandemic, excessive internet use has been a concern to many people (Király et al., 2020).

According to Islam et al (2020), young adults were more vulnerable to PIU during the COVID-19 pandemic in Bangladesh. Further, they found that PIU was significantly correlated with low levels of physical activity, excessive use of social media, and smoking. However, although Islam et al (2020) demonstrated similar findings in a larger sample size, Xie (2021) demonstrated in a more recent study that PIU was associated with post-traumatic stress disorder (PTSD), depressive and anxiety symptoms among university students during the COVID-19 outbreak in China. The majority of research on the relationship between PIU and psychological well-being among young adults has been conducted in Asian countries (Alt & Boniel-Nissim, 2018; Kitazawa et al., 2018; Mamun et al., 2020). Despite the higher population density in Asian countries (Mohsin et al., 2021), the use of the Internet has also increased significantly in North America (Acuff et al., 2021) and Europe (Kuss et al., 2021). For example, during the United Kingdom COVID-19 lockdown, Deutrom et al (2021) stated that loneliness was negatively correlated with life satisfaction and positively correlated with PIU, which predicted cyber security behaviour. In spite of this, research indicates that PIU may also predict social media addiction, which appears to be prevalent among young adults.

In light of the increased use of the internet and smartphones, social media addiction has captured the attention of many researchers (Cheng et al., 2021; Hou et al., 2019; Sun & Zhang, 2021). Social media addiction is often compared to internet addiction since both share the same characteristic of excessive and uncontrolled use (Hawi & Samaha, 2019). Research on social media usage and mental health has shown that prolonged use of social media applications, such as Instagram, Facebook (Brailovskaia et al., 2019) and TikTok (Li et al., 2021), is associated with mental health problems. Due to the COVID-19 pandemic, a recent study by Marengo et al. (2022) found that young adults enrolled in distance learning had reduced opportunities to engage in in-person socializing, resulting in an increase in social

networking and instant messaging. Nevertheless, excessive social media use may lead to young adults' addiction to social media, which could result in psychological problems and problematic smartphone usage (Rozgonjuk et al., 2018; Zhao & Zhou, 2020). Among early to late adolescents, Marengo et al. (2022) examined the influence of smartphone and social media applications. In their study, the authors found that adolescents who used smartphone applications like WhatsApp and YouTube reported lower levels of social media addiction. On the other hand, adolescents who engaged in Instagram, TikTok, or both were more likely to report high levels of social media addiction. With this in mind, the article highlights the detrimental effects that smartphone applications have on young adults (Rozgonjuk et al., 2018). During the COVID-19 pandemic, applications such as TikTok were reported to be the most addictive and commonly used applications among young adults (Li et al., 2021; Montag et al., 2021; Ostrovsky & Chen, 2020). In their study Morengo et al (2022) make an extremely worthy recommendation that more prevention campaigns be launched demonstrating the negative impacts of social media use on mental and physical health.

### **The benefits of mindfulness for psychological well-being: Solution**

Smartphone provides a number of distracting notifications that may lead to users wanting to use it for extended periods of time (Zarandona et al., 2019). Problematic smartphone usage interferes with an individual's daily routine (Fiorinelli et al., 2021; Zarandona et al., 2019). It has been demonstrated that uncontrolled use of modern technology has a negative impact on people's ability to concentrate (Hsieh et al., 2019; Kwon et al., 2022), which is essential to mindfulness (Beblo et al., 2018). Many studies in the fields of applied science and psychology suggest that the fixation on watching constantly changing videos, images, and messages may change how the brains function (Crone & Konijn, 2018; Tan et al., 2018). In recent years, attention spans have received a great deal of attention but little research has examined how inattention can prevent people from experiencing or

engaging in mindfulness practices (de Jong & van den Boer, 2021; Keller et al., 2019; Mormann & Russo, 2021). Sriwilai and Charoensukmongkol (2015) suggest that people are likely to lose their ability or desire to be present in the present moment due to prolonged or problematic use of social media. While Sriwilai and Charoensukmongkol make an interesting point regarding how the urge to use social media affects mindfulness, Weaver and Swank (2021) argue that the fear of missing out, FOMO, is a consequence of problematic social media and smartphone usage, which can interfere with individuals' ability to be aware and mindful in the present moment. In addition, studies have shown that this issue associated with being distracted and not being mindful of the present is generally more prevalent among young adults (Throuvala et al., 2020; Wimmer et al., 2019). According to Ostrovsky and Chen (2020), this issue is more prevalent in young adults because social media applications such as TikTok and Instagram provide features that are specifically targeted at young adults. Regan et al (2020) found that mindfulness can reduce smartphone usage and enhance psychological well-being as a possible solution to problematic smartphone use. Research into modern technology and social media is developing at a rapid pace, however, some researchers have attempted to introduce mindfulness-based techniques to help reduce the negative effects of problematic smartphone, internet, and social media usage (Goel & Gupta, 2020)

In recent years, mindfulness-based interventions have been used in several behavioural addiction studies to reduce symptoms of smartphone addiction, according to Lan et al (2018). Despite this, few studies have been conducted on the subject of smartphone addiction among young adults with social media addictions and internet addictions. Modern technology is developing at a rapid rate and new problematic factors keep cropping up (Lustgarten et al., 2020). It may be argued that due to this, there is currently a research gap in this area. In this context, Lan et al. (2018) investigated the effectiveness of group

mindfulness-based cognitive-behavioural interventions among college students who were addicted to their smartphones. Additionally, the authors discuss some other research studies that demonstrate the growth in popularity of smartphones during the past decade. Also, they discuss how smartphone addiction has become a critical issue worldwide. However, it is interesting to note that Lan et al. (2018) examined this issue among young adults and the importance of mindfulness in the prevention of it. Considering this, Prakash et al (2015) state that mindful awareness is crucial for young adults who wish to increase their emotional regulation abilities. Furthermore, daily mindfulness has been shown to have a positive impact on depression and anxiety caused by problems associated with the use of smartphones (Elhai et al., 2018).

### **Research Aim and Hypothesis**

An important gap exists in the literature that examines the relationship between mindfulness, problematic smartphone use, and psychological well-being. In recent years, the issue of problematic smartphone usage has increased, particularly among young adults (Twenge, 2020; Wacks & Weinstein, 2021). Social behaviours of young adults have changed significantly over the past decade, and excessive smartphone use and a lack of mindfulness can be cited as contributing factors (Marino et al., 2021; Prakash et al., 2017; Sawyer et al., 2018). The aim of this study is to determine whether higher levels of mindfulness predict less problematic smartphone use among young adults. Additionally, this study examines the relationship between problematic smartphone usage and psychological well-being in young adults. Considering the rapid changes that occur in the brain, behavioural, and social systems in the 18-24 age group, few mindfulness studies have focused on this group. Taking into account research gaps, this study is of considerable importance since it intends to investigate the impact of mindfulness on problematic smartphone use, which has been associated with stress, anxiety, and depression in young adults. The current question of study examines

whether mindfulness and problematic smartphone use are related, and if so, whether it is predictive of psychological well-being. Based on literature reviews, the present study will test the following hypotheses:

Hypothesis 1: Awareness predicts variation in PSUM.

Hypothesis 2: Nonjudgement predicts variation in PSUM

Hypothesis 3: Observation predicts variation in PSUM

Hypothesis 4: Describing predicts variation in PSUM

Hypothesis 5: Nonreactivity predicts variation in PSUM

Hypothesis 6: Mindfulness predicts variation in PSUM

Hypothesis 7: PSUM predicts variation in DASS

## **Methodology**

### **Participants**

A total of 140 participants aged between 18 and 24 made up the current research sample. The participants were recruited through an Instagram account using a convenience sampling method. To increase recruitment, the current study's survey was also advertised to employees within a private organization. Participants were only asked to provide age, gender, and occupation as demographic information. Participation in this study was restricted to people who were at least 18 years old as a result of ethical considerations. Participants gave informed consent prior to participating.

### **Measures**

#### **Mindfulness**

Traits of mindfulness was assessed using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al, 2006). FFMQ measures five aspects (or facets) of mindfulness: observation, description, aware actions, non-judgmental inner experience, and non-reactivity. A total of 39 items measures the five factors, with the results serving as an assessment of the

respondent's level of mindfulness and self-awareness. Using a Likert-type scale, participants rated how true given statements are about themselves (1= rarely true to 5= very often or always true). The Cronbach Alphas for each factor were as follows: Observation (8 items,  $a = .74$ ; e.g. "When I'm walking, I deliberately notice the sensations of my body moving"), describing (8 items, 3 of them been reverse scores,  $a = .87$ ; e.g. "I'm good at finding words to describe my feelings"), acting with awareness (8 item, all reversed scores,  $a = .89$ ; e.g. "When I do things, my mind wanders off and I'm easily distracted"), nonjudging (8 items, all reversed scores,  $a = .92$ ; e.g. "I criticize myself for having irrational or inappropriate emotions") and nonreactivity (7 items,  $a = .82$ ; e.g. "I perceive my feelings and emotions without having to react to them"). A Cronbach Alpha for all five facet added as one variable was  $.78$ . (Appendix C).

### **Problematic Smartphone Use**

Problematic smartphone use was measured by 23 items created by Kim (2017). Each of the 23 questions in the survey is designed to give respondents an indication of how often they engage in behaviours and thought patterns associated with problematic smartphone usage (1 = Never, 5 = Always). For example; I find it difficult to turn off my smartphone; I check my smartphone right after waking up; I feel lost without my smartphone; I am annoyed if others bother me when I am using my smartphone. The Cronbach Alpha for this survey was  $a = .75$ . (Appendix D)

### **Psychological Well-being**

The psychological well-being of participants was assessed with the 21-item Depression Anxiety Stress Scale, a short version of the original DASS (Lovibond & Lovibond, 1995). There are three subscales of seven items each, including depression, anxiety, and stress. The DASS-21 uses Likert-type ratings from "0 = Did not apply to me at all" to "3 = Applies to me very much or most of the time." The Cronbach Alphas for each of

the three subscales were .83 for depression, .84 for anxiety and .83 for stress. The total Cronbach Alpha as independent variable was .93. (Appendix E)

### **Design**

A cross-sectional qualitative study design was implemented in this study. Six predictor variables (PV) were used, which included awareness, nonjudgement, observation, describing, nonreactivity, and mindfulness. The criterion variables were problematic smartphone usage (PSUM) and psychological well-being (DASS). In order to assess the first, second, third, fourth, fifth, and seventh hypothesis, a standard multiple regression analysis was conducted. This research examined the associations between 1) awareness and problematic smartphone use 2) nonjudgment and problematic smartphone use 3) observation and problem, 4) describing and problematic smartphone use, 5) nonreactivity and problematic smartphone use, and 6) problematic smartphone use and psychological well-being. As for hypothesis six, a linear regression was conducted to analyse the relationship between problematic smartphone use and psychological well-being (DASS).

### **Procedure**

The current study was recruited through social media platforms and an advertisement placed in a private organization. Specifically, the survey was posted on Instagram and it was also advertised by the Human Resources Lead within a private company known as Verizon Connect. The International Human Resources Lead from Verizon Connect also provided a consent form for ethical reasons (see Appendix B). Before completing the questionnaire (see appendix A), participants were required to complete a consent form/information sheet, in which a brief description of the study and its goals was provided, as well as an expectation of how long the survey would take, which was between 10 to 15 minutes. Each participant was free to discontinue the survey at any time without incurring any consequences. This information was clearly stated in the consent form prior to proceeding with the survey. In the



consent form, all participants had to check a box that indicated that they had read and understood the terms and agreed to work collaboratively. They were also required to check a box to confirm that they were between 18 and 24 years of age and had smartphone. Upon reading the consent form, providing their content, verifying their age and smartphone use, participants were then able to complete the survey.

### **Procedure and Ethical Considerations**

The current study was recruited through social media platforms and an advertisement placed in a private organization. Specifically, the survey was posted on Instagram and it was also advertised by the Human Resources Lead within a private company known as Verizon Connect. The International Human Resources Lead from Verizon Connect also provided a consent form for ethical reasons (see appendix A). Before completing the questionnaire (see appendix B), participants were required to complete a consent form/information sheet, in which a brief description of the study and its goals was provided, as well as an expectation of how long the survey would take, which was between 10 to 15 minutes. Each participant was free to discontinue the survey at any time without incurring any consequences. This information was clearly stated in the consent form prior to proceeding with the survey. In the consent form, all participants had to check a box that indicated that they had read and understood the terms and agreed to work collaboratively. They were also required to check a box to confirm that they were between 18 and 24 years of age. Upon reading the consent form, providing their content and verifying their age, participants were then able to complete the survey.

According to the guidelines of the National College of Ireland, all data was collected in accordance with ethical considerations. It is important to note that all participants provided informed consent and were clearly informed of the risks and benefits of taking part in the study. There were no incentives to take part in the study. Furthermore, along with the

researcher's student email address and the research supervisor's work email, details of helplines were also provided, including The Samaritans and Niteline, in case of distress as a result of participation in the study

## Results

### Descriptive Statistics

The descriptive statistics were applied to all variables including awareness, nonjudgement, observation, describing, nonreactivity, mindfulness, PSUM and DASS. In addition to testing for normality, the results were presented as Means, Standard Deviations, Medians, and Ranges. An initial analysis of the data set showed that the continuous variables followed the assumptions of normality. A summary of the results is provided in Table 1.

Table 1: *Descriptive statistics for all continuous variables*

Variables	M (95% CI)	SD	Range
Age	21.09 (20.70, 21.50)	2.05	6
Gender	.65 (.56, .75)	.48	1
Awareness	14.09 (12.91, 15.28)	6.07	30.00
Nonjudgement	14.15 (12.79, 15.52)	7.02	32.00
Observation	19.76 (18.78, 20.74)	5.04	30.00
Describing	18.43 (17.27, 19.59)	5.67	32.00
Nonreactivity	13.63 (12.70, 14.56)	4.76	25.00
Mindfulness	80.07 (76.32, 83.82)	19.23	140.00
PSUM	84.08 (77.44, 90.71)	34.50	156.0
DASS	30.37 (27.5, 33.20)	14.61	59.00

### **Inferential Statistics**

Hypothesis One predicted an association between awareness and PSUM. An analysis of awareness was conducted using a standard multiple regression model with PSUM as the dependent variable. PSUM scores are significantly predicted by awareness scores ( $b=-.447, t=-5.053, p<.001$ ), with higher awareness scores predicting lower PSUM scores.

Hypothesis Two proposed that nonjudgment positively correlated with PSUM. In a standard multiple regression, it was found that nonjudgement scores significantly predicted PSUM scores ( $b=-.323, t=-3.451, p<.001$ ), with greater awareness scores predicting lower PSUM scores.

The third hypothesis proposed that the relationship between observation and PSUM is negatively correlated. The results of standard multiple regression analysis revealed that observation scores did not significantly predict PSUM scores ( $b= -0.031, t= -.312, p>.05$ ), with higher observation scores failing to predict lower PSUM scores.

In the fourth hypothesis, the correlation between describing and PSUM is negatively correlated. Based on a standard multiple regression analysis, the describing score did not significantly predict lower PSUM scores ( $b=-.177, t=-1.815, p>0.05$ ), with higher describing scores not predicting lower PSUM scores.

Hypothesis Five assumes that there is a negative correlation between nonreactivity and PSUM. Using standard multiple regression analyses, nonreactivity scores did not significantly predict lower PSUM scores ( $b= -.187, t= -1.918, p>.05$ ), with higher nonreactivity scores not predicting lower PSUM scores.

In Hypothesis six assumes that higher levels of FFMQ as an independent variable predicts variation in PSUM. In order to assess the total predictive impact of mindfulness on problematic smart phone usage, a total composite score of all mindfulness subconstructs was computed. A linear regression was undertaken to assess the relationship between total

mindfulness and problematic smart phone usage. A significant relationship exists between FFMQ scores and PSUM scores ( $b=-.367$ ,  $t=-.398$ ,  $p<.001$ ), with higher FFMQ scores predicting lower PSUM scores.

In Hypothesis seven, the relationship between PSUM and DASS was predicted. A standard multiple regression analysis was used to determine the relationship between PSUM and DASS. Results can be found in Table 6. A significant relationship exists between PSUM scores and DASS scores ( $b=.496$ ,  $t=5.764$ ,  $p<.001$ ), with higher PSUM scores predicting

### **Discussion**

The current study explored mindfulness, problematic smartphone use, and psychological well-being among young adults aged 18-24. In this study, the aim was to determine if mindfulness levels were associated with a decrease in problematic smartphone use and, if so, whether this decreased problematic smartphone use was associated with improved psychological well-being.

As a result of the first hypothesis, mindfulness comparison had a small, but positive association with lower levels of problematic smartphone usage. Suggesting that individuals who are more aware of the present moment are less likely to resort to problematic smartphone use. The second hypothesis was also confirmed: the results indicated that nonjudgment has a small, positive relationship with problematic smartphone use. It was found that individuals who maintain a positive mindset and refrain from allowing their inner critic to dominate their happiness are less likely to engage in problematic smartphone use. As support for the third hypothesis, the results demonstrated that observation was not related to problematic smartphone use. The fourth hypothesis was also supported by the findings, as describing was not correlated with problematic smartphone use. Based on the results of the fifth hypothesis, nonreactivity was not associated with problematic smartphone usage.

Results also supported the sixth hypothesis, FFMQ levels showed a small positive effect on

PSUM. These results indicate that those who are more mindful are less likely to engage in problematic smartphone behaviour. The seventh hypothesis was also supported and found to have a small positive impact on psychological well-being at lower levels of problematic smartphone usage. Therefore, the less an individual uses their smartphone in a problematic manner, the less likely they are to suffer from psychological issues such as depression, anxiety, and stress.

Research has found that higher levels of mindfulness are associated with decreased smartphone use (Regan et al., 2020). This finding is in line with previous research and supports the hypothesis. An understanding of mindfulness' effects on smartphone usage is crucial. By paying attention to the present moment, mindfulness reduces the severity of the risk factors involved in problematic smartphone use (Elhai et al., 2018; Regan et al., 2020). Recent research has shown that mindfulness, the ability to be present without judgment, can be a useful tool in combating a number of problematic behaviours (Prakash et al., 2017; Schuman-Olivier et al., 2020; Sriwilai & Charoensukmongkol, 2016). Regan et al. (2020), for instance, found that mindfulness led to a reduction in boredom, impulsiveness, and problematic use of mobile devices. As a result, mindfulness decreases boredom, impulsivity, and problematic smartphone use, which are the main causes of problematic smartphone use. Furthermore, when mindfulness is combined with another factor, it can also produce positive psychological changes (Regan et al., 2020a). According to research on this current study, mindfulness reduces smartphone use, which contributes positively to psychological wellbeing (Elhai et al., 2018a; Regan et al., 2020a). Halluer et al (2022) concluded that mindfulness is strongly associated with a decrease in problematic smartphone use, which results in a decrease in depression and anxiety symptoms.

A significant finding of the study highlighted the need to distinguish between different traditions of mindfulness. It was found that two aspects of the Five Face

Mindfulness Questionnaire appear to be more closely associated with problematic smartphone use than the other facets. Research has discovered that being mindful of the present moment, letting go of an inner critic and maintaining a positive outlook contribute to reducing smartphone usage (Elhai et al., 2018; Regan et al., 2020). Bauer et al. (2017) state that there are a number of factors why people spend an extended period of time using their smartphones, with messaging being one of the most important factors. According to Bauer et al. (2017), the use of instant messaging mindfully, nonjudgmentally, and with awareness was associated with improved well-being, as evidenced by higher levels of positive affect and lower levels of stress. According to this perspective, awareness and nonjudgment are much more likely to predict problematic smartphone usage than the other components of the FFMQ, such as observation, describing, and nonreactivity. This study provides an example of this perspective in that it found no association between the other components of the FFMQ (observation, describing, and nonreactivity), but awareness and nonjudgment did.

The findings, however, are consistent with previous research suggesting mindfulness is associated with reduced levels of problematic smartphone usage (Lan et al., 2018). It is critical to understand how mindfulness impacts smartphone usage. The ability to be mindful allows an individual to understand the various options associated with problematic smartphone usage, enabling the individual to choose the most productive, healthy, or useful behaviour (Regan et al., 2020). Many problematic behaviours can be predicted with mindfulness, which is simply paying attention to the present without judgment. According to Owen et al (2018), mindfulness (attention, nonjudgment, awareness, and describing) is all associated with reduced smartphone usage problems. It is evident that FFMQ and PSUM are influenced by the relationship between awareness and PSUM, as well as the relationship between nonjudgement and PSUM, since these are the two factors that have a significant impact on PSUM

Further, the findings of this study are consistent with and support previous research that suggests lower levels of problematic smartphone use are associated with better psychological well-being, such as depression and anxiety. It is very important to understand the impact of smartphone use on psychological well-being among young adults. Several social media apps are specifically designed to captivate the attention of young adults, making it difficult for them to avoid it (Marino et al., 2021). Consequently, excessive use of social media can result in mental health problems and problematic smartphone use (Weaver & Swank, 2021). In the current study, however, it was found that the less an individual uses their smartphone in a problematic manner, the less likely they are to experience depression, anxiety, and stress. In fact, Berg and Perich (2022) found that mindfulness practice via a smartphone application may reduce depression among young adults.

#### Implications

From an academic and practical standpoint, the findings of this study are important. While this study illustrates that different forms and directions of mindfulness may be able to help reduce problematic smartphone use, it also shows how using a smartphone in a nonproblematic way can enhance mental health. There is a need for more experimental research to investigate the effects of mindfulness on reducing smartphone use and psychological outcomes. Mindfulness, for example, is continuously present in individuals' daily lives. Simply taking a moment to be aware of what is happening in the present moment can significantly improve problematic behaviours and psychological outcomes. It is important to explore different research methods, such as experimental designs and longitudinal studies, in order to identify new research directions. In an experimental design, the effect of mindfulness could be studied by comparing a mindfulness group to a control group. For longitudinal research, examining mindfulness over multiple time periods can provide insight into the long-term effect of mindfulness on smartphone use and well-being.

This study is focused on young adults between the ages of 18 and 24 as studies have demonstrated that these individuals are still in the process of developing their brains (Brewer, 2019; Casey et al., 2019). The benefits of mindfulness for people of all ages have been shown to include a multitude of health benefits (Im et al., 2021). Therefore, there is a need for more studies to be carried out in older adults as their brain may already have reached its full maturity. Despite this, older adults report to have higher levels of stress compared to their younger counterparts (Bherer et al., 2013). This is one of the reasons why conducting experimental research testing the impact of mindfulness on smartphone usage in older adults and on their psychological well-being can be among the most significant findings.

#### Strengths and limitations

Research on mindfulness, problematic smartphone use, and psychological well-being can be conducted using many methods. However, in the current study, a survey method has been used to collect data. Using a survey method in the current study had many advantages. To begin with, it is a reliable survey given that peer-reviewed questionnaires (FFMQ, PSUM, and DASS-21) were used. This is due to a number of reasons, but the most significant is that survey questions are standardized and all respondents answer them the same way. Qualitative surveys on the other hand have a lack of consistency in comparison to quantitative surveys. Some quantitative surveys are also not as reliable as others. An inaccurately phrased question may lead to confusion on the part of the respondent, and a very long survey may demotivate the respondent from completing it accurately.

One of the strengths of this study is its cost-effectiveness. In order to gain responses, an online survey can be distributed on a variety of social media platforms. Today's society provides many opportunities for free publicity of surveys. For the current study, the survey was advertised on a free social media platform multiple times in order to influence respondents. Furthermore, by utilizing free survey-formatting platforms such as Google



Docs, the survey was cost-effective. With the assistance of Google Docs, the survey questions were grouped into a single survey format, making it easier for respondents to complete all survey questions associated with the current study. However, it is important to keep in mind that not everyone uses social media, so it is possible that the survey may not be available to all possible respondents in the age group of the study.

Despite the many strengths of the current study, there are still certain limitations. This study utilized peer review surveys for the collection of data. Three surveys were used because no one survey covered all aspects of the study, which included mindfulness, problematic smartphone use, and psychological wellbeing. Combining more than one survey can cause difficulties since each survey asks a different number of questions. When there are a large number of questions, respondents may become demotivated to provide accurate and honest responses. In this study, there may have been negative consequences associated with the survey's length. Therefore, it is important to keep the number of questions in a survey as low as possible in order to minimize time expenditure and ensure accuracy.

### **Conclusion**

This study contributes to the understanding of how mindfulness affects smartphone usage and psychological well-being. Based on the current study, higher levels of mindfulness are associated with lower levels of problematic smartphone usage. These findings have been supported by previous research. The findings of research also support the notion that higher levels of psychological well-being are related to lower levels of problematic behaviours. Studies in the future may utilize a new paradigm by developing a measure of mindfulness's impact or importance on smartphone usage and psychological well-being, rather than simply correlating mindfulness in problematic smartphone use and psychological well-being. Moreover, it is essential to conduct more experimental and longitudinal studies to better understand how mindfulness reduces smartphone usage and improves psychological

well-being, as well as how these effects progress over time. By establishing preventative measures and interventions in this manner, associated outcomes may be reduced. Smartphone usage is an evolving construct influenced by our surroundings, culture, and preferences. In view of the negative health outcomes associated with this topic such as depression, anxiety, and stress, it is important to continue updating knowledge and research on this topic. This wider implication of this study could lead to healthcare professionals, mentors, and teachers promoting awareness as well as encouraging mindfulness so that not just a person's mental well-being is improved, but also quality of life is improved.

### Bibliography

- Acuff, S. F., Pilatti, A., Collins, M., Hides, L., Thingujam, N. S., Chai, W. J., Yap, W. M., Shuai, R., Hogarth, L., Bravo, A. J., & Murphy, J. G. (2021). Reinforcer pathology of internet-related behaviors among college students: Data from six countries. *Experimental and Clinical Psychopharmacology*. <https://doi.org/10.1037/pha0000459>
- Alheneidi, H., AlSumait, L., AlSumait, D., & Smith, A. P. (2021a). Loneliness and Problematic Internet Use during COVID-19 Lock-Down. *Behavioral Sciences*, *11*(1), 5. <https://doi.org/10.3390/bs11010005>
- Alheneidi, H., AlSumait, L., AlSumait, D., & Smith, A. P. (2021b). Loneliness and Problematic Internet Use during COVID-19 Lock-Down. *Behavioral Sciences*, *11*(1), 5. <https://doi.org/10.3390/bs11010005>
- Alt, D., & Boniel-Nissim, M. (2018). Using multidimensional scaling and PLS-SEM to assess the relationships between personality traits, problematic internet use, and fear of missing out. *Behaviour & Information Technology*, *37*(12), 1264–1276. <https://doi.org/10.1080/0144929X.2018.1502353>
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment*, *13*(1), 27–45. <https://doi.org/10.1177/1073191105283504>
- Basch, C. H., Hillyer, G. C., & Jaime, C. (2020). COVID-19 on TikTok: harnessing an emerging social media platform to convey important public health messages. *International Journal of Adolescent Medicine and Health*, *0*(0). <https://doi.org/10.1515/ijamh-2020-0111>
- Beblo, T., Pelster, S., Schilling, C., Kleinke, K., Iffland, B., Driessen, M., & Fernando, S. (2018). Breath Versus Emotions: The Impact of Different Foci of Attention During

- Mindfulness Meditation on the Experience of Negative and Positive Emotions. *Behavior Therapy*, 49(5), 702–714. <https://doi.org/10.1016/j.beth.2017.12.006>
- Behan, C. (2020). The benefits of meditation and mindfulness practices during times of crisis such as COVID-19. *Irish Journal of Psychological Medicine*, 37(4), 256–258. <https://doi.org/10.1017/ipm.2020.38>
- Berg, D., & Perich, T. (2022). Use of mobile mindfulness apps in young adults with depression: Results from a cross-sectional survey. *Professional Psychology: Research and Practice*, 53(1), 42–49. <https://doi.org/10.1037/pro0000411>
- Bherer, L., Erickson, K. I., & Liu-Ambrose, T. (2013). A Review of the Effects of Physical Activity and Exercise on Cognitive and Brain Functions in Older Adults. *Journal of Aging Research*, 2013, 1–8. <https://doi.org/10.1155/2013/657508>
- Bohlmeijer, E., ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric Properties of the Five Facet Mindfulness Questionnaire in Depressed Adults and Development of a Short Form. *Assessment*, 18(3), 308–320. <https://doi.org/10.1177/1073191111408231>
- Brailovskaia, J., Margraf, J., Schillack, H., & Köllner, V. (2019). Comparing mental health of Facebook users and Facebook non-users in an inpatient sample in Germany. *Journal of Affective Disorders*, 259, 376–381. <https://doi.org/10.1016/j.jad.2019.08.078>
- Brewer, J. (2019). Mindfulness training for addictions: has neuroscience revealed a brain hack by which awareness subverts the addictive process? *Current Opinion in Psychology*, 28, 198–203. <https://doi.org/10.1016/j.copsyc.2019.01.014>
- Carpenter, J. K., Conroy, K., Gomez, A. F., Curren, L. C., & Hofmann, S. G. (2019). The relationship between trait mindfulness and affective symptoms: A meta-analysis of the Five Facet Mindfulness Questionnaire (FFMQ). *Clinical Psychology Review*, 74, 101785. <https://doi.org/10.1016/j.cpr.2019.101785>

- Casey, B. J., Heller, A. S., Gee, D. G., & Cohen, A. O. (2019). Development of the emotional brain. *Neuroscience Letters*, *693*, 29–34. <https://doi.org/10.1016/j.neulet.2017.11.055>
- Cheng, C., Lau, Y., Chan, L., & Luk, J. W. (2021). Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. *Addictive Behaviors*, *117*, 106845. <https://doi.org/10.1016/j.addbeh.2021.106845>
- Conversano, C., di Giuseppe, M., Miccoli, M., Ciacchini, R., Gemignani, A., & Orrù, G. (2020). Mindfulness, Age and Gender as Protective Factors Against Psychological Distress During COVID-19 Pandemic. *Frontiers in Psychology*, *11*. <https://doi.org/10.3389/fpsyg.2020.01900>
- Crone, E. A., & Konijn, E. A. (2018). Media use and brain development during adolescence. *Nature Communications*, *9*(1), 588. <https://doi.org/10.1038/s41467-018-03126-x>
- de Bruin, E. I., Topper, M., Muskens, J. G. A. M., Bögels, S. M., & Kamphuis, J. H. (2012). Psychometric Properties of the Five Facets Mindfulness Questionnaire (FFMQ) in a Meditating and a Non-meditating Sample. *Assessment*, *19*(2), 187–197. <https://doi.org/10.1177/1073191112446654>
- de Jong, P. F., & van den Boer, M. (2021). The relation of visual attention span with serial and discrete rapid automatized naming and reading. *Journal of Experimental Child Psychology*, *207*, 105093. <https://doi.org/10.1016/j.jecp.2021.105093>
- Donald, J. N., Atkins, P. W. B., Parker, P. D., Christie, A. M., & Ryan, R. M. (2016). Daily stress and the benefits of mindfulness: Examining the daily and longitudinal relations between present-moment awareness and stress responses. *Journal of Research in Personality*, *65*, 30–37. <https://doi.org/10.1016/j.jrp.2016.09.002>
- Economides, M., Martman, J., Bell, M. J., & Sanderson, B. (2018). Improvements in Stress, Affect, and Irritability Following Brief Use of a Mindfulness-based Smartphone App: A

Randomized Controlled Trial. *Mindfulness*, 9(5), 1584–1593.

<https://doi.org/10.1007/s12671-018-0905-4>

Elhai, J. D., Levine, J. C., & Hall, B. J. (2019). The relationship between anxiety symptom severity and problematic smartphone use: A review of the literature and conceptual frameworks. *Journal of Anxiety Disorders*, 62, 45–52.

<https://doi.org/10.1016/j.janxdis.2018.11.005>

Elhai, J. D., Levine, J. C., O'Brien, K. D., & Armour, C. (2018a). Distress tolerance and mindfulness mediate relations between depression and anxiety sensitivity with problematic smartphone use. *Computers in Human Behavior*, 84, 477–484.

<https://doi.org/10.1016/j.chb.2018.03.026>

Elhai, J. D., Levine, J. C., O'Brien, K. D., & Armour, C. (2018b). Distress tolerance and mindfulness mediate relations between depression and anxiety sensitivity with problematic smartphone use. *Computers in Human Behavior*, 84, 477–484.

<https://doi.org/10.1016/j.chb.2018.03.026>

Elhai, J. D., Levine, J. C., O'Brien, K. D., & Armour, C. (2018c). Distress tolerance and mindfulness mediate relations between depression and anxiety sensitivity with problematic smartphone use. *Computers in Human Behavior*, 84, 477–484.

<https://doi.org/10.1016/j.chb.2018.03.026>

Fiorinelli, M., di Mario, S., Surace, A., Mattei, M., Russo, C., Villa, G., Dionisi, S., di Simone, E., Giannetta, N., & di Muzio, M. (2021). Smartphone distraction during nursing care: Systematic literature review. *Applied Nursing Research*, 58, 151405.

<https://doi.org/10.1016/j.apnr.2021.151405>

Fischer-Grote, L., Kothgassner, O. D., & Felnhofer, A. (2019). Risk factors for problematic smartphone use in children and adolescents: a review of existing literature.

*Neuropsychiatrie*, 33(4), 179–190. <https://doi.org/10.1007/s40211-019-00319-8>

Goel, A., & Gupta, L. (2020). Social Media in the Times of COVID-19. *JCR: Journal of Clinical Rheumatology*, 26(6), 220–223.

<https://doi.org/10.1097/RHU.0000000000001508>

Grimaldi-Puyana, M., Fernández-Batanero, J. M., Fennell, C., & Sañudo, B. (2020). Associations of Objectively-Assessed Smartphone Use with Physical Activity, Sedentary Behavior, Mood, and Sleep Quality in Young Adults: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, 17(10), 3499. <https://doi.org/10.3390/ijerph17103499>

Hadlington, L. J. (2015). Cognitive failures in daily life: Exploring the link with Internet addiction and problematic mobile phone use. *Computers in Human Behavior*, 51, 75–81. <https://doi.org/10.1016/j.chb.2015.04.036>

Harris, B., Regan, T., Schueler, J., & Fields, S. A. (2020). Problematic Mobile Phone and Smartphone Use Scales: A Systematic Review. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00672>

Hawi, N., & Samaha, M. (2019). Identifying commonalities and differences in personality characteristics of Internet and social media addiction profiles: traits, self-esteem, and self-construal. *Behaviour & Information Technology*, 38(2), 110–119. <https://doi.org/10.1080/0144929X.2018.1515984>

Hearn, J. H., & Cross, A. (2020). Mindfulness for pain, depression, anxiety, and quality of life in people with spinal cord injury: a systematic review. *BMC Neurology*, 20(1), 32. <https://doi.org/10.1186/s12883-020-1619-5>

Heuschkel, K., & Kuypers, K. P. C. (2020). Depression, Mindfulness, and Psilocybin: Possible Complementary Effects of Mindfulness Meditation and Psilocybin in the Treatment of Depression. A Review. *Frontiers in Psychiatry*, 11. <https://doi.org/10.3389/fpsyg.2020.00224>

Hosen, I., al Mamun, F., Sikder, M. T., Abbasi, A. Z., Zou, L., Guo, T., & Mamun, M. A.

(2021). Prevalence and Associated Factors of Problematic Smartphone Use During the COVID-19 Pandemic: A Bangladeshi Study. *Risk Management and Healthcare Policy, Volume 14*, 3797–3805. <https://doi.org/10.2147/RMHP.S325126>

Hou, Y., Xiong, D., Jiang, T., Song, L., & Wang, Q. (2019). Social media addiction: Its impact, mediation, and intervention. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 13*(1). <https://doi.org/10.5817/CP2019-1-4>

Hsieh, Y.-P., Yen, C.-F., & Chou, W.-J. (2019). Development and Validation of the Parental Smartphone Use Management Scale (PSUMS): Parents' Perceived Self-Efficacy with Adolescents with Attention Deficit Hyperactivity Disorder. *International Journal of Environmental Research and Public Health, 16*(8), 1423. <https://doi.org/10.3390/ijerph16081423>

Hussain, Z., Wegmann, E., Yang, H., & Montag, C. (2020). Social Networks Use Disorder and Associations With Depression and Anxiety Symptoms: A Systematic Review of Recent Research in China. *Frontiers in Psychology, 11*. <https://doi.org/10.3389/fpsyg.2020.00211>

Im, S., Stavas, J., Lee, J., Mir, Z., Hazlett-Stevens, H., & Caplovitz, G. (2021). Does mindfulness-based intervention improve cognitive function?: A meta-analysis of controlled studies. *Clinical Psychology Review, 84*, 101972. <https://doi.org/10.1016/j.cpr.2021.101972>

Islam, Md. S., Sujana, Md. S. H., Tasnim, R., Ferdous, Most. Z., Masud, J. H. B., Kundu, S., Mosaddek, A. S. Md., Choudhuri, M. S. K., Kircaburun, K., & Griffiths, M. D. (2020). Problematic internet use among young and adult population in Bangladesh: Correlates with lifestyle and online activities during the COVID-19 pandemic. *Addictive Behaviors Reports, 12*, 100311. <https://doi.org/10.1016/j.abrep.2020.100311>



- Janssen, M., Heerkens, Y., Kuijer, W., van der Heijden, B., & Engels, J. (2018). Effects of Mindfulness-Based Stress Reduction on employees' mental health: A systematic review. *PLOS ONE*, *13*(1), e0191332. <https://doi.org/10.1371/journal.pone.0191332>
- Jo, D., & Yang, E. (2019). The role of present moment awareness and cognitive fusion with food craving in the relationship between depression and binge eating. *Journal of Contextual Behavioral Science*, *13*, 126–133. <https://doi.org/10.1016/j.jcbs.2019.08.001>
- Keller, A. S., Leikauf, J. E., Holt-Gosselin, B., Staveland, B. R., & Williams, L. M. (2019). Paying attention to attention in depression. *Translational Psychiatry*, *9*(1), 279. <https://doi.org/10.1038/s41398-019-0616-1>
- Kim, J.-H. (2017). Smartphone-mediated communication vs. face-to-face interaction: Two routes to social support and problematic use of smartphone. *Computers in Human Behavior*, *67*, 282–291. <https://doi.org/10.1016/j.chb.2016.11.004>
- Kim, J.-H. (2019). Longitudinal Associations Among Psychological Issues and Problematic Use of Smartphones. *Journal of Media Psychology*, *31*(3), 117–127. <https://doi.org/10.1027/1864-1105/a000234>
- Király, O., Potenza, M. N., Stein, D. J., King, D. L., Hodgins, D. C., Saunders, J. B., Griffiths, M. D., Gjoneska, B., Billieux, J., Brand, M., Abbott, M. W., Chamberlain, S. R., Corazza, O., Burkauskas, J., Sales, C. M. D., Montag, C., Lochner, C., Grünblatt, E., Wegmann, E., ... Demetrovics, Z. (2020). Preventing problematic internet use during the COVID-19 pandemic: Consensus guidance. *Comprehensive Psychiatry*, *100*, 152180. <https://doi.org/10.1016/j.comppsy.2020.152180>
- Kitazawa, M., Yoshimura, M., Murata, M., Sato-Fujimoto, Y., Hitokoto, H., Mimura, M., Tsubota, K., & Kishimoto, T. (2018). Associations between problematic Internet use and psychiatric symptoms among university students in Japan. *Psychiatry and Clinical Neurosciences*, *72*(7), 531–539. <https://doi.org/10.1111/pcn.12662>

- Kriakous, S. A., Elliott, K. A., Lamers, C., & Owen, R. (2021). The Effectiveness of Mindfulness-Based Stress Reduction on the Psychological Functioning of Healthcare Professionals: a Systematic Review. *Mindfulness, 12*(1), 1–28. <https://doi.org/10.1007/s12671-020-01500-9>
- Kuss, D. J., Kristensen, A. M., & Lopez-Fernandez, O. (2021). Internet addictions outside of Europe: A systematic literature review. *Computers in Human Behavior, 115*, 106621. <https://doi.org/10.1016/j.chb.2020.106621>
- Kwon, S. J., Kim, Y., & Kwak, Y. (2022). Influence of smartphone addiction and poor sleep quality on attention-deficit hyperactivity disorder symptoms in university students: a cross-sectional study. *Journal of American College Health, 70*(1), 209–215. <https://doi.org/10.1080/07448481.2020.1740228>
- Lan, Y., Ding, J.-E., Li, W., Li, J., Zhang, Y., Liu, M., & Fu, H. (2018). A pilot study of a group mindfulness-based cognitive-behavioral intervention for smartphone addiction among university students. *Journal of Behavioral Addictions, 7*(4), 1171–1176. <https://doi.org/10.1556/2006.7.2018.103>
- Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and Satisfaction with Life in college students. *Computers in Human Behavior, 31*, 343–350. <https://doi.org/10.1016/j.chb.2013.10.049>
- Li, Y., Guan, M., Hammond, P., & Berrey, L. E. (2021). Communicating COVID-19 information on TikTok: a content analysis of TikTok videos from official accounts featured in the COVID-19 information hub. *Health Education Research, 36*(3), 261–271. <https://doi.org/10.1093/her/cyab010>
- Lima, L. C., & Mendes, L. C. (2020). Mindfulness and Psychological Well-being: Effects of a Mindfulness-Based Health Promotion Program on Healthy Adults. *Trends in Psychology, 28*(2), 213–229. <https://doi.org/10.1007/s43076-020-00020-8>

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states:

Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33(3), 335–343.

[https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)

Lustgarten, S. D., Garrison, Y. L., Sinnard, M. T., & Flynn, A. W. (2020). Digital privacy in

mental healthcare: current issues and recommendations for technology use. *Current*

*Opinion in Psychology*, 36, 25–31. <https://doi.org/10.1016/j.copsy.2020.03.012>

Mamun, M. A., Hossain, Md. S., Moonajilin, Mst. S., Masud, M. T., Misti, J. M., & Griffiths,

M. D. (2020). Does loneliness, self-esteem and psychological distress correlate with

problematic internet use? A Bangladeshi survey study. *Asia-Pacific Psychiatry*, 12(2).

<https://doi.org/10.1111/appy.12386>

Marino, C., Canale, N., Melodia, F., Spada, M. M., & Vieno, A. (2021). The Overlap

Between Problematic Smartphone Use and Problematic Social Media Use: a Systematic

Review. *Current Addiction Reports*, 8(4), 469–480. [https://doi.org/10.1007/s40429-021-](https://doi.org/10.1007/s40429-021-00398-0)

[00398-0](https://doi.org/10.1007/s40429-021-00398-0)

Melcher, J., Hays, R., & Torous, J. (2020). Digital phenotyping for mental health of college

students: a clinical review. *Evidence Based Mental Health*, 23(4), 161–166.

<https://doi.org/10.1136/ebmental-2020-300180>

Mohsin, M., Kamran, H. W., Atif Nawaz, M., Sajjad Hussain, M., & Dahri, A. S. (2021).

Assessing the impact of transition from nonrenewable to renewable energy consumption

on economic growth-environmental nexus from developing Asian economies. *Journal of*

*Environmental Management*, 284, 111999.

<https://doi.org/10.1016/j.jenvman.2021.111999>

Montag, C., Yang, H., & Elhai, J. D. (2021). On the Psychology of TikTok Use: A First

Glimpse From Empirical Findings. *Frontiers in Public Health, 9*.

<https://doi.org/10.3389/fpubh.2021.641673>

Mormann, M., & Russo, J. E. (2021). Does Attention Increase the Value of Choice

Alternatives? *Trends in Cognitive Sciences, 25*(4), 305–315.

<https://doi.org/10.1016/j.tics.2021.01.004>

Mrazek, A. J., Mrazek, M. D., Cherolini, C. M., Cloughesy, J. N., Cynman, D. J., Gougis, L.

J., Landry, A. P., Reese, J. v., & Schooler, J. W. (2019). The future of mindfulness training is digital, and the future is now. *Current Opinion in Psychology, 28*, 81–86.

<https://doi.org/10.1016/j.copsyc.2018.11.012>

Ostrovsky, A. M., & Chen, J. R. (2020). TikTok and Its Role in COVID-19 Information

Propagation. *Journal of Adolescent Health, 67*(5), 730.

<https://doi.org/10.1016/j.jadohealth.2020.07.039>

Prakash, R. S., Whitmoyer, P., Aldao, A., & Schirda, B. (2017). Mindfulness and emotion regulation in older and young adults. *Aging & Mental Health, 21*(1), 77–87.

<https://doi.org/10.1080/13607863.2015.1100158>

Regan, T., Harris, B., van Loon, M., Nanavaty, N., Schueler, J., Engler, S., & Fields, S. A.

(2020a). Does mindfulness reduce the effects of risk factors for problematic smartphone use? Comparing frequency of use versus self-reported addiction. *Addictive Behaviors, 108*, 106435. <https://doi.org/10.1016/j.addbeh.2020.106435>

<https://doi.org/10.1016/j.addbeh.2020.106435>

Regan, T., Harris, B., van Loon, M., Nanavaty, N., Schueler, J., Engler, S., & Fields, S. A.

(2020b). Does mindfulness reduce the effects of risk factors for problematic smartphone use? Comparing frequency of use versus self-reported addiction. *Addictive Behaviors, 108*, 106435. <https://doi.org/10.1016/j.addbeh.2020.106435>

<https://doi.org/10.1016/j.addbeh.2020.106435>

- Rozgonjuk, D., Kattago, M., & Täht, K. (2018). Social media use in lectures mediates the relationship between procrastination and problematic smartphone use. *Computers in Human Behavior, 89*, 191–198. <https://doi.org/10.1016/j.chb.2018.08.003>
- Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health, 2*(3), 223–228. [https://doi.org/10.1016/S2352-4642\(18\)30022-1](https://doi.org/10.1016/S2352-4642(18)30022-1)
- Schuman-Olivier, Z., Trombka, M., Lovas, D. A., Brewer, J. A., Vago, D. R., Gawande, R., Dunne, J. P., Lazar, S. W., Loucks, E. B., & Fulwiler, C. (2020). Mindfulness and Behavior Change. *Harvard Review of Psychiatry, 28*(6), 371–394. <https://doi.org/10.1097/HRP.0000000000000277>
- Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry, 19*(1), 356. <https://doi.org/10.1186/s12888-019-2350-x>
- Sriwilai, K., & Charoensukmongkol, P. (2016). Face it, don't Facebook it: Impacts of Social Media Addiction on Mindfulness, Coping Strategies and the Consequence on Emotional Exhaustion. *Stress and Health, 32*(4), 427–434. <https://doi.org/10.1002/smi.2637>
- Sun, Y., & Zhang, Y. (2021). A review of theories and models applied in studies of social media addiction and implications for future research. *Addictive Behaviors, 114*, 106699. <https://doi.org/10.1016/j.addbeh.2020.106699>
- Tan, L., Ng, S. H., Omar, A., & Karupaiah, T. (2018). What's on YouTube? A Case Study on Food and Beverage Advertising in Videos Targeted at Children on Social Media. *Childhood Obesity, 14*(5), 280–290. <https://doi.org/10.1089/chi.2018.0037>
- Tangmunkongvorakul, A., Musumari, P. M., Thongpibul, K., Srithanaviboonchai, K., Techasrivichien, T., Suguimoto, S. P., Ono-Kihara, M., & Kihara, M. (2019).

Association of excessive smartphone use with psychological well-being among university students in Chiang Mai, Thailand. *PLOS ONE*, *14*(1), e0210294.

<https://doi.org/10.1371/journal.pone.0210294>

Throuvala, M. A., Griffiths, M. D., Rennoldson, M., & Kuss, D. J. (2020). Mind over Matter:

Testing the Efficacy of an Online Randomized Controlled Trial to Reduce Distraction from Smartphone Use. *International Journal of Environmental Research and Public Health*, *17*(13), 4842. <https://doi.org/10.3390/ijerph17134842>

<https://doi.org/10.3390/ijerph17134842>

Tran, U. S., Glück, T. M., & Nader, I. W. (2013). Investigating the Five Facet Mindfulness

Questionnaire (FFMQ): Construction of a Short Form and Evidence of a Two-Factor Higher Order Structure of Mindfulness. *Journal of Clinical Psychology*, *69*(9), 951–965.

<https://doi.org/10.1002/jclp.21996>

Twenge, J. M. (2020). Increases in Depression, Self-Harm, and Suicide Among U.S.

Adolescents After 2012 and Links to Technology Use: Possible Mechanisms.

*Psychiatric Research and Clinical Practice*, *2*(1), 19–25.

<https://doi.org/10.1176/appi.prcp.20190015>

Twenge, J. M., & Campbell, W. K. (2019). Media Use Is Linked to Lower Psychological

Well-Being: Evidence from Three Datasets. *Psychiatric Quarterly*, *90*(2), 311–331.

<https://doi.org/10.1007/s11126-019-09630-7>

Vatansever, D., Wang, S., & Sahakian, B. J. (2021). Covid-19 and promising solutions to

combat symptoms of stress, anxiety and depression. *Neuropsychopharmacology*, *46*(1),

217–218. <https://doi.org/10.1038/s41386-020-00791-9>

Wacks, Y., & Weinstein, A. M. (2021). Excessive Smartphone Use Is Associated With

Health Problems in Adolescents and Young Adults. *Frontiers in Psychiatry*, *12*.

<https://doi.org/10.3389/fpsy.2021.669042>

- Wang, C., Wen, W., Zhang, H., Ni, J., Jiang, J., Cheng, Y., Zhou, M., Ye, L., Feng, Z., Ge, Z., Luo, H., Wang, M., Zhang, X., & Liu, W. (2021). Anxiety, depression, and stress prevalence among college students during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of American College Health*, 1–8. <https://doi.org/10.1080/07448481.2021.1960849>
- Wang, J., Li, M., Zhu, D., & Cao, Y. (2020). Smartphone Overuse and Visual Impairment in Children and Young Adults: Systematic Review and Meta-Analysis. *Journal of Medical Internet Research*, 22(12), e21923. <https://doi.org/10.2196/21923>
- Weaver, J. L., & Swank, J. M. (2021). An Examination of College Students' Social Media Use, Fear of Missing Out, and Mindful Attention. *Journal of College Counseling*, 24(2), 132–145. <https://doi.org/10.1002/jocc.12181>
- Weber, J. (2017). Mindfulness is not enough: Why equanimity holds the key to compassion. *Mindfulness & Compassion*, 2(2), 149–158. <https://doi.org/10.1016/j.mincom.2017.09.004>
- Wimmer, L., Stockhausen, L., & Bellingrath, S. (2019). Improving emotion regulation and mood in teacher trainees: Effectiveness of two mindfulness trainings. *Brain and Behavior*, 9(9). <https://doi.org/10.1002/brb3.1390>
- Xie, X., Zhu, K., Xue, Q., Zhou, Y., Liu, Q., Wu, H., Wan, Z., Zhang, J., Meng, H., Zhu, B., & Song, R. (2021). Problematic Internet Use Was Associated With Psychological Problems Among University Students During COVID-19 Outbreak in China. *Frontiers in Public Health*, 9. <https://doi.org/10.3389/fpubh.2021.675380>
- Yang, J., Fu, X., Liao, X., & Li, Y. (2020). Association of problematic smartphone use with poor sleep quality, depression, and anxiety: A systematic review and meta-analysis. *Psychiatry Research*, 284, 112686. <https://doi.org/10.1016/j.psychres.2019.112686>

Zarandona, J., Cariñanos-Ayala, S., Cristóbal-Domínguez, E., Martín-Bezoz, J., Yoldi-

Mitxelena, A., & Hoyos Cillero, I. (2019). With a smartphone in one's pocket: A descriptive cross-sectional study on smartphone use, distraction and restriction policies in nursing students. *Nurse Education Today*, *82*, 67–73.

<https://doi.org/10.1016/j.nedt.2019.08.001>

Zhao, N., & Zhou, G. (2020). Social Media Use and Mental Health during the COVID-19 Pandemic: Moderator Role of Disaster Stressor and Mediator Role of Negative Affect. *Applied Psychology: Health and Well-Being*, *12*(4), 1019–1038.

<https://doi.org/10.1111/aphw.12226>



## Appendix

### Appendix A

Information Sheet.

Hello, I'm Carlos Feitosa and I'm a psychology student at the National College of Ireland. I would really appreciate it if you could answer a few questions for my final year dissertation. The purpose of this research is to find out whether higher level of mindfulness predicts less problematic smartphone usage in young adults. The study will also examine whether lower levels of problematic smartphone usage predict high levels of psychological well-being (anxiety, depression, and stress) in young adults.

This survey will be completely anonymous, and no other personal data will be gathered or stored. Confidentiality and privacy will be respected at all times. In this study, all participation is entirely voluntary. Up until the point when you click submit, you have the right to withdraw your data from the survey. Thereafter, your participation will be totally anonymous. It will not be possible to withdraw your data after you click submit. The data will be stored anonymously in an encrypted file on a password-protected laptop. Data obtained from this survey will be used anonymously in the current final year thesis submission.

Participants must meet the following criteria in order to take part in the survey:

- Participants must be aged between 18 and 24.
- Participants must own a smartphone

As you click the "agree" button in the bottom left-hand corner, you are agreeing to participate in the survey and to have read and understood these terms. Participating in this survey poses no known or foreseeable risks. Nevertheless, if you feel distressed as a result of this study, we will provide you with a list of helplines and support services. Contributing to this study is important as it will help us understand the relationship between mindfulness and smartphone usage. Also, you will be helping a final year student finish his thesis.

The survey takes around 10-15 minutes to complete, and you can save it and return to it at a later time.

Contact information

Please do not hesitate to contact me if you do not understand any part of the information sheet, if you would like more information or if you need further assistance.

Researcher: Carlos Feitosa  
Email: [x18106242@student.ncirl.ie](mailto:x18106242@student.ncirl.ie)

Supervisor: Dr. David Morthersill  
Email: [david.mothersill@ncirl.ie](mailto:david.mothersill@ncirl.ie)

Helplines:  
Samaritans: 116 123  
Niteline: 1800 793 793

Eligibility Consent \*

Am aged between 18 and 24.

I own a smartphone

In clicking agree, you confirm that you have read and understand the terms and conditions above, you understand that you can withdraw from the study at any point up until the point that you click submit, and you consent to participate in the study voluntarily. \*

Agree

Next

Clear form

### Demographic Information

Age in years \*

Your answer

---

Gender \*

- Female
- Male
- Prefer not to say

Occupation \*

- Student
- Employee

Back

Next

Clear form

## Appendix B



**Verizon Ireland Ltd**  
Erne Street Lower, Dublin Docklands  
Dublin, Ireland

**Private & Confidential**

15 November 2021

**Re: Research Support Letter**

To whom it may concern,

The purpose of this letter is to confirm support for Carlos Feitosa's academic research into the relationship between mindfulness and smartphone usage. Once Carlos' survey is ready for distribution, it will be shared with employees for optional participation.

Verizon HR would be keen to learn more about the results on the whole with a view to applying our learning to refining our internal wellbeing programmes.

Yours Sincerely,

A handwritten signature in black ink, appearing to read "Michael Arkins".

---

Michael Arkins  
International HR Lead  
Verizon Connect / Smart Communities / VSIL / VES  
Email: michael.arkins@verizonconnect.com  
Tel: (01) 4131250

Appendix C

Five Facet Mindfulness Questionnaire (FFMQ)

Please rate each of the following statements with the number that best describes <i>your own opinion</i> of what is <i>generally true</i> for you.		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 1	When I'm walking, I deliberately notice the sensations of my body moving. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 2	I'm good at finding words to describe my feelings. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 3	I criticize myself for having irrational or inappropriate emotions. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 4	I perceive my feelings and emotions without having to react to them. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 5	When I do things, my mind wanders off and I'm easily distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 6	When I take a shower or bath, I stay alert to the sensations of water on my body. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 7	I can easily put my beliefs, opinions, and expectations into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 8	I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 9	I watch my feelings without getting lost in them. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 10	I tell myself I shouldn't be feeling the way I'm feeling. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 11	I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 12	It's hard for me to find the words to describe what I'm thinking. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 13	I am easily distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 14	I believe some of my thoughts are abnormal or bad and I shouldn't think that way. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 15	I pay attention to sensations, such as the wind in my hair or sun on my face. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 16	I have trouble thinking of the right words to express how I feel about things. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 17	I make judgments about whether my thoughts are good or bad. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 18	I find it difficult to stay focused on what's happening in the present. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 19	When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 20	I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 21	In difficult situations, I can pause without immediately reacting. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 22	When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 23	It seems I am "running on automatic" without much awareness of what I'm doing. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 24	When I have distressing thoughts or images, I feel calm soon after. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 25	I tell myself that I shouldn't be thinking the way I'm thinking. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 26	I notice the smells and aromas of things. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 27	Even when I'm feeling terribly upset, I can find a way to put it into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 28	I rush through activities without being really attentive to them. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 29	When I have distressing thoughts or images, I am able just to notice them without reacting. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 30	I think some of my emotions are bad or inappropriate and I shouldn't feel them. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 31	I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 32	My natural tendency is to put my experiences into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 33	When I have distressing thoughts or images, I just notice them and let them go. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 34	I do jobs or tasks automatically without being aware of what I'm doing. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 35	When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 36	I pay attention to how my emotions affect my thoughts and behavior. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 37	I can usually describe how I feel at the moment in considerable detail. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 38	I find myself doing things without paying attention. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 39	I disapprove of myself when I have irrational ideas. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

**Scoring:**

(Note: R = reverse-scored item)

Subscale Directions	Your Score TOTAL	Your score item Avg.
<b>Observing:</b> Sum items 1 + 6 + 11 + 15 + 20 + 26 + 31 + 36		
<b>Describing:</b> Sum items 2 + 7 + 12R + 16R + 22R + 27 + 32 + 37.		
<b>Acting with Awareness:</b> Sum items 5R + 8R + 13R + 18R + 23R + 28R + 34R + 38R.		
<b>Nonjudging</b> of inner experience: Sum items 3R + 10R + 14R + 17R + 25R + 30R + 35R + 39R.		
<b>Nonreactivity</b> to inner experience: Sum items 4 + 9 + 19 + 21 + 24 + 29 + 33.		
<b>TOTAL FFMQ (add subscale scores)</b>		

**NOTE:** Some researchers divide the total in each category by the number of items in that category to get an average category score. The Total FFMQ can be divided by 39 to get an average item score.

## Appendix C

### Problematic Use of Smartphone Measure

#### Items

---

*How often do you find yourself in the following situations? (Never , Rarely , Sometimes , Often , Always )*

- I am annoyed if others bother me when I am using my smartphone.
- I become irritable if I have to turn off my smartphone for meetings, dinner engagements or at the movies.
- I feel anxious if I do not check for messages or calls on my smartphone for some time.
- When I can't use my smartphone, I obsess about checking my smartphone.
- I feel impatient when I am not holding my smartphone.
- I have my smartphone in my mind even when I am not using it.
- Even when I have other things to do, I find myself saying "Just a few more minutes" and continue to use my smartphone.
- I have tried to cut down the amount of time spent on my smartphone but failed.
- Compared to others, I spend more time on my smartphone.
- I lose track of time when I am using or playing with my smartphone.
- I find myself using smartphone for longer period than intended.
- My friends and family complain about the amount of time I spend on my smartphone.
- I find it difficult to turn off my smartphone.
- I have tried to hide from others how much time I spend on my smartphone.
- The time I spend on my smartphone has increased over the last 12 months.
- I prefer playing with my smartphone to intimacy with friends and family.
- I check my smartphone right after waking up.
- I feel lost without my smartphone.
- If I don't have my smartphone, my friends and family would find it hard to get in touch with me.
- There are times when I would rather use my smartphone than deal with other more pressing issues.
- I constantly check my smartphone so as not to miss any message.
- I can't imagine living without my smartphone.
- I look forward to playing with my smartphone.



**Appendix D**

<b>DASS21</b>	Name: _____	Date: _____			
<p>Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you <b>over the past week</b>. There are no right or wrong answers. Do not spend too much time on any statement.</p> <p>The rating scale is as follows:</p> <p>0 Did not apply to me at all          1 Applied to me to some degree, or some of the time          2 Applied to me to a considerable degree or a good part of time          3 Applied to me very much or most of the time</p>					
1 (s)	I found it hard to wind down	0	1	2	3
2 (a)	I was aware of dryness of my mouth	0	1	2	3
3 (d)	I couldn't seem to experience any positive feeling at all	0	1	2	3
4 (a)	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5 (d)	I found it difficult to work up the initiative to do things	0	1	2	3
6 (s)	I tended to over-react to situations	0	1	2	3
7 (a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8 (s)	I felt that I was using a lot of nervous energy	0	1	2	3
9 (a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 (d)	I felt that I had nothing to look forward to	0	1	2	3
11 (s)	I found myself getting agitated	0	1	2	3
12 (s)	I found it difficult to relax	0	1	2	3
13 (d)	I felt down-hearted and blue	0	1	2	3
14 (s)	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 (a)	I felt I was close to panic	0	1	2	3
16 (d)	I was unable to become enthusiastic about anything	0	1	2	3
17 (d)	I felt I wasn't worth much as a person	0	1	2	3
18 (s)	I felt that I was rather touchy	0	1	2	3
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20 (a)	I felt scared without any good reason	0	1	2	3
21 (d)	I felt that life was meaningless	0	1	2	3